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THE EFFECT OF STUDENT MOBILITY ON STUDENT ACHIEVEMENT

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ABSTRACT OF DISSERTATION

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The Graduate School

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THE EFFECT OF STUDENT MOBILITY ON ACADEMIC ACHIEVEMENT

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Education in the
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By
Lisa Eddy

Lexington, Kentucky

Director: Dr. Beth Rous, Professor of Educational Leadership

Lexington, Kentucky

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Student mobility and its relationship to academic success have been researched since World War II with varied findings (Goebel, 1978). Establishing the relationship between mobility and achievement is difficult due to the fact that mobility is related to many factors. Mobility has been found to be prevalent among students who traditionally demonstrate achievement gaps (specifically students of low-income status) (Long, 1992; Smith, Fien & Paine, 2008).

Mobility's relationship to achievement is complex. Led by a single definition of mobility, admittance to more than one school in the given district over the period of one academic year, this research study sought to determine the effect of mobility on academic achievement. Specifically, the research focused on mobility's effect on students classified as low-income and the effect of school mobility level on academic achievement of its students. This study used a quantitative design; student records were obtained for mobility data, and criterion referenced test scores in mathematics and language arts were utilized to measure academic achievement.

Findings revealed that mobile students performed below non-mobile students, low-income status affected mobile students negatively, and mobility level of the school attended had a negative effect on the academic achievement of its students.

KEYWORDS: Mobility, Student Mobility, Academic Achievement, Low-Income Status, School Mobility Level, Achievement Gaps

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THE EFFECT OF STUDENT MOBILITY ON STUDENT ACHIEVEMENT

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For Mark

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Chapter I

Introduction

As educators navigate the current era of high stakes accountability, the need to examine student achievement and factors that affect it has become critical. One factor that permeates American schools today is mobility, an increasingly pertinent characteristic of today's student. Titus (2007) stated that "with about one fifth of the population moving annually, (the United States) has one of the highest national mobility rates in the world" (p. 2). Further, Maxwell (2008) found when studying 86,000 students in New York City that "standard academic progress – defined as students being continuously enrolled and promoted each year to the next grade – was the exception not the rule" (p.2). The Columbus Foundation (2003) asserted that "researchers have found that student mobility has negative impacts on teachers, as well as on stable students" (p. 3). Because mobility is clearly evident in today's schools two questions arise: To what extent does it influence student outcomes? What do educators need to be doing to mitigate its effects?

The Influence of Mobility on Student Outcomes

Student mobility and its relationship to academic success have been researched since World War II with varied findings (Goebel, 1978). Establishing the relationship between mobility and achievement is difficult due to the fact that mobility is related to so many variables. For example, highly mobile students tend to be poor and come from single-parent families where the parents have low levels of education attainment (Long, 1992; Smith, Fien & Paine, 2008), and are more likely to be a minority and have a greater chance of qualifying for special education services (Columbus Public Schools, 2003).

Much of the early research reported mobility as having a negative effect on academic achievement (Dauber, Alexander, & Entwistle, 1993; Frankel & Forlano, 1967; Mantzicopoulos & Knutson, 2000; Rumberger, Larson, Palardy, Ream, & Schleicher, 1998; Straits, 1987). However, Heinlein and Shinn (2000) studied the relationship between school mobility and academic success in the sixth grade, while controlling for third grade achievement, and found no significant effect. Similarly, Strand (2002) discovered that when factors such as ethnicity, income level, and prior achievement as tested at age 7 were controlled, little or no effect was found. Paradoxically, in a follow-up study, Strand and Demie (2007) learned that the negative effect of mobility resurfaced when they controlled for prior achievement on subjects at age 11. This inconsistency of results is reason for closer examination of research design and further study.

Further research has revealed that assessing the influence of mobility on student achievement is more than just a dichotomous question, does mobility affect academic progress or not? For example, Paredes (1993) discovered mobility to have a significant effect specific to students at an early age, whereas other researchers found mobility to have an increased effect at a later phase (Strand & Demie, 2007). Additionally, Engec (2006) and the District Administration (2005) learned that as the rate of mobility increased, so also did the effect on academic progress (i.e., the more mobile a student was, the greater negative effect on subsequent test scores).

To add to the discussion on academic progress, in a somewhat surprising finding, mobility appeared to have a positive effect on retention rates (Engec, 2006; South, Haynie & Bose, 2007), and a positive effect on absenteeism while decreasing grade point average (GPA) (Felner, Primavera & Cauce, 1981). Furthermore, Levine, Wesolowski

and Corbett (1966) reported mobility had an adverse effect on citizenship. The Columbus Public School Project (2003) discovered that students who moved multiple times within the school year had a mean of 30.6 days of absence compared to 20.2 days for the non-movers.

Another variable to be considered when examining the effects of mobility is school climate, which can be profound and predictable (Chen, 2008). Chen further found that levels of criminal incidents at school increased when the combined impact of school size, mobility rate, and discipline issues were considered. When studying effects of student mobility on the classroom, distractions, discontinuity of instruction (Titus, 2007) and excess stress and expense on the staff to remediate and provide services (Slater, 2005) were noted consequences. Similarly, Brown and Beckett (2006) disclosed that schools with increased levels of student mobility had more behavior issues calling for a greater need for district-wide discipline policies.

Another indicator of academic success that has been demonstrated to relate to student mobility is dropout rate. Coleman (1988) recorded an average dropout rate of 11.8 percent in the United States, with rates varying widely across high schools. The District Administration (2005) reported that students who experienced mobility between first and eighth grade had a greater chance of not graduating from high school, even when eighth grade level of achievement was controlled.

