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ABSTRACT

The impact of student and teacher mobility on New York City (NYC) public school outcomes was examined in the context of other variables known to affect school performance. Performance data on various state mandated tests and New York State Regents' examinations for the 1990-91 academic year, selected student and teacher demographics, and student mobility data for all NYC public schools were obtained from the State Department of Education and the NYC Board of Education. Data analyses were performed using the Statistical Package for the Social Sciences. High mobility rates in NYC are significantly related to low school performance on school outcome measures. High student mobility is consistently and highly associated with a low level of school performance at all levels. Although student mobility alone was highly correlated with elementary school and middle school performance, it was less important than such variables as attendance rate, poverty status, limited English proficiency, and the student and teacher minority composition. At the high school level, student mobility is more important. Teacher mobility, weakly but significantly related to school performance, was much less of a factor in determining school outcomes than student mobility. Ninety-five percent of NYC public schools had teacher mobility rates under 35 percent. Included are 7 tables and 43 references. (SLD)

The University of the State of New York
The State Education Department
Office for Planning, Research and Support Services

STUDENT AND TEACHER MOBILITY: IMPACT ON SCHOOL PERFORMANCE IN NEW YORK CITY PUBLIC SCHOOLS

THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department
Office for Planning, Research and Support Services
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HIGHLIGHTS

- High mobility rates in New York City public schools are significantly related to low school performance on the school outcome measures. The correlation coefficients indicate that the higher the mobility rate, the lower the percentage of students in a school scoring above the State Reference Point (SRP) on the Pupil Evaluation Program (PEP) tests and the preliminary competency tests, and the lower the percentage of students passing most Regents Competency Tests and Regents examinations, the fewer students earning Regents diplomas, the fewer students going to college, and the more students dropping out of school.

- Student mobility significantly differentiates school performance. The differences in school performance by schools with varying degrees of mobility are large enough to cause concern. Specifically, elementary and middle schools with low, medium and high mobility rates are likely to perform at different levels while high schools with mobility rates above 20 percent are likely to have significantly lower school performance on most high school outcome measures than those with mobility rates below 20 percent.

- Although student mobility alone was found to be highly correlated with elementary school performance (r= -.695) and middle school performance (r= -.618), it became the least important variable in explaining the differences in elementary and middle school performance after the effects of other variables, such as attendance rate, poverty status, limited English proficiency (LEP) and student and teacher minority composition, were accounted for.

- The implication of the regression results is that for elementary and middle schools, such factors as attendance rate, poverty status, LEP, and student and teacher minority composition, make such large differences in school performance that student mobility does not add significantly more to the explanation of the school performance differences. However, at the high school level, student mobility remains the most important variable after controlling for the same set of variables.

- Ninety-five percent of New York City public schools had teacher mobility rates under 35 percent. Teacher mobility was weakly but significantly related to school performance. However, compared to student mobility, teacher mobility is much less of a factor in determining school outcomes.

- The study indicates that student mobility in New York City public schools is a problem across all school levels, and that high student mobility has detrimental effects on high school performance and predicts high dropout rates.

INTRODUCTION

Each year in the United States, approximately one-fifth of the population changes place of residence. Frequent family moves cause the average child to change school several times during the course of his/her first 12 years of schooling. The latest census data show approximately 17.5 percent of school-age children and youth (ages 5 to 19) changing their places of residence annually (U.S. Bureau of the Census, 1991). Most of these moves are within the same county (11.6 percent); other moves are within the State (three percent), across states (two percent), and to and from abroad (0.5 percent). In many urban areas, school transfers occur at very high rates with some children transferring several times during one school year (Fernández, 1987).

In some schools in the cities of Rochester and New York, student mobility reaches as high as 112 percent each year (Schuler, 1990). In New York City, for example, the overall student mobility rate was 27 percent in 1991. According to a 1992 report by the New York State Education Department,[1] while the majority of the public schools outside New York City had stability rates of 81 percent or greater, only one percent of New York City public schools had a stability rate that high. The stability rates were even lower in New York City schools under registration review (SURR schools). Another Department profile[2] shows that more than 90 percent of the New York City SURR schools had stability rates of 70 percent or lower, 52 percent had stability rates of 60 percent or below, and 17 percent had stability rates at or below 50 percent. New York City also has a higher average teacher mobility rate (14 percent) than the State average (nine percent).

Families move for a variety of reasons. Sometimes, families move to better housing due to upward mobility and improvement in socioeconomic status. Other times, moving one's home is a forced choice caused by poverty, homelessness and family break up. High mobility rates are also associated with particular occupations, such as military service and migrant work.

High mobility is often associated with certain populations. In particular, households with children under six years of age are most apt to move (Hendrickson, 1967); families in poor housing areas move more frequently than those in average and good housing situations; students living with one parent or with no natural parents move from school to school more frequently than do children living with two parents. Families with limited financial resources move more frequently than families in other types of financial situations. Schuler (1990), for example, found that 58 percent of welfare families in an urban area moved at least once a year. Poor families move frequently to seek better housing or neighborhoods. This is due to economic reasons such as job changes, personal reasons such as wishing to be closer to relatives, or other reasons including conflicts with landlords or neighbors, demolished housing, and the splitting up of families. Across ethnic groups, Hispanic households were found to change residence more often than other groups (Sewell, 1982). In general, families in New York City often move for easier family living, more security, and better schools.

With families changing places of residence, children face problems of disruptions in school curricula, teachers, and social support systems. It is commonly believed that changing schools affects children both academically and psychologically. Highly mobile students are thought to be more educationally at-risk than their more stable counterparts. Similarly, schools with high percentages of transient students are found to be disadvantaged when aggregate test scores are used as indicators of school performance.

PURPOSE OF THE STUDY

The primary purpose of this study is to examine the impact of student mobility and teacher mobility on New York City public school outcomes. In particular, the impact of student mobility will be assessed in the context of other student and teacher variables that are known to affect school performance. A clear understanding of the effect of mobility is necessary for better interpreting school achievement data, and therefore making fair judgments of school effectiveness and improvement. More importantly, it will make schools more aware of the need to provide programs and services to make transitions for students who move as smooth as possible.

Sewell (1982) studied the relationship between student mobility and achievement test results in the Community School District 17 in Brooklyn, New York, and found that the predominantly Black and Hispanic district schools are not looking at the same population year after year. He concluded that some of the differences in achievement test scores among schools may be accounted for by analyzing the mobility factor, and others may also be traced to such factors as motivation, test-taking skills and attitudes. Fernández (1987) pointed out that poor performance in schools with high transient student populations is not so much a function of poor instruction, but rather is attributable to the lack of opportunity for some students to be exposed to the curriculum.