In addition to the previously mentioned issues, in an age when educators are trying to close the achievement gap between racial/ethnic minorities and the White population, mobility has been found to be a contributing factor. Offenberg (2004) found that schools with characteristics typical of schools that indicate a need for improvement

revealed high rates of mobility. Dauber et al. (1993) found that the majority of schools with high mobility rates serviced low income, non-White students. Smith et al. (2008) found mobility to disproportionately affect students in impoverished schools.

Definitions of Mobility

An inherent problem in the issue of mobility is a focused definition. Paredes (1993) referred to student mobility as "the rate at which students move from one school community to another" (p. 1). Is this referring to a change of residence and thus a change in school, or is it simply a school change? Is this definition referring to how many times a student changes schools in one academic year and are planned promotional changes included? Is there a consideration of the mobility rate of the school as well as the student? Various studies on mobility have defined it as within-year transfers, between-year transfers, transfers outside of the original district, and transfers within a district. Some studies have included consideration of a residential move where others have not. Ligon and Paredes (1992) reviewed 62 formulas and definitions demonstrating the various ways mobility has been defined.

Alexander, Entwisle, and Dauber (1996) defined mobility as the number of school changes within a year whereas Heinlein and Shinn (2000) calculated the mobility rate over a span of years. The problem with looking at a span of several years is that this introduces a myriad of confounding variables. Was the initial transition difficult but followed by a year of stability when academic compensation and other stabilization factors entered in? Did the effects of mobility strengthen or wane over the ensuing years?

Another important factor to be taken into consideration is when to look at mobility in the life of the student. Demie (2002), Alexander et al. (1996), and Ingersoll, Scamman, and Eckerling (1989) all argue that mobility may have a specifically profound effect on young children. Alexander et al. (1996) note these students are just beginning to gain an "academic foothold" (p. 3) when disruption to the educational process occurs.

Recent studies on student mobility and its point of accountability in the learning paradigm have defined mobility as the number of student transfers within a district in a given time frame. This allows mobility to not be considered simply as a binary variable (mobile or not) but considered in degrees for more detailed analysis (Heinlein & Shinn, 2000). Another advantage of this definition (of limiting the time frame) is that confounding variables are minimized.

Operational Definition of Mobility

This study operationalized student mobility as admittance to more than one school in a given district over the period of one academic year. The dependent variable was scores on the standardized Mathematics and Language Arts tests administered each spring. The mobility rate was a variable where 1 corresponded to more than one admission, 0 corresponded to students who remained in the same school throughout the academic year. This study examined this variable for students in the fourth grade, with consideration of test scores from the third grade when studying the possible effect of previous achievement.

Rationale for the Study

Examination of mobility in the schools suggests two "very different migration streams" (Alexander et al., 1996, p. 6) of mobile students; the relatively wealthy on the

one hand and poor minorities on the other. A closer look reveals that typical characteristics of the highly mobile student include a Hispanic or Black heritage and eligibility for free or reduced lunch (U. S. Department of Education, 2002, as cited in Rumberger, 2003). Along that vein, Franke and Hartman (2003) noted: "frequent . . . school change is disproportionately experienced by students whom the educational system is most likely to fail: low-income, minority, immigrant, special education . . . and foster children" (p. 1). With this in mind, as educators work to mitigate the factors that adversely affect achievement for minority and impoverished students, mobility becomes a factor worthy of study.

Furthermore, in the era of No Child Left Behind, it is critical to examine the effects of mobility in the context of educational reform since mobility creates constant shifts in the student populations for whom the reform is designed. Further, these reforms are based on data drawn from these ever changing populations. Offenberg (2004) stated:

> Should a school be held accountable for all students present for assessment, even though many of their competencies were acquired elsewhere? The way these questions are addressed can lead to overestimating the effectiveness of schools by seriously undercounting students needing the most help, or by underestimating it and holding schools responsible for students whose achievement they had little opportunity to affect; neither is an appropriate policy. (p. 354)

If educators wish to bridge the achievement gap between minorities and whites and generate reform based on valid achievement scores, the issue of mobility in the student population requires further attention. Inconsistency of results in previous studies is another reason for closer examination of research design and further study.

Purpose of the Study

The purpose of this quantitative study is to add to the knowledge base on mobility and to examine further the relationship between mobility and academic achievement, specifically as it pertains to students with low income versus students not having low income status. Mobility plays a role in education today that is affecting the educational experience of students in many ways. It affects students of varying ages to varying degrees in a broad range of settings. The purpose of this study is to bring clarity to the role of mobility in schools today and its relationship to achievement. The following research questions were used to guide this project.

Research Questions

1. Is there a difference in academic achievement between mobile and non-mobile students?
2. Is there a difference in academic achievement of mobile students who are low income versus mobile students who are not? Does the effect of mobility on academic achievement vary according to student's income level?
3. Are there differences in academic achievement of fourth grade students based on the mobility level of the school they attend?

Summary

Mobility's relationship to achievement is complex. Led by a single definition of mobility, admittance to more than one school in the given district over the period of one academic year, this research study sought to determine the affect of mobility on academic achievement. This study used a quantitative design examining the relationship between mobility and academic achievement. Student records were obtained for mobility data, and

criterion referenced test scores in mathematics and language arts were utilized to measure academic achievement.

The organization for the remainder of the study is as follows: Chapter 2 reviews the literature for the study. Chapter 3 details the methodology for the study, and chapter 4 presents the results of the statistical data with data analysis. Chapter 5 discusses the results with recommendations for research and practice along with conclusions drawn from the study.

Chapter II

Literature Review

The purpose of this chapter is to review the scholarly literature on student mobility and its relationship to academic achievement. The literature review first examines the mobility studies over the last 50 years, organized by how mobility has been operationalized (see Table 2.1) with an operational definition given for this study. This is followed by a brief review of mobility studies organized by themes that emerged from the literature. Finally, a review is offered consistent with the conceptual framework of the study which examines the relationship between mobility and the social, emotional, and academic experience of the mobile student.