Compared to public schools in the rest of State, New York City public schools have higher student mobility rates, more minority students, more students with limited English proficiency, higher proportions of student populations from poor families, lower student attendance rates, lower levels of teacher experience, and higher proportions of teachers without permanent certifications. We also know that, compared with public schools in the rest of the State, New York City public schools have significantly lower levels of school performance as measured by standardized tests, and that the majority of the low-performing schools under the Department's review are in New York City. The Department has recently examined the relationship between selected student and teacher characteristics on school outcomes.

There is a need to further assess the relative importance of mobility and other variables in influencing school performance. A better understanding of the impact of student mobility is especially necessary for New York City public schools where student mobility is higher and school achievement is lower than the rest of the State.

To this end, this study attempts to answer the following research questions:

1) To what extent is student mobility related to New York City public school performance as measured by various State mandated tests and other school outcome variables?

2) To what degree does student mobility differentiate school outcomes?

3) To what extent does student mobility independently explain the variations in school outcomes when other student and teacher variables are controlled for?

4) To what extent does teacher mobility affect school performance?

PAST RESEARCH

The influence of student mobility on school achievement has been the focus of several studies. Yet the research findings are inconsistent. Most research studies indicate that high mobility negatively affects student achievement, particularly when students are from low-income, less-educated families. Other studies, however, show that mobility has no effects or differential effects for different student populations. Studies showing different results are reviewed below. The purpose of reviewing these studies is to evaluate the context within which these studies were conducted and, therefore, to decide whether the research findings are applicable to the present study. Relevant research findings can shed light on and help form a more sensitive approach to this study.

Schuler (1990) analyzed the relationship between excessive student mobility and academic achievement in the largest public school in the Rochester City School District where, in some schools, student mobility reaches as high as 112 percent each year. A mobile student is defined as a student who moved to a different school one time more than the number of years he/she was in school. The average percentiles of the test scores on the California Achievement Test (CAT) of 66 mobile students were compared to the total student population from grades 3 to 6, using data from 1986, 1987, and 1988. In his study, "traditional" classes -- those including only English-speaking students with one teacher all day and with no special education students -- were included. The study found a direct relationship between elementary school math and reading

scores, and family mobility. At every grade level (with the exception of 5th grade reading scores), the study found the mobile group scoring significantly lower than the total student population. For example, the average reading score for the mobile third-grader students was at the 32nd percentile, while the total 3rd grade average was at the 49th percentile. The researcher concludes that higher student mobility negatively affects student academic performance and greatly increases the chance that he/she will fail academically.

The 1991 Cohort Report on the four-year results for the class of 1990 by the New York City Board of Education found high student mobility to be one of the factors correlated with high dropout rates. Specifically, the Report shows that over 80 percent of those students who graduated within four years had attended only one high school, while 18.5 percent of those who graduated on time within four years attended two or more high schools; over 40 percent of the dropouts attended two or more high schools before dropping out. In addition, approximately one-third of the students who did not graduate within four years and are still enrolled in school had already attended two or more schools by 1990.

A study by the Cleveland Public Schools (1980) compared the characteristics and achievement levels of the most stable and most nonstable students. A stable student was defined as one who was enrolled in school for at least 178 days and did not transfer from one school to another. Students who, during this period, were not enrolled in school for at least 178 days, and who transferred to another school at least once, were included in the most nonstable group. The results indicated that, compared with nonstable students, stable students were more likely to: come from families with higher family income, and have higher attendance rates and lower suspension rates. They were less likely to have withdrawn from or dropped out of school, and more likely to have been promoted from grade to grade and to have received higher scores on reading achievement and mathematics.

Ingersoll and Others (1988) assessed the impact of student mobility on overall student achievement in urban Denver public schools. In their study, mobility was defined by student enrollment patterns from 1985 to 1987. Analysis of mean composite achievement scores at each grade level revealed highly significant statistical differences among the mobile and stable student groups. Specifically, achievement levels of the more stable student population were consistently higher than those of the mobile population. Even after controlling for the effect of student socioeconomic status (family in poverty), the negative effect of mobility still remained. The researchers concluded that geographic mobility is an aversive influence on student achievement. These aversive effects are most notable in the more unstable populations and persist even after controlling for socioeconomic status.

Sewell and Others (1982) found that the nonmobile students at all grade levels scored significantly higher than the national norm on the California Achievement Reading and Mathematics Tests, and higher than did the mobile group. The regression analysis indicated that, besides mobility, five other variables -- funded programs, types of schools, attendance, limited English proficiency, and discipline -- were also significant predictors of the test results. They concluded that mobility does affect reading and math achievement while remaining in one school results in significantly more gains in achievement over the more mobile pupils.

Other researchers, however, found that mobility had no effects on school outcomes. Using a sample of 315 students in a school with a total enrollment of 1,638, Fernández (1987) investigated the effect of student mobility on performance on the High School Proficiency Test (HSPT), a state-mandated graduation test in New Jersey. Student mobility was measured in three ways: by the type of mobility, the number of moves, and the number of consecutive uninterrupted years in the district. Mobility and other home factors were studied. The results indicated that mobility has little effect on achievement when other school and home factors are held constant. After controlling for the effects of school and family factors, none of the three mobility factors (type of transfers, number of transfers, and years in the district) were significantly related to HSPT performance. However, a set of school and family factors, including school behavior, attendance, and language spoken at home, was significantly related

to HSPT performance even when the other variables were held constant.

In a census data study of age-grade correspondence among students who had or had not experienced interstate migration, Long (1975) found no clear effects of mobility on achievement. However, when controlling for income and parental education, some evidence was found that those students who experienced interstate moves were less likely to be below grade level. Long also found an increased likelihood of below expected grade level assignment among children whose parents had not attended college. The researcher concluded that interstate moves are more likely among those with more education.

Still other researchers found that student mobility had differential effects for students at various ability levels. Whalen and Fried (1973), for example, identified highly mobile children who could be differentiated by socioeconomic status and intelligence. Their results indicated that mobility may exacerbate already existing differences among students. They concluded that high mobility had a different effect on different students. Specifically, they found that high IQ students with high mobility experienced increased achievement while low IQ students with high mobility had lower achievement.

In summary, the research studies reviewed here have shown inconsistent findings. The discrepancies among these research findings may be due to many factors, such as varying study designs, different student samples in different geographic settings, different definitions of mobility, varying degrees of control over such confounding variables as SES and IQ scores and different statistical procedures used. However, studies involving urban schools (Schuler, 1990; Ingersoll and Others, 1988; and Sewell and Others, 1982) have consistently shown that student mobility negatively affects student and school performance. These studies have also shown that besides mobility, other school and home variables, such as socioeconomic status, minority status, language proficiency, attendance, and discipline also have significant impact on achievement.

Research studies of the impact of teacher mobility on school achievement are very limited. A small scale study of the relationship between achievement level and teacher mobility in an urban school (Lawton, 1981) found no direct relationship between the two. However, the data did suggest that the basic skill departments, which were unstable and contained highly inexperience teachers, had the most difficulty teaching and disciplining students. In addition, students in the basic skills department scored lowest and failed more often than any other departments.