Table 2.1

Ways Mobility Has Been Operationalized

	Frequency	% found mobility had effect on achievement
Mobility represented by number of moves by student	10	90
Mobility in degrees	2	100
Unique Definition or formula given by researcher	22	82
Total	34	

Operationalizing Mobility

Part of the problem inherent in the issue of mobility is a precise definition (see Table 2.1). Paredes (1993) referred to student mobility as "the rate at which students move from one school community to another" (p. 1). Does this refer to a change of residence and a change of schools, or just a school change? Does this consider how many times a student changes schools in one academic year, and are planned promotional changes included? Is consideration being given to the mobility rate of the school as well as the student? Various studies on mobility have defined mobility as within-year transfers, between-year transfers, transfers outside of the original district, and transfers within a district. Studies have included a consideration of residential moves where some do not. Ligon and Paredes (1992) reviewed 62 formulas and definitions demonstrating the wide variety of ways to define mobility. As discussed in Chapter I and exhibited in Table 2.1, mobility has been defined in a number of ways in several studies. This review of the literature will consider operational definitions within five categories. These categories include mobility as defined by: (a) the actual number of school changes experienced by the student; (b) the level (measured by relative frequency) of mobility experienced by the student; (c) the distance of the move or moves made by the student (or student's family); (d) definitions unique to the researcher; and (e) the level of mobility as experienced by the school.

Many studies examined mobility based on the number of moves (between schools as reported in school records). Such studies predominantly found mobility to have a negative effect on achievement (Haveman, Wolfe, & Spaulding, 1991; Levine et al., 1966; Maxwell, 2008; Morris, Pestaner & Nelson, 1967; Nelson, Simoni, & Adelman,

1996; Strand & Demie, 2007; Temple & Reynolds, 2000). Levine et al. (1966) used descriptive statistics and studied elementary students in an urban elementary school in inner city New Haven, Connecticut (n= 574). These researchers found the number of previous schools attended to be negatively related to academic grades as recorded in report cards and citizenship marks. Morris et al. conducted their study with fifth grade students in an ethnically homogeneous sample from the suburbs of Northern California. Dependent variables included scores from the reading and arithmetic portions of the California Achievement Tests (CAT). Mobility was reported to be a detriment to achievement in reading but not with regard to mathematics. Haveman et al. looked at mobility in terms of number of moves for students aged 4-15 and found mobility to have a significant and negative impact on high school completion. Nelson et al. studied 2,524 elementary students from 24 schools over a three year period and found students that had moved two or more times over the three year span demonstrated significantly more behavioral problems (specifically absenteeism and tardiness) than their more stable peers.

Researchers have reported varied academic impediments due to mobility including delayed learning and lowered mathematics and reading achievement (Maxwell, 2008; Strand & Demie, 2007; Temple & Reynolds, 2000). Temple and Reynolds examined 1,087 students over the eight year period from kindergarten to seventh grade. Using ordered probit regression analysis, they reported that mobile students performed approximately one year behind non-mobile students; half of that difference was attributable to mobility. Strand and Demie studied over 6,000 urban English students using their national test scores from 1995, 1996, and 1997 to determine mobility effects. They found that the mobile group achieved significantly lower outcomes than the stable

group on all tests; the greatest effect was on math attainment. The most recent study that looked at number of moves was done by Maxwell; this was a longitudinal study of 86,000 students where their school experience from grade 1-8 was examined in the context of mobility. Results revealed only one third of mobile students finished the eighth grade on time.

Several studies have operationalized mobility in terms of level of mobility (i.e., high versus low mobility) (Astone & McLanahan, 1994; Columbus Foundation, 2003; Engec, 2006; Whalen & Fried, 1973). Whalen and Fried categorized mobility as high if the student had attended schools in four or more cities in the time frame studied; low, if the student had remained in the same city during the time frame of the study (one academic year). This study did comparisons of combinations where mobility level was paired with Intelligence Quotient (IQ). The combination of high mobility and high IQ was found to result in significantly higher achievement than the combination of high mobility and low IQ. Astone and McLanahan attributed levels of mobility as follows: 1= no mobility; 2 = one move; 3 = two moves; and 4 = three or more moves. Results from this study indicated mobility accounted for 18 percent of educational disadvantages experienced. The Columbus Foundation used three levels of mobility: no mobility, one move, and more than one move. Results from this study indicated mobility had a cumulative effect. Further, mobility led to increased absenteeism, and increased the likelihood the student would repeat a grade. Engec gave the variable of mobility three levels: one move, two moves and three or more moves. This researcher studied students enrolled in Louisiana Public Schools (N= 785,956). The dependent variable used in this study included criterion referenced and norm referenced test scores of students in grades

3, 5, 6, and 7. ANOVA results revealed "As the number of moves increased, the performance of students on the achievement test decreased" (p. 171).

The third category of definitions used in the study of mobility includes the distance of the move or moves made by the student (or student's family) (Adduci, 1990; Barrett & Noble, 1973).) Adduci looked specifically at some components involved with mobility including the distance of the move. While this study found no significant effect of mobility on achievement using a mandated High School Proficiency Test (HSPT) scores as the dependent variable, it did discover that mobility accounted for 1.8 percent more of achievement variance than the non-mobility factors (covariates examined in the study included family structure, primary language, and socio economic status).

Researchers that focused on long distance moves examined the effects of loss of social capital on achievement. Hagan, MacMillan, & Wheaton (1996) reported the negative effects of family migration were significantly more pronounced in families with uninvolved fathers and unsupportive mothers. Interestingly, Barrett & Noble (1973) found no basis for relating anxiety with long distance moves in upwardly mobile families with college educated heads of family. In order to be involved with the study, subjects must have moved a total of 50 miles or more.

Mobility has also been operationalized in a manner unique to the researcher based on the study they were conducting. Regardless of its definition, these studies confirmed the finding that mobility has a negative effect on academic achievement for the mobile student (Long, 1975; Offenberg, 2004; Simmons, Burgeson, Carlton-Ford, & Blyth, 1987). Offenberg (2004) used three categories of mobility: 1= students who moved out of the district in a three year span; 2= students who moved within the district during the

three year period; and 3= students who transferred into the district during the experimental timeframe. He examined the accuracy of judging an educational program by examining test scores of students in the program due to the extent of mobility in a given district. His results revealed that program quality could not be inferred from test scores. Long (1975) operationalized mobility based on the number of states that a school-aged child lived in and found that the greater the number of residences, the greater the likelihood of being enrolled below modal grade for age. Simmons et al. (1987) examined mobility within the context of several life changes and included residential mobility as well as transitioning from elementary school to a new junior high school in the operational definition of mobility. This was a longitudinal study that followed students from the sixth through the seventh grade and used self-esteem (as measured by the Rosenberg Self-Esteem Scale), grade point average and participation in extracurricular activities as the dependent variables. These researchers reported negative consequences for students coping with several transitions (stressors) concurrently. Finally, mobility has been operationalized from the perspective of the school (not the student) . Results regarding the effect of mobile students on the classroom as a whole are mixed. Bruno and Isken (1996) studied 1,030 students using the Comprehensive Test of Basic Skills (CTBS) as their dependent variable. Using a series of regression analyses they found that mobility had a statistically significant (negative) impact on educational attainment. Heywood, Thomas and White (1997) looked at the assumption that mobility influences the movers and examined the effect of mobility on the stable classmates. This study used a formula to calculate a mobility index:

Mobility Index = (A+L)/(S+A), where S = number of students on the school roster for at least 164 of the 180 school days, L = number of students initially on the school roster but left prior to the end of the school year, and A = the number of students who arrived after the third Friday of September.

Regression analyses were used to determine the effect of mobility on the school. No statistically significant results were found. Researchers posited that this may have been due to the fact that the achievement indices were low overall in the student sample.

For this study student mobility was operationalized as more than one school admission within the district over the period of one academic year (2007-2008). The dependent variable was scores on standardized Math and Language Arts tests administered annually in the spring. For mobility rate, 1 corresponded to more than one school attended during the 2007-2008 school year, 0 corresponded to non-mobile students (students who do not change schools during the 2007-2008 academic year). This study examined mobility for students in grade 4 (with consideration of test scores in grade 3 for comparison).

Categories of Findings

Four overall themes emerged from the literature on the relationship between mobility and achievement. Some researchers have found a negative relationship between academic achievement and mobility (Rumberger & Larson, 1996; Strand & Demie, 2007). Other researchers have found no relationship between the two variables (Adduci, 1990; Bollenbacher, 1962). There is evidence that mobility is one of several factors that emerge to create high risk for some students (Kerbow, 1996; Newman, 1988). Other

studies have focused on the emotional experience of mobility on students (Allan & Bardsley, 1983; Vail, 1996). A series of studies on mobility have considered the possibility that mobility has varied effects depending on the student's intelligence, prior achievement level, family stability, and socioeconomic status (Pribesh & Downey, 1999; Whalen & Fried, 1973). The proposed study employed the framework of studies used by Newman (1988) and Kerbow (1996) which examined the relationship between mobility and achievement, took covariates such as income level, ethnicity, and previous achievement levels into account, and considered school mobility levels.

Due to the various ways in which mobility has been defined and studied, it can present a challenge to educators in how to interpret the various findings to arrive at conclusions that can inform educational practice. If mobility was studied with more consistency regarding how it is operationalized and which statistics are used, findings may be more consistent in nature and helpful to educators as a result. The following section will present studies on student mobility according to the emergent themes from the results.

Mobility's Negative Effect on Achievement

A wide range of negative effects from student mobility have been demonstrated. These include lower scores on criterion and norm referenced tests, an increased likelihood students will drop out from high school, an increase in absenteeism, an increased chance of grade retention and lower citizenship evaluations. Ingersoll et al. (1989) explored the effects of geographic mobility in the multi-ethnic urban setting of the Denver public school system and found most negative effects of mobility were seen in early elementary grades. They further found the most significant effects on achievement

were among students who changed schools within the district during the academic year as opposed to students who were new to a school at the beginning of the school year. The loss of achievement was observed in scores from the Iowa Tests of Basic Skills (ITBS) for elementary students and the Tests of Academic Progress (TAP) for high school students which were administered annually. Differences in achievement between students who changed schools mid-year versus students that did not were statistically significant ($p < .001$). Vail (1996) found 41 percent of third graders who changed schools more than once during the academic year performed below grade level in reading compared to 26 percent of students who did not experience mobility. Similarly, 33 percent of mobile students scored below grade level in mathematics compared to 17 percent of those who had never changed schools. Heinlein and Shinn (2000) reported , consistent with Ingersoll et al.'s findings (1989), that mobility in the early grades was a more powerful predictor of achievement in the 6th grade than mobility in later grades.

Rumberger and Larson (1998) reported that high school students who had made even one non-promotional school change were less likely to graduate than their stable counter-parts. Schafft (2006) found a negative correlation between mobility and achievement in an urban district, where as mobility increased, achievement decreased, and a positive relation between the frequency of moves and the likelihood of lowered achievement. Similarly, Engec (2006) collected data from Louisiana public schools grades 1-12 to examine the effect of mobility on academic achievement. Using ANCOVAs to control for differences in ethnicity, gender and qualification for free or reduced lunch, findings indicated the impact of mobility was greater than either gender or poverty status (as measured by free or reduced lunch status).