The inconsistent and conflicting findings make it difficult to generalize on the impact of mobility on school performance. A definitive answer about the effect of mobility for New York City public schools can only be provided through a direct study of the school system itself.

THE STUDY

The present study, using a quantitative research method, is a correlational and explanatory study. For this study, performance data on various State mandated tests and Regents examinations for the 1990-1991 academic year, a selected student and teacher demographics, and student mobility data for all New York City public schools were obtained from the New York State Education Department and the New York City Board of Education. Data files from the two sources were merged for statistical analyses. The data analyses were performed using the Statistical Package for the Social Sciences (SPSSX).

The dependent or performance outcome variables examined in the study include: percent of students scoring above the State Reference Point (SRP) on PEP reading and mathematics tests for elementary schools; percent of students scoring above SRP on the Preliminary Competency Test (PCTs) for middle schools; and percent of students passing Regents Competency Tests (RCTs) and the Regents examinations in mathematics and science, percent of average enrollment receiving Regents diplomas, percent of students going to college, and annual dropout rates for high schools. The independent variables include: student mobility rates, student minority composition, poverty status, Limited English Proficiency (LEP), average attendance rates, percent of permanent teachers, percent of minority teachers, and median years of

teaching experience. Student mobility rate is defined as the number of students who were not in school for the entire academic year. These students include those who were in the school by October 1, 1990 and left it prior to the end of the school year, those who entered the school on or after October 1, 1990 and remained until the end of the school year, and those who entered the school on or after October 1, 1990 and left the school prior to the end of the school year. Mobility rate is calculated by dividing the sum of the above mentioned students by the total enrollment.

The unit of analysis of this study is at the school level.[3] Three types of statistical analysis were performed. First, correlation analysis was performed to determine the relationships between the dependent[4] and independent[5] variables. Statistically significant associations established by the correlation analysis were used as a basis for further inferential analyses. Second, Oneway Analysis of Variance (Oneway) was used to determine whether schools with low, medium or high mobility perform at different levels, and how different the performances can be. Finally, multiple regression analysis was used to assess the independent impact of student mobility on school performance in the context of other student and teacher variables.[6]

RESULTS

The results are organized to provide answers to the three research questions posed by this study:

1. Correlation Between Student Mobility and School Performance

The overall student mobility rate for New York City public schools is 27.5 percent, ranging from 5.2 percent to 80.6 percent. However, the majority of the schools (88 percent) have student mobility rates below 35 percent; only two percent of the schools have mobility rates above 50 percent. Among the three school levels, high schools have the highest mean mobility rate (31 percent), compared to approximately 26.9 and 27.3 percent for elementary and middle schools, respectively. High schools also have the highest percent of schools (27 percent) in the high mobility category (36 percent and above), compared to 8 and 10 percent for elementary and middle schools, respectively, in the same category (Table 1).

Table 1
Mobility Rates in New York City Public Schools

School Level	Mean (%)	Range (%)	School's Mobility Rate		
			5% - 20%	21% - 35%	36% & Up
Elementary Schools	26.93	6.7 to 55.6	21	71	8
Middle Schools	27.34	8.1 to 56.5	19	69	10
High Schools	31.05	5.2 to 80.6	18	55	27
Total	27.54	5.2 to 80.6	20	68	12

Correlation analyses were performed to determine the relationship between student mobility rates and various school outcome variables.[7]

As shown in Table 2 (Column 1, Part II), the student mobility rate is significantly correlated with all school outcome variables, except for the RCT Writing and Regents examination in earth science. The correlation coefficients are beyond .50 between student mobility and the percent of students scoring above SRP on Grade 3 PEP reading and mathematics tests, Grade 6 PEP reading test, and PCT reading test. The correlation coefficients were even higher for percent of average enrollment passing the Regents examinations in sequential mathematics II (r= -.586), sequential mathematics III (r= -.685), biology (r= -.654), chemistry (r= -.713), physics (r= -.665), percent of students receiving Regents diploma (r= -.705), and dropout rates (r= -.676). The correlation coefficients are relatively low between mobility and the RCTs.

The negative signs of the significant correlation coefficients suggest that high mobility rates in New York City public schools are significantly related to low school performance on the school outcome measures. Specifically, the higher the mobility rate, the lower the percent of students in a school scoring above the SRP on the PEP tests and the PCTs, the lower percent of average enrollment passing most of the Regents examinations, the fewer students earning Regents diplomas, the fewer students going to college, and the more students dropping out of school. Larger values of correlation coefficients indicate stronger relationships between mobility and performance.

The results of the correlation analyses also indicate significant associations between student mobility and other independent variables examined in the study and among the independent variables (Table 2, Part I). The associations are especially high between mobility and student minority composition (r= .541), poverty (r= .505), and attendance rate (r= -.644); between student minority composition and poverty (r= .652); and, between medium years of teacher experience and minority teacher composition (r= -.506).[8] This means that schools with high mobility rates tend to have a large proportion of minority students, more students from poor families, and lower school attendance rates. At the same time, the minority students are more likely to come from poor families, and to be taught by minority teachers. In addition, minority teachers tend to have less teaching experience.

2. The Extent to Which Mobility Differentiates School Performance

Oneway tests were used to assess the extent to which mobility differentiates school performance.[9] To perform the Oneway test, all New York City public schools are grouped into low, medium, and high mobility groups. The low mobility group is defined by schools with 20 percent or lower mobility rates; the medium mobility group includes schools with mobility rates between 21 percent and 35 percent; and the high mobility group is composed of schools with 36 percent or higher mobility rates. (The mean *performance* of each group on all the school outcome measures is displayed in Table 3.)

Examination of the group means (Columns 1 to 3) shows that elementary and middle schools with low student mobility rates had averages of 83 to 94 percent of students scoring above the SRP on the PEP tests and the PCT tests, while elementary and middle schools with high mobility rates had averages of 54 to 78 percent of students scoring above the SRP on the same tests. High Schools with low mobility rates had between 32 to 42 percent of average enrollment passing the Regents examination in sequential mathematics II, sequential mathematics III, biology, chemistry, and physics. High schools with high mobility rates, on the other hand, had averages of two and six percent of average enrollment passing the same examinations. High schools with low mobility rates had a mean of 40 percent students receiving Regents Diploma and schools with high mobility rates had a mean of 4.4 percent. Significant F ratios (Column 4, Table 3) indicate statistically significant differences among the three groups.[10]