A common practice in mobility research is to use grade point average (GPA) and standardized test scores to measure the impact of mobility on academic achievement. Using those indices, many researchers have found it to have a negative effect (Felner et al., 1981; Kerbow, 1992; Wood, Halfon, Scarla, Newacheck & Nissam, 1993). Felner et al. (1981) revealed that high rates of mobility correlated positively with poor academic performance, especially for Black and Hispanic students. Specifically, mobility translated to an increase in absenteeism for females and a decrease in GPA for Black females. Levine et al. (1966) found increased mobility related to decreased grades and citizenship.

Recent research has placed a focus on mobility to learn more about how and to what degree it impacts learning. Strand and Demie (2007) defined mobility as one or more school moves between age 11 and 16. Their sample included 1,329 pupils from an ethnically diverse urban district in London, England. The dependent variable was the uncapped total points score (TPS) for each student which summarizes a student's performance on all examinations completed. They performed multiple regression analyses to isolate the effects attributed to age, sex, socioeconomic status, special education needs, ethnicity and prior academic attainment and found that mobile students performed significantly lower than their non-mobile peers ($p < .001$). Controlling for these factors, the researchers learned that the impact of mobility was greater than either gender or entitlement to free or reduced lunch.

Gruman, Harachi, Abbott, Catalano and Fleming (2008) worked within the developmental science research framework to conduct a longitudinal study examining the effects of mobility on academic performance. Using 1,003 predominantly Caucasian

elementary students in a suburban school district, the researchers found that total school changes (mobility) were correlated negatively with academic performance (Pearson r correlation is significant at the .01 level). Specifically, they found that mobility correlated negatively with class participation.

Mobility and No Effect on Achievement

On the other hand, some researchers found no relationship between mobility and achievement. Adduci (1990) used step-wise regression which revealed that mobility did not affect achievement. He was able to determine that only 1.8 percent of the variance in student achievement could be attributed to mobility. Other studies have found that differences in academic achievement between mobile and non-mobile students existed prior to the mobility (rather than because of mobility) (Blane, Pilling & Fogelman, 1985; Bollenbacher, 1962; Pribesh & Downey, 1999). Blane et al. (1985) conducted a longitudinal study which employed a series of multivariate analyses. Pribesh and Downey (1999) also used longitudinal data and found that mobility resulted in a decrease in social capital, but the predominant achievement differences between mobile and non-mobile students existed before the mobility occurred. Bollenbacher (1962) reported that the differences previously reported between mobile and non-mobile student in reading scores disappeared when she controlled for intelligence quotient (IQ).

Mobility as a Factor Emerging with Other Variables

One theme in the literature is that mobility emerges consistently with other variables that have been demonstrated to interfere with learning including poverty, minority status, and qualification for special education services (Kerbow, 1996; Levine et al., 1966; Nelson et al., 1996; Newman, 1988). Levine and Murray (1960) found that

mobility was highest in low-income groups of students who produced the greatest incidence of social and academic problems. The Columbus Foundation (2003) found that student mobility was more common in students that were African American, low-income, and candidates for special education. Newman (1988) reported that mobility was a complicating factor for children who have other at-risk characteristics including low socioeconomic status as well as unique issues regarding family structure. Nelson et al. (1996) reported that mobility in students emerged with a pattern that included poverty, hunger, drug abuse, divorce, and violence. Kerbow (1996) also found that mobile students tended to display certain characteristics including lower socioeconomic status (e.g., qualified for free and reduced lunch and reported lower household income), single parent (mother-only) households, and African American ethnicity.

Along this vein, some researchers have examined mobility specifically focusing on education and the intelligence level of the student and the student's family (Long, 1975; Whalen & Fried, 1973). Whalen and Fried (1973) studied mobility and found that students with higher intelligence may demonstrate increased academic performance as a result of a move, where less intelligent students suffered academically. Long (1975) examined the educational backgrounds of parents of mobile students and reported that children of well-educated fathers were less likely to be behind schedule in school with frequent moves than their peers who had fathers without a college degree.

The Emotional Consequences of Mobility

Some researchers conducted qualitative studies to investigate the emotional consequences of mobility. Allan and Bardsley (1983) found that only one move, especially in the primary grades; can be traumatic for a child. Signs of unresolved

psychological pain (i.e., hitting, bullying, bragging, lying and sometimes withdrawal) were demonstrated and sometimes brought to a point of healing through work with a school counselor. Jalongo (1985) concluded through teacher interviews that changing schools and friends pose significant stressors which result in problems for mobile students. Beck, Kratzer, and Isken (1997) investigated mobility as they studied what they called "an ethic of care". They examined how school personnel care for marginalized students (i.e. mobile students). Interestingly, Beck et al. (1997) found through their qualitative study what other researchers have found in their quantitative studies, namely that mobile students suffer from gaps in curriculum, teachers are inadequately prepared to deal with their needs, and a lack of communication exists between families, previous schools, and current schools of mobile students. Beck et al. (1997) found that these issues result in frustration experienced by the mobile students, the teachers, and the families of those students.

The Columbus Foundation (2003) conducted interviews and found mobility to have varied effects on mobile students. Over 50 percent of the families interviewed experienced mobility as stressful, while approximately one-third of the families interviewed found the experience to be a positive one, because they were moving into better situations.

Conceptual Framework

One of the unique issues about mobility is its potential to affect many aspects of a student's life. Moving or changing schools (even without a geographic move) has been shown to affect children academically, socially, and emotionally.