Table 2
Correlation Matrix

	1	2	3	4	5	6	7	8	9
Part I									
Intercorrelations Among Independent Variables									
1. Mobility									
2. Minority	.541								
3. Poverty	.505	.652							
4. LEP	.143	.227	.224						
5. Attendance	-.644	-.330	-.358	.076					
6. Pupil/Teacher Ratio	-.189	-.182	-.225	-.046*	.355				
7. Teacher Experience	-.302	-.416	-.310	-.149	.232	.136			
8. % Permanent Teachers	-.154	-.317	-.313	-.143	.175	.105	.262		
9. % Minority Teachers	.374	.677	.582	.151	-.270	-.069	-.506	-.291	
Part II									
Correlations Between Dependent and Independent Variables									
Grade 3 Reading	-.547	-.680	-.678	-.310	-.642	.162	.437	.223	-.638
Grade 3 Math	-.512	-.619	-.656	-.274	.618	.123	.402	.222	-.613
Grade 5 Writing	-.356	-.464	-.459	-.219	.414	.104	.310	.190	-.522
Grade 6 Reading	-.534	-.594	-.574	-.168	.668	.317	.295	.228	-.564
Grade 6 Math	-.497	-.531	-.518	-.072*	.674	.229	.313	.212	-.547
PCT Reading	-.648	-.635	-.648	-.359	.718	.340	.269	.224	-.522
PCT Writing	-.467	-.465	-.447	-.185	.565	.164*	.245	.282	-.414
RCT Reading	-.218	-.355	-.240	-.352	.367	.172*	.258	.202	-.439
RCT Math	-.350	-.309	-.389	-.206	.453	-.004*	.181	.131	-.267
RCT Science	-.460	-.494	-.559	-.233	.538	.118*	.195	.151	-.382
RCT Writing	-.128*	-.262	-.249	-.211	.245	.249	.149*	.053*	-.305
Regents Math I	-.186	-.161*	-.230	-.069*	.376	-.092*	.054*	.192	-.056*
Regents Math II	-.586	-.386	-.337	-.044*	.546	.032*	.258	.130*	-.132*
Regents Math III	-.685	-.503	-.461	-.045*	.617	.079*	.340	.210*	-.350
Regents Earth Science	-.052*	-.089*	-.152*	-.059*	.251	-.114*	-.044*	.108*	.014*
Regents Biology	-.654	-.412	-.397	-.187*	.570	.060*	.334	.154*	-.233
Regents Chemistry	-.713	-.500	-.452	-.179*	.609	.062*	.343	.165*	-.344
Regents Physics	-.665	-.448	-.410	-.199*	.577	.388	.302	.158*	-.311
Regents Diploma	-.705	-.547	-.501	-.215*	.649	.538	.385	.271	-.405
College Going Rate	-.460	-.218	-.170*	-.214*	.415	.433	.337	.040*	-.121*
Dropout Rates	-.676	-.240	-.151*	-.028*	-.613	-.287	-.239	-.189	.248

All correlation coefficients are statistically significant at .01 level or above, except for the ones with an *.

Table 3
Mean Percent Scoring Above SRP for PEP Tests, PCTs and Passing Regents Examinations by Mobility Rates

Outcome Variables	Mean Percent Passing: Low (1) Mobility (0-20%)	Medium (2) Mobility (21%-35%)	High (3) Mobility (36% & Up)	F Ratio	Scheffe Tests
Grade 3 Reading	82.9	62.8	54.1	91.18	3<2,1; 2<1**
Grade 3 Math	94.0	82.1	76.9	73.86	3<2,1; 2<1
Grade 5 Writing	92.6		74.4	41.48	3<2,1; 2<1
Grade 6 Reading	88.8	74.3	63.6	59.22	3<2,1; 2<1
Grade 6 Math	92.2	80.4	70.7	47.60	3<2,1; 2<1
PCT Reading	93.7	82.1	69.9	43.15	3<2,1; 2<1
PCT Writing	94.4	84.4	78.1	25.31	3,2<1
Sequential Math I	36.4	33.9	17.9	1.73*	N.S.***
Sequential Math II	36.6	14.2	5.2	24.00	3,2<1
Sequential Math III	35.4	9.8	3.4	29.69	3,2<1
Biology	41.7	14.1	5.9	30.87	3,2<1
Earth Science	24.0	20.4	22.9	0.06*	N.S.
Chemistry	41.0	10.2	3.5	35.19	3,2<1
Physics	32.0	6.3	1.9	24.39	3,2<1
Receiving Regents Diploma	40.0	13.0	4.4	34.59	3,2<1

Note: All F ratios are statistically significant above .001 level, except for the ones with *.
** Group 3 performs better than Groups 1 and 2; Group 2 performs better than Group 1.
*** Statistically nonsignificant.

Further, Scheffe tests[11] were performed to determine whether all three groups differed significantly from one another on the various State mandated tests and Regents examinations. The results (Column 5) confirm that elementary and middle schools with low mobility rates significantly out-performed schools with medium and high mobility rates on all PEP tests and PCTs. Elementary and middle schools with medium mobility rates, in turn, significantly out-performed those with high mobility rates on the same tests, except for the PCT writing test. High schools with low mobility rates had a statistically higher percent of average enrollment passing Regents examinations in sequential mathematics II, sequential mathematic III, biology, chemistry and physics, and also had a statistically higher percent of students receiving Regents diplomas than did high schools with medium and high mobility rates. The medium- and high-mobility groups did not differ significantly from each other on any of the high school outcome measures.

3. The Independent Impact of Mobility on School Performance

Multiple regression analyses were used to determine the independent impact of student mobility on school outcomes in the context of other student and teacher variables. Earlier correlation analyses indicated that student mobility, as well as other student and teacher variables, is significantly correlated with school outcomes. At the same time, some of these variables are also intercorrelated. These findings have formed the basis for selecting the independent variables to be included in the multiple regression analyses. Multiple regression analysis measures the effects of several independent variables on a dependent variable simultaneously. Therefore, it offers a fuller explanation of the relative importance of each independent variable while accounting for the effects of all other independent variables.[12]

Based on the high correlations among the school outcome variables at each school level (Table 4), three composite performance variables were constructed for use in the multiple regression analyses: Elementary School Performance, Middle School Performance, and High School Performance. The high correlations among the school outcome variables within each school level suggest that schools which perform well on one outcome measure tend to perform well on the others. For example, the high intercorrelations among the high school performance variables indicate that high schools with a large percentage of enrollment passing one Regents examination tend to have a large percentage of students passing all other Regents examinations and more students receiving Regents diplomas. For the same reason, mobility is consistently and highly associated with all high schools outcome variables. It is, therefore, reasonable and more efficient to use composite outcome variables instead of treating each test result as a separate outcome variable in the regression analyses.

Table 4
Intercorrelations Among School Outcome Variables

K to Grade 8:	1	2	3	4	5	6	7	8	9
1. Grade 3 Reading									
2. Grade 3 Math	.870								
3. Grade 5 Writing	.530	.530							
4. Grade 6 Reading	.721	.677	.513						
5. Grade 6 Math	.669	.676	.476	.861					
6. PCT Reading	-	-	-	.835	.790				
7. PCT Writing	-	-	-	.603	.580	.662			
8. RCT Math	-	-	-	-	-	.549	.414		
9. RCT Science	-	-	-	-	-	.593	.395	.781	

Grade 9 to Grade 12:	1	2	3	4	5	6	7	8	9
1. Regents Math I									
2. Regents Math II	.376								
3. Regents Math III	.547	.954							
4. Regents Biology	.357	.952	.952						
5. Regents Chemistry	.560	.951	.969	.966					
6. Regents Physics	.544	.923	.944	.935	.965				
7. Regents Diploma	.698	.917	.908	.949	.926	.870			
8. College Attendance	.496	.509	.467	.506	.489	.424	.520		
9. Dropout Rates	-.496	-.477	-.520	-.519	-.564	-.523	-.556	-.477	

All correlation coefficients are statistically significant at .01 level.

Five multiple regression analyses were performed, using the following dependent variables: 1) Elementary School Performance, 2) Middle School Performance, 3) High School Performance, 4) Percent of Students Receiving Regents Diplomas, and 5) Dropout Rates. Elementary School Performance is constructed by taking the average of the percent of students scoring above the SRP on Grade 3 PEP reading and mathematics tests; Middle School Performance by taking the average of the PCT reading and PCT writing tests; and High School Performance by the average enrollment passing Regents examinations in sequential mathematics I, sequential mathematics II, sequential mathematics III, biology, chemistry, and physics. Eight independent variables were included in the regression analyses: Student Mobility Rate, Percent of Minority Students, Poverty Level, LEP Status, Average Daily Attendance Rate, Percent of Minority Teachers, Median Years of Teaching Experience, and Percent of Permanent Teachers.[13]

The results of the multiple regression analyses are shown in Table 5. The Correlation Coefficients (r) in Column 1 (r) indicate the simple correlation between each independent variable and the school outcome variables when its effect is assessed without accounting for the effects of all other variables in the equation. The Part on Correlations in Column 2 reflect the relation of each independent variable with the school outcome variables when the effects of the other independent variables have been removed. As can be seen, the values of the Part Correlations are significantly smaller than the simple correlation coefficients, because of the intercorrelation among the independent variables. When the independent variables are interrelated, their effects on the school outcome variables are not independent of each other.[14] The relative importance of the independent variables in explaining the variations in school performance is reflected by the Beta value (Column 3).

As shown in Table 5, although student Mobility was found highly correlated with Elementary School Performance (r= -.695) when it was assessed independently, it became nonsignificant and the least important variable in explaining differences in elementary schools when the other independent variables were added to the equation. In other words, after removing the effects of the other independent variables, student mobility no longer plays a significant role in explaining variations in elementary school performance. Among the eight independent variables examined, five were found statistically significant (relative importance in descending order): Average Daily Attendance Rate, Student Minority Composition, Percent of Minority Teachers, Poverty Level, and LEP Status. Together, the eight independent variables explained 68 percent of the differences in Elementary School Performance. However, it is important to note that only those independent variables with significant Betas contributed significantly to the amount of variance explained.

A similar pattern was found for Middle School Performance. While Student Mobility alone was found to be highly correlated with Middle School Performance (r= -.618), it became nonsignificant and the least important variable in the presence of seven other student and teacher variables. Four out of the eight independent variables were found significant in explaining the variance in Middle School Performance. Again, Average Daily Attendance Rate was the most important variable in explaining the performance variance, followed by LEP Status, Poverty Level, and Student Minority Composition. Together, the set of independent variables explained 67 percent of the differences in Middle School Performance.

The regression results are different for high school outcomes. Three separate regression analyses were performed, using High School Performance in Regents examinations in mathematics and science, Percent Receiving Regents Diplomas, and Dropout Rates as the dependent variables. LEP and Percent of Permanent Teachers were dropped as independent variables because they were found nonsignificant in the simple correlation analyses. In all three regression analyses, Student Mobility was found to be the most important explanatory variable among the independent variables examined, with or without the presence of the other independent variables. In addition to Student Mobility, Student Minority Composition and Attendance Rates were also found to be statistically significant in explaining the differences in High School

Table 5
Results of Regression Analyses

	r	Part Corr	Beta	T Value	R2
1. **Elementary School Performance:**					
Attendance	.647	.158	.246	6.13*	
Minority	-.695	-.135	-.231	-5.23*	
% Minority Teachers	-.690	-.133	-.211	-5.17*	
Poverty	-.705	-.122	-.198	-4.73*	
LEP	-.341	-.135	-.142	-5.26*	
% Permanent Teachers	.220	.017	.082	0.67	
Teacher Experience	.438	.033	.040	1.30	
Mobility	-.695	-.003	-.004	-0.13	
					.678
2. **Middle School Performance:**					
Attendance	.710	.304	.462	6.42*	
LEP	-.368	-.178	-.193	-3.74*	
Poverty	-.659	-.128	-.192	-2.70*	
Minority	-.610	-.099	-.161	-2.09*	
% Permanent Teachers	.319	.062	.068	1.32	
Teacher Experience	.272	-.043	-.050	-0.91	
% Minority Teachers	-.533	-.030	-.049	-0.63	
Mobility	-.618	-.007	-.012	-0.17	
					.666
3. **High School Performance:**					
Mobility	-.761	-.343	-.572	-4.88*	
Minority	-.498	-.185	-.290	-2.63*	
Attendance	.684	-.141	.274	2.01*	
% Minority Teachers	-.308	-.097	.201	1.39	
Poverty	-.471	-.094	.184	1.34	
Teacher Experience	.306	-.056	.084	0.80	
					.644
4. **Dropout Rates:**					
Mobility	.774	.316	.526	5.31*	
Attendance	-.751	-.238	-.443	-3.99*	
Teacher Experience	-.141	.174	.224	2.93*	
Poverty	.498	-.111	-.197	-1.86	
% Minority Teachers	.375	-.094	.168	1.58	
% Permanent Teachers	-.295	-.085	-.106	-1.43	
Minority	.364	-.010	-.017	-0.17	
					.698
5. **% Receiving Regents Diplomas:**					
Mobility	-.687	-.266	-.442	-5.71*	
Minority	-.494	-.187	-.306	-2.64*	
Attendance	.635	.140	.260	1.95*	
Teacher Experience	.393	.127	.164	1.79	
% Permanent Teachers	.187	-.095	-.118	-1.33	
% Minority Teachers	-.389	.073	.131	1.02	
Poverty	-.470	-.057	.099	0.78	
					.565

* Statistically significant at .05 level and above.