The academic issues relevant to mobility include gaps in curriculum, inappropriate placements after a move, divergent pacing, and the disadvantages students face regarding knowledge of school norms and teacher expectations. Black (2006, p. 3) found "many highly mobile students take four to six months to recover academically" after a given move. Kerbow, Azcoitia, and Buell (2003) asserted the fact that students who transfer between schools may miss the presentation of key concepts which hinders their continuity of education. Kerbow et al. (2003) also studied the relationship between curricular inconsistency and student mobility and found that due to inefficiency in record transfers, students are frequently placed in classes inappropriate for their skill level. Further, in order to address mobile students entering classes in the middle of the academic year, teachers have to compensate with slower pacing, resulting in less curriculum being covered. Kerbow et al. contend , "Following students who change schools three or more times from first grade to sixth reveals that they are almost one academic year behind their stable counterparts" (p. 161). Another academic problem is lowered teacher expectations. Black (2006) interviewed an assistant principal who reported that teachers "convey low expectations" (p. 3) to mobile students.

Pribesh and Downey (1999) discussed the social ramifications of mobility in terms of social capital:

> "The social capital explanation for the negative association between moving and school performance is that moving often damages, and sometimes completely severs, important social ties that inhere in family relations and in community organization and that are useful for the cognitive or social development of a child" (p. 521).

Similarly, Boisjoly, Duncan, and Hofferth (1995) defined social capital as access to support from friends and relatives in a student's given community. This support is clearly absent or lacking following a move.

Emotional effects of mobility have been addressed by several researchers. Bowlby (1980) argued that moving and changing schools for a young child is comparable to the experience of death and grief. Their world is such that the discontinuity with friends, teachers, and activities is characterized by sadness, anger, and detachment that can result in failure at school. Similarly, Black (2006) learned that students that moved midyear experienced adjustment problems. Rumberger and Larson (1996) interviewed mobile students regarding their feelings about changing schools: "…Every time I moved I felt less and less important" (p. 3).

Consistent with the conceptual framework introduced in this section, this study examined the relationship between mobility and academic achievement. The rationale for mobility having a negative effect is that mobility interferes with curricular progress, social support, and healthy emotional development, all of which contribute to academic success. The way in which academic, social, and emotional elements of mobility contribute to decreased academic attainment could be characterized by the following diagram (Figure 1.1).

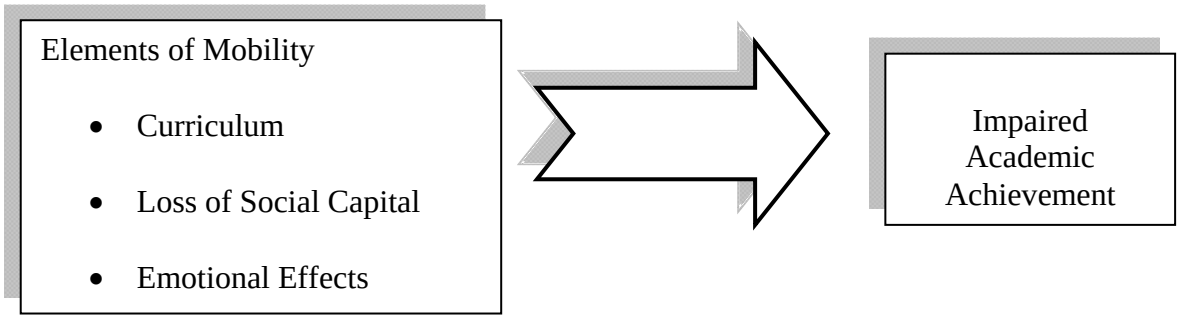

Figure 1.1. The mobile student's experience.

Chapter 3 discusses the methodology for the study, and chapter 4 presents the results of the statistical data with data analysis. Chapter 5 discusses the results of the analysis with recommendations for research and practice along with conclusions drawn.

Chapter III

Research Methods

This study is descriptive in nature, and presents quantitative analysis of school data from a local school district database. This inquiry focused on the relationship between student mobility and academic achievement. Findings on the relationship between mobility and academic achievement have varied, therefore one purpose of this study was to expand the knowledge base and provide insight into inconsistencies previously found. Rumberger (2003) suggested inconsistencies in findings may be due to confounding variables: "Studies that do not control for the background characteristics of students consistently find that mobile students have lower achievement than non-mobile or stable students" (p. 9). One variable found to affect learning that is prevalent among mobile student populations is low family income (U.S. Department of Education, 2002). Another factor found to impact achievement while confounding results of mobility studies is previous achievement (Strand, 2002; Temple & Reynolds, 2000).

Mobility also varies among schools. The rate students enter and exit schools has been found to exceed 30 or 40 percent in some settings, but lower in others (Ligon & Paredes, 1992). Therefore a question this study considers is: Does school level mobility affect learning? Do mobile students perform better or worse depending on the mobility level of their respective school?

This study focused on adding to the body of research on student mobility by examining three major areas relevant to mobility: 1) differences in academic achievement for students who changed schools versus students that did not change schools; 2) differences in academic achievement between mobile students whose families are

economically disadvantaged and mobile students whose families are not ; and 3) differences in academic achievement of students in schools that have high rates of student mobility compared to students in schools with little or no mobility. The following research questions guided this study.

Research Questions

1. Is there a difference in academic achievement between mobile and non-mobile students?
2. Is there a difference in academic achievement of mobile students who are economically disadvantaged versus mobile students who are not? Does the effect of mobility on academic achievement vary according to student's income level?
3. Are there differences in academic achievement of fourth grade students based on the mobility level of the school they attend?

Three hypotheses were tested consistent with the research questions. First, mobility rate will not predict students' achievement as reported by criterion referenced test (CRT) scores in mathematics and language arts. Second, there will not be differences in achievement as reported by CRT scores in mathematics and language arts between students whose families are economically disadvantaged and students whose families are not. Finally, there will not be differences in achievement in relation to mobility level of the school attended.

This chapter offers operational definitions used throughout the study including student mobility, economic disadvantage, and learning outcomes. This is followed by a description of the context of the study, the data source, analyses and measures, and ethical considerations for the protection of subject's rights. A discussion of analyses and

measures used to answer the research questions is presented next. Finally, potential limitations of the study are discussed.