Performance and Percent Receiving Regents Diplomas. Attendance and Median Years of Teacher Experience were two other significant variables in determining Dropout Rates. Together, the set of variables explained 64 percent of the variance in High School Performance, 57 percent of the variance in Percent of Students Receiving Regents Diplomas, and 70 percent of the Dropout Rates.

To summarize, the results from the regression analysis suggest that elementary schools with higher attendance rates, fewer minority students and teachers, lower poverty levels and fewer students with limited English proficiency had higher percents of students scoring above the SRP on Grade 3 PEP reading and mathematics tests than their counterparts. Similarly, middle schools with higher attendance rates, fewer students with limited English proficiency, fewer minority students, and lower poverty levels had higher percents of students scoring above the SRP on PCT reading and writing tests. However, it is important to emphasize that Student Mobility did not turn out to be a significant factor in the regression analyses, only because Average Daily Attendance was a stronger factor than Mobility, and that Mobility and Attendance were highly correlated with each other. Further analysis shows that without differences in Student Attendance Rates, Mobility becomes a significant factor in explaining differences in both elementary and middle school performance.

At the high school level, the regression results suggest that high schools with lower student mobility rates, higher attendance rates, and fewer minority students had higher percents of average enrollment passing the Regents examinations in mathematics and science and more students earning Regents diploma; high schools with higher mobility rates, lower attendance rates and teachers with fewer years of teaching experience had more students dropping out of school.

To answer the original research question on the independent impact of student mobility, student mobility does not independently influence elementary and middle school performance, while it does high school performance. It is reasonable to derive that, for elementary and middle schools, it is more important that students attend school than they stay in one school. At the high school level, however, it is essential that students both stay in one school and attend school more.

4. Teacher Mobility and School Performance

Finally, the relationships between teacher mobility and various school outcomes, and the extent to which teacher mobility affects school performance were examined. Teacher Mobility Rate, or Annual Teacher Turnover Rate, is expressed as the number of teachers who were employed in New York City public schools in 1989-90 but not in 1990-91 divided by the total number of New York City public school teachers employed in 1989-90.

The mean teacher mobility rate for New York City public schools was 18.67 percent. Although teacher mobility rates range from zero to 100 percent, 95 percent of the schools had teacher mobility rates below 35 percent; only one percent schools had teacher mobility rates ranging from 50 to 100 percent. Relatively speaking, middle schools have the highest teacher mobility with a mean of 21.43 percent, compared to 17.44 percent for elementary schools and 18.55 percent for high schools. Likewise, more middle schools (57 percent) had teacher mobility rates above the mean than either elementary schools (37 percent) or high schools (44 percent).

Correlation analyses were performed between teacher mobility rate and a selected number of school outcome variables. As shown in Table 6, the correlation coefficients between teacher mobility rates and all school outcome variables were low but significant, except for Regents examination in sequential mathematics I, English and high school dropout rates. The statistically significant correlations range from -.14 and -.27, with the correlation coefficients for Grade 3 Reading and PCT Reading being the highest ($r = -.27$). The negative correlation coefficients mean that higher teacher mobility is related to lower school performance.

Based on the results of significant correlations, Oneway Analysis of Variance (Oneway) was performed to determine the extent to which teacher mobility differentiates average performance by schools with low, medium and high teacher mobility. To perform Oneway, all New York City

Table 6
Correlation Between
Teacher Turnover Rates and School Outcomes

	Correlation	Probability
Grade 3 Reading	-.27	P<.000
Grade 3 Math	-.18	P<.000
Grade 5 Writing	-.14	P<.000
PCT Reading	-.27	P<.000
PCT Writing	-.22	P<.000
Regents Examinations in:		
Math I	-.07	N.S.
Math II	-.19	P<.014
Math III	-.25	P<.005
English	-.01	N.S.
Biology	-.21	P<.011
Chemistry	-.24	P<.010
Physics	-.25	P<.009
Regents Diploma	-.26	P<.004
Dropout Rates	.01	N.S.

N.S. means statistically nonsignificant.

Table 7
Mean Percent Passing PEP and Regents Examinations
By Teacher Mobility Rates

Outcomes	Mean % by Turnover Rate Low (1)	Medium (2)	High (3)	F Ratio	Scheffe Test
Grade 3 Reading	71.48	66.48	58.18	13.30	3<2,1*
Grade 3 Math	87.30	84.25	79.62	10.77	3<2,1
PCT Reading	87.25	85.35	78.16	11.66	3<2,1
PCT Writing	87.63	86.42	81.37	4.70	N.S.
Regents Exams in:					
Math II	37.50	15.54	10.85	5.57	3,2<1
Math III	32.00	13.04	8.00	4.90	3,2<1
Biology	40.38	16.56	11.87	6.06	3,2<1
Chemistry	36.25	13.93	9.16	5.13	N.S.
Physics	31.62	8.92	8.14	6.16	3,2<1
Regents Diploma	31.00	16.31	10.19	3.40	N.S.

All F ratios are significant at .01 level.
* Group 3 performs at lower level than Groups 1 and 2.

public schools were divided into three groups: the low teacher mobility schools (mobility rates ranging from 0 to 10 percent), the medium teacher mobility schools (mobility rates ranging from 11 to 24 percent), and the high teacher mobility group (mobility rates ranging from 25 to 100 percent). Examinations of the mean performances of the three groups on various school outcome variables showed that, as teacher mobility rate goes up, school performance goes down. For example, elementary schools with low teacher mobility rates had an average of 72 percent of students passing the State Reference Point on Grade 3 reading tests, while schools with high teacher mobility rates had an average of 58 percent passing rate. The Oneway results indicated by F ratios confirmed that the groups' differences on the school outcomes were statistically significant. The F ratios also indicated that relatively large differences were observed for Grade 3 reading test, Grade 3 math test and for the Preliminary Regents Competency Test in reading. Further tests (Scheffe tests) showed that, for the above three tests, the group of schools with the highest teacher mobility rates performed significantly lower than the groups with medium and low teacher mobility rates. Scheffe tests also indicated that the group with low teacher mobility rates out-performed the medium and high teacher mobility groups on Regents examinations in math II, math III, biology and physics (Table 7).

In summary, teacher mobility rates were weakly but significantly related to school performance. This means that knowing the variation in teacher mobility offers some information on the variation of school outcomes. However, compared to student mobility, teacher mobility is much less of a factor in determining school outcomes. This result can not be taken as to suggest that we can overlook the effect of teacher mobility in improving school learning conditions.

CONCLUSIONS

Based upon the findings of this study, several conclusions pertaining to New York City public schools can be made. First, high student mobility in New York City public schools is consistently and highly associated with a low level of school performance at all levels. At the high school level, high student mobility plays the most important role in predicting a low level of academic performance and high dropout rates. Low student attendance rates and high concentration of minority student population are two other major reasons for low school performance, while low student attendance and less experienced teachers explain much of the differences in school dropout rates. For elementary and middle schools, however, student attendance is the most important variable in determining school performance. In addition, elementary and middles schools with high poverty levels, a large minority student population, and a large number of students with limited English proficiency are likely to have low levels of school performance.

Second, the study further confirms that student mobility significantly differentiates school performance at all levels. Elementary and middle schools with low student mobility rates tend to significantly outperform those with medium and high student mobility; those with medium mobility rates, in turn, tend to perform significantly better than those with high mobility rates. In addition, elementary and middle schools with high mobility rates are most likely to perform below the SRP on PEP and PCT tests. High schools with less than 20 percent mobility rates tend to have more students passing the Regents examinations, more students earning Regents Diploma, and fewer students dropping out of school than those with mobility rates above 20 percent.

Third, teacher mobility in New York City public schools is weakly but significantly associated with school performance. High teacher mobility negatively affects school performance at all levels. However, compared with student mobility, teacher mobility is much less a factor in determining school outcomes.

Fourth, the effect of student mobility on school outcomes is likely to be compounded by high concentrations of poverty and as well as a high level of absenteeism. Schools with high student mobility rates also tend to have a high concentration of poverty and low attendance rates. It is reasonable to conclude that it is the combination of all those factors that causes the variations in school performance.

IMPLICATIONS

The findings of this study have several implications for New York City public schools as well as for the City's Board of Education. The most important implication of the study is that New York City public schools can help improve school performance by reducing mobility rates. Such purpose can be achieved cooperatively by the State Education Department, the New York City Board of Education, local schools, and other State and local agencies serving children and families. The following practices could be useful:

1. *An Electronic Record Transfer System*

One of the critical school administrative problems with mobile students stems from a lack of prompt transfer of student records. Students may be given inappropriate placement and even held back, while their receiving school waits three to five months for their records (Neuman, 1988, and Sewell, 1982). The State Education Department and the New York City Board of Education should help the City schools to set up an electronic record keeping and transferring system, so that records of mobile students can be transferred instantly to the receiving schools. This will help the teachers assess the new students' needs and provide the necessary social and academic assistance to the students.

3. *Uniform School Curriculum*

Frequent moves from one school to another hamper student academic progress, due to differences of school academic curriculum and policies. To help soften the impact of mobility on academic progress, the New York City Board of Education could consider a uniform school curriculum for the major academic subjects, such as reading, writing and mathematics. Since more than 80 percent of the student movement among New York City public schools is intra-district, streamlining school curriculum in basic skills areas would greatly mitigate the disruptive effects of students changing schools.

4. *Parent Education Programs*

Parent education programs that acquaint new parents with the effects of moving on their children's academic performance are important in reducing the mobility rates. School district newsletters disseminating research findings on the negative effects of mobility can be sent to parents. Letters to the parents from the receiving teachers, parent-teacher conferences, and school handbooks informing the parents of the new school's policies and procedures are also useful channels for such programs. A pilot study in Rochester suggests that schools can lower mobility rates by sending letters to the parents (in several languages) describing the negative effects of mobility on grades and graduation rates and helping parents solve landlord disputes or find housing nearby (Schuler, 1990).

5. *Meeting Family Needs by Working with Other Agencies*

Schuler (1990) maintains that mobility can be reduced by holistic programs that improve school climate and by enlisting other agencies to help change the conditions in the community and the attitudes of students and parents. Schools can expand their capacity to reduce student mobility by helping families. Research indicates that families who move their places of residence frequently are also likely to be poor. They often have to move because of a variety of problems, such as inability to pay rent, loss of job, or break up of the family. These families, therefore, often have multiple needs other than their children getting a good education. Schools can help these families by getting the assistance they need from other agencies serving children and families, such as housing, social service, and job-training agencies. Helping these families settle landlord disputes, finding other homes in the same school attendance area for those who must move, securing employment opportunities or job training opportunities will significantly reduce family mobility.

6. *A Comprehensive School Support System*

Although schools cannot correct the socioeconomic status and many other family background characteristics of the mobile students, they can control many aspects of mobile children's school experience, including adjustment to the new schools. Susan Holland-Jacobsen and Others (1984), in their writing about a child's successful adaptation to a new school, specified that three

basic tasks must be resolved: 1) the child must find an acceptable place among his or her new peers; 2) the child must be able to meet the academic and behavioral standards for his or her grade level in the new school; and 3) the child must be accepted by the teacher and as an appropriate member of the assigned class. Successful school practices for assisting all mobile students to adjust more easily to a new school and to perform up to potential include: making schools a welcoming place for newcomers through orientation and welcoming sessions; touring of the new school; helping the mobile students make new friends and join study groups; providing academic assistance to those who lag behind the school curriculum; and teaching adjustment and coping skills through counseling services.

7. *Raising School Attendance*

All schools should focus on raising school attendance rates. The more the students attend school, the more they will learn. Raising student attendance involves joint efforts by schools, parents, and the community at large. For example, schools should improve the learning environment so that they are safe, appealing and conducive to learning. Parents should be made accountable for sending their children to school and teachers accountable for informing the parents if their children skipped school.

8. *Stabilizing and Upgrading the Teachers*

Stabilizing and upgrading teachers in New York City public schools ought be one of the priorities for the school system. High teacher mobility rates in New York City public schools, coupled with other unfavorable school conditions, such as high percentage of unlicensed teachers, high percentage of teachers who were teaching outside their subject of certification, and less experienced teaching staff, will undoubtedly have detrimental effects on student learning. Strategies to retain teachers can be derived from the vast amount of theory and research studies on teacher retention available to date.

Chapman (1982, 1989), for example, has shown that current work conditions, satisfaction, and factors such as family formation are important influences on teacher retention. A recent longitudinal study by the National Center for Education Statistics (1991) found that economic and human capital variables played a large part in predicting retention in teaching. However, it found that the best predictors were primarily human capital variables. These human variables include number of years in teaching, satisfaction with the job, teaching in a public school, number of continuing education activities, and number of education credits. Alsalam and Hafner (1990) found that wages, opportunity costs, and other economic incentives have strong influences on teacher retention. Based on these research findings, strategies by New York City schools to recruit and retain quality teachers by improving their working condition, providing a quality teaching experience initially and frequent inservice training activities, and responding to teachers' personal needs would be theoretically sound.

In addition, in-service training sessions should be provided to teachers who serve mobile students, including those who are culturally different from themselves. Such training should include techniques to assess students' social and academic needs and work effectively with students and parents from diverse family backgrounds.

9. *Making Accurate Judgments of School Achievement*

In order to make a fair and accurate judgment of school quality and improvement, schools with high mobility rates should disaggregate student achievement data into mobile and stable student groups when analyzing their student performance data. In the instances of high mobility, the use of aggregate test results to measure school progress tends to underestimate the real effect of school improvement initiatives because such schools deal with very different student populations from year to year. Disaggregating data into mobile and stable groups produces more accurate pictures of student progress in the school and can help schools realize their weaknesses and strengths.