Operational Definitions

Student Mobility

Due to the varied ways student mobility has been operationalized (Ligon & Paredes, 1992), findings cannot be accurately compared. For example, the school district used for this study defined a mobile student to be one who was enrolled in school less than 180 days. By utilizing this definition of mobility, any student that missed the first (or last) day of school, was considered mobile. As a result, the district reported a mobility rate of 29 percent. However, for the purpose of this study, mobility was operationalized as attending more than one school during the academic year 2007-2008. A non-mobile student was coded as a 0, while a mobile student was coded as a 1. The rationale for using this definition was to isolate the effect of changing schools on achievement. This definition is also consistent with other studies of student mobility (Gruman et al., 2008; Rumberger, 2003). Using this definition of mobility, the mobility rate for the fourth grade studies in the district studied was 6.1 percent, with a range by school of 0 to 17 percent.

Economic Disadvantage

For the purpose of this study economic disadvantage was operationally defined as any student who qualified for free or reduced lunch. Students not qualifying for free or reduced lunch were coded as a 0; students qualifying for free or reduced lunch were coded as a 1. Using free or reduced lunch qualification as a proxy for economic disadvantage presents potential limitations. Students who qualify for free or reduced

lunch come from diverse educational and economic backgrounds which are not accounted for in this study. However, using this criterion helped maintain student anonymity, and the status was readily available through school records.

Learning Outcomes

The school district studied administered criterion referenced tests in Language Arts and Mathematics each spring to every fourth grader. Scores were easily attainable through school records, while maintaining subject anonymity, making Mathematics and Language Arts scores a viable and measurable learning outcome. Percent scores were used as dependent variables. Percent scores for language arts ranged from 23 to 100, for mathematics ranged from 5 to 100.

Context of the Study

Setting

The study was conducted in a large, urban, community encompassing 110 square miles located in the western United States. The community is housed within a larger community with an estimated population of 183,000 during the 2007-2008 academic year. For purposes of the study, the city will be referred to as West City (WC). West City was an area originally inhabited by Native American Indians (the Shoshone, Paiute, Goshute, and Ute tribes). The city experienced a minimal population decline from 2000 to 2007 of approximately 1.6 percent. In 2007 the median home price in the community was approximately $150,000. The majority of the population in West City is White (79.2%), with minority populations including Black (1.8%), American Indian and Alaskan Native (1.3%), Asian (3.6%), Native Hawaiian/Pacific Islander (1.8%), and Hispanic (12.3%). W C boasts that 65 percent of its inhabitants are between the ages of

18 and 65. Twenty-four percent of the population is under 18 years of age, and only 11 percent of the population is over 65. While district demographics are mentioned above, the table below illustrates the demographics for the district.

Table 3.1

District-Wide Student Ethnicity 2007-2008

Category	***N***	**Valid %**	**Cumulative %**
White	10816	45	45
Black	1212	5	50
American Indian and Alaskan Native	482	2	52
Asian	964	4	56
Native Hawaiian/Pacific Islander	1156	5	61
Hispanic	9134	38	99
Other	190	1	100

The School District

This study utilized data from one suburban school district in a mountain west state. For the purposes of this inquiry, Washington School District (WSD) will be used as a pseudonym for the district. There are 40 schools in WSD which served approximately 24,000 students during the 2007-2008 academic year. The district included 28 elementary schools (grades P-6), which consisted of approximately 12,000 students, including 1,581 fourth grade students (see Table 3.1) during the time frame of this study. Student mobility for the fourth grade in WSD ranged from 0 percent in four of the elementary schools to approximately 17 percent in two of the schools. The overall average mobility rate was 6 percent (see Table 3.2).

Table 3.2

Elementary School Populations (% refers to the percent mobility in the school)

School	***n***	**# mobile students/total students**	**%**	**Std Dev**
School 1	70	3/70	4.0	.204
School 2	54	0/54	0	0
School 3	55	1/55	2.0	.135
School 4	57	0/57	0	0
School 5	61	4/61	7.0	.250
School 6	60	1/60	2	.129
School 7	68	3/68	4	.207
School 8	42	0/42	0	0
School 9	46	4/46	9	.285
School 10	64	11/64	17	.380
School 11	68	2/68	3	.170
School 12	56	1/56	2	.134
School 13	58	2/58	3	.184
School 14	61	4/61	7	.250
School 15	48	2/48	4	.202
School 16	30	4/30	13	.346
School 17	54	9/54	17	.376
School 18	61	0/61	0	0
School 19	56	2/56	4	.187
School 20	40	3/40	8	.267
School 21	53	4/53	8	.267
School 22	61	6/61	10	.300
School 23	65	7/65	11	.312
School 24	73	7/73	10	.296
School 25	67	1/67	1	.122
School 26	62	3/62	5	.216

Table 3.2 (continued)

School 27	33	4/33	12	.331
School 28	58	8/58	14	.348

Sample

The district had an even distribution of female and male students with just fewer than 51 percent being female. Racial/ethnic minorities composed approximately 54 percent of the students. Approximately 60 percent of students were from low socioeconomic backgrounds based on eligibility for free or reduced lunch. The mobility rate for the fourth graders in the district (defined as having attended more than one school during the academic year) was approximately 6 percent. Approximately 14 percent of the fourth graders received services for special education, and 35 percent were English language learners (see Table 3.3).