All of these implications may be very relevant to New York City in addressing the impact of high student mobility. They may not be necessarily appplicable to other stituations. A word of caution must be included against overgeneralizing the findings of this study. Since the study is based on

data from New York City public schools, the findings are applicable only to New York City public schools or urban schools with student, teacher and community characteristics similar to the New York City public schools. This study concludes that, the relatively low performance by New York City public schools, in comparison with schools in the rest of the State, is the function of a combination of many factors: high mobility, low school attendance, a large proportion of minority students who are also poor, a large percent of minority teachers who are also less-experienced, and more students with limited English proficiency. Such characteristics may or may not be typical of schools elsewhere. Thus, what is found true for New York City schools may not be true in schools with different characteristics or in schools where mobility does not pose a real problem.

Further, mobility itself entails different meanings. Mobility can be used to explain positive changes when it involves upward socioeconomic mobility and changes for the better. Mobility can also cause disorganization when it adversely affects mobile families. To provide a more accurate picture of what mobility does to school or student performance, future research should treat mobilities of different natures as separate variables rather than as one general variable. Future research should also use a variety of school outcome measures rather than rely solely on standardized tests as the indicators of school quality or school improvement. Standardized tests may not fully reflect local school curriculum or capture the educational impact of local school improvement efforts. Schools can best evaluate their strengths and weaknesses by using a combination of standardized tests and local assessments.

This study is only the beginning to explain what educational conditions and inputs are most likely to contribute to successful school outcome or the lack of it. Due to the limited data available for this study, many other variables that are known to be related to effective urban schools are not included. Further studies are needed to assess the effects of such variables as instructional leadership, teacher expectations, school learning environments, and emphasis on the acquisition of basic skills, and the use of school resources. Such studies will help policymakers at various levels understand the function of various educational inputs and processes better and, therefore, develop effective strategies to improve the City's public schools.

ENDNOTES

1. New York, The State of Learning: A Report to the Governor and the Legislature on the Educational Status of the State Schools, submitted February 1992.

2. Profiles of SURR Schools: 1989-90, 1990-91.

3. Theoretically, the lower the level of the unit of analysis, the more likely it is to detect real differences in academic performance among schools. Specifically, school level analysis is more advantageous than district level analysis, and student level analysis is, in turn, more advantageous than school level analysis in detecting differences in school performance. In district level unit analysis, differences among schools and individual students are ignored or balanced out. Further, data collected and analyzed at the district level cannot be used to make statements about individual schools or students, while student level data can be used to generate statements about school and district performance.

4. Dependent variables are also known as the criterion or outcome variables. They refer to the results or outcomes of the study. In this study, they are the test results, percent of students earning Regents diplomas, college-going rate, and dropout rates.

5. Independent variables that may cause differences or variations in the outcome variables, i.e., mobility, attendance and various student and teacher characteristic variables.

6. Unlike correlation analysis which measures the exclusive relationship between mobility and achievement, or oneway analysis of variance which measures the dispersion that mobility alone creates in school performance, multiple regression analysis is capable of measuring the effects or interactive effects of several independent variables on a dependent variable simultaneously, and determining the relative importance of one variable while controlling for the effects of all other independent variables.

7. Correlation analysis measures association between two variables. The degree of association between two variables is indicated by a correlation coefficient (r). A correlation coefficient is a decimal number, between .00 and +1.00, or .00 and -1.00. A coefficient of near .00 indicates no relationship, the further away from .00 the coefficient is, in either direction, (toward +1.00 or -1.00), the stronger the relationship. A coefficient of +1.00 or -1.00 indicates equally perfect relationship. As a rule of thumb, a correlation below .20 is considered weak and negligible for consideration in further analysis; a coefficient beyond .40 often serves as a focus of additional inferential research. A correlation coefficient with a significant level of .05 or .01 is statistically significant, depending on the criteria set for the study.

8. Statistically, a correlation coefficient squared indicates the amount of shared common variance between two variables. Common variance refers to the variation in one variable that is attributed to its tendency to vary with the other. For example, a shared common variance between mobility and dropout rates means that mobility alone accounts for 46 percent of the variance in dropout rates (Squared r of .675). However, due to the high intercorrelations among a number of student and teacher variables, the amount of common variance between mobility and school performance cannot be attributed to mobility alone. In other words, the amount of variance in school performance accounted for by student mobility is also shared by other student and teacher variables. The univariate associations established by the correlation analyses, however, provide a sound basis for further research and more powerful statistical analyses.

9. Oneway Analysis of Variance (Oneway) tests were used to assess the extent to which mobility differentiates school performance. Unlike correlation analysis which measures the association between two or more variables, Oneway tests measure differences between two or more group means. In this case, Oneway is used to test whether schools with low, medium, and high mobility rates tend to have different levels of school performance. The extent to which mobility rate differentiates school performance on a particular school outcome is indicated by an F ratio. The larger the F ratio, the larger the differences among the group means. Statistically significant F values ($p<.01$ or .05) indicate significant effect of mobility in differentiating school outcomes.

10. The F ratios (Column 4) indicate the extent to which student mobility differentiates school performance or the overall differences among the group means. Large F ratios reflect large differences among groups means. Statistically significant F ratios indicate that the differences among the group means are real and are not due to chance. As indicated by the F ratios, student mobility significantly distinguishes school outcomes, except for performance on PCT Writing and the Regents examination in earth science. That is, schools with low, medium and high mobility rates performed significantly differently on most of the school outcome measures. The relatively larger F ratios for elementary school outcomes indicate relatively larger overall differences among the three groups.

11. Scheffe tests measure the intergroup differences in the outcome variables.

12. Unlike research in natural sciences where one-to-one relationships between the cause and effect can be determined, the relationships among human factors in social science are almost always inexact. Few social phenomena are the product of a single cause or the independent effects of several variables added together. For example, variations in school performance are the function of many factors, such as student, teacher, or school factors. The function of these factors is seldom independent of one another. They are often interwoven with one another, making the explanation of independent effect of each single factor difficult. Multiple regression analysis makes such explanations easier by partitioning the effect of one factor while controlling for the effects of all other factors in the same equation.

13. The number of independent variables entered in each regression analysis is based on the univariate correlations between mobility and school outcomes. Nonsignificant independent variables are excluded from the equations.

14. The Beta in Column 3 show the relative importance of the independent variables in the equation. The larger the Beta, the more powerful the independent variable is in explaining the variations in school outcome variations. The T Values in Column 4 are tests of significance of the Beta values. Independent variables with statistically significant Beta are the ones that really explain the differences in school outcomes. R squared, or the coefficients of multiple determination (Column 5), indicates the amount of variance of each school outcome variable explained by independent variables in the equation.

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