Table 3.3

District Demographics for Fourth Grade 2007-2008

Demographic	**Category**	***N***	**Valid %**	**Cumulative %**
Economic Status	Non-Economically Disadvantaged	625	39.5	39.5
	Economically Disadvantaged	956	60.5	100
	Total	1581	100	
Special Education	Regular Ed	1359	86	86
	Special Ed	222	14	100
	Total	1581	100	
Limited English Status	Native English or Opt Out	1024	64.8	64.8
	English Language Learner	557	35.2	100
	Total	1581	100	
Racial/Ethnicity	White	728	46	
	Ethnicity other than White	754	54	
	Total	1581	100	

The WSD employed approximately 2,840 staff, with teachers comprising approximately 1,250 of the total during the 2007-2008 year. The teachers' mean number of years of experience was 17.1 (SD = 9.6), with approximately 10 percent having had five or fewer years of experience. Females made up over 74 percent of the teacher work force and 89 percent of the teachers were White.

The data for this study included fourth grade students who were enrolled in WSD during the 2007-2008 school year. This population consisted of 1,581 students. In this sample, approximately 54 percent of the student population was comprised of racial/ethnic minorities. The White population consisted of 46 percent, Hispanic comprised 38.6 percent, Pacific Islander totaled 5.1 percent, followed by Black with 4.4 percent, Asian with 3.8 percent, American Indian with 1.8 percent, and other race/ethnicity totaled .3 percent. The students studied had criterion referenced tests (CRTs) scores in mathematics and language arts from the 2007-2008 academic school year. These CRTs were the required tests for the state accountability system.

Table 3.4

District Ethnicity for Fourth Grade 2007-2008

Race/Ethnicity	***N***	**%**	**Cumulative %**
White	728	46	46
Hispanic	610	38.6	84.6
Pacific Islander	81	5.1	89.7
Black	69	4.4	94.1
Asian	60	3.8	97.9
American Indian	28	1.8	99.7
Other	5	.3	100
Total	1581	100	

The WSD met their federal Adequate Yearly Progress (AYP) for the academic year 2007-2008. The district also constructed two elementary schools that year.

Analyses and Measures

Question one, which focused on the difference in academic achievement for mobile versus non-mobile students, was assessed using Welch's Two Sample t-test. The mean mathematics and language arts CRT scores of mobile versus non-mobile students were used for comparison. The CRT results assessed the knowledge and skill of students in Grade 4 in the areas of reading and mathematics and were required for the No Child Left Behind Act (NCLB) and state accountability. These tests were administered in the spring. All students in the study participated in the testing. The scores are percentages. Alpha was set at .05 to interpret statistical significance.

The second research question regarding potential differences in the effect of mobility on academic achievement, specifically for economically disadvantaged mobile students versus mobile students who are not, was also addressed using Welch's two sample t-test. The two groups were economically disadvantaged mobile students, and non-economically disadvantaged mobile students. Additionally, a general linear model was used to test the effect of mobility, low-income status and a possible interaction between mobility and low-income status on academic achievement.

The third question examined the relationship between each student's academic performance and their respective school mobility level. A linear regression model was used. The model examined math CRT scores as a function of the square root of the mean of the school mobility, and language arts CRT scores as a function of the mean of school mobility.

Ethical Considerations

Data were collected from extant records thereby minimizing the possibility of social, emotional or physical harm to subjects. Pseudonyms are used to protect the identity of the city, district and schools. The University of Kentucky Institutional Review Board granted exemption for this study, and a letter of approval from the research site was secured. This letter has not been included in the Appendix as it provides identifying information about the district in which the study was conducted.

Limitations of the Study

There are several limitations to this study. First, by operationalizing mobility as one or more moves within a system during the academic year, this study did not allow for differentiation between within district moves and moves across districts. Due to this lack of distinction, some effects may have been lost (e.g., if long distance moves have a more profound effect, this was not identified here). Second, due to the limited time frame of the study, there was no information on previous moves or the possible cumulative effect thereof. A third limitation is that the reasoning behind the moves is unknown. If there are varied effects depending on why the move took place (e.g., loss of employment, employment promotion, unhappiness with the school, etc.), those are not known or examined. This study also did not account for moves from outside the district versus moves within the district.

Additionally, since the t-test assumes two sources of variability in the sample, and the present study examined the entire fourth grade population, it yielded only one source of variability (the performance of a given student on a given day), therefore the p values for the t-tests may be high, thereby affecting the outcome. Further, due to the fact

the dependent variable used was CRT scores it should be noted these tests may present bias which could potentially affect mobile students' performance. Finally, the study took place in one district, limiting generalizability across all populations.

The chapter following presents findings relevant to the research questions and hypotheses offered in the current chapter.

Chapter IV

Results

The intent of this study was to add clarity to the knowledge base on mobility. Three concerns were investigated. First, the effect of student mobility on academic outcomes was analyzed. Second, differences in academic achievement between economically disadvantaged mobile students (students that qualify for free or reduced lunch) and mobile students who did not qualify as economically disadvantaged were examined. Third, the effect of varied rates of mobility within a given school on student's academic performance was studied. The relevant literature reviewed on mobility, along with the goals of this inquiry led to the following research questions.

1. Is there a difference in academic achievement between mobile and non-mobile students?
2. Is there a difference in academic achievement of mobile students who are economically disadvantaged versus mobile students who are not? Does the effect of mobility on academic achievement vary according to student's income level?
3. Are there differences in academic achievement of fourth grade students based on the mobility level of the school they attend?

Three hypotheses were tested consistent with the research questions. First, mobility will not predict students' achievement as reported by CRT scores in mathematics and language arts. Second, there will not be differences in achievement as reported by CRT scores in mathematics and language arts between students who are economically disadvantaged students who are not. Finally, there will not be differences in achievement in relation to mobility level of the school attended.

This chapter follows the following organization. First, a description of measures used with respective rationale is offered for each of the research questions. Next, research questions are addressed in order of their presentation. A brief summary of major findings follows the presentation of the results found. Finally, an introduction to the fifth chapter is given.

Question one, regarding possible differences in academic achievement between mobile and non-mobile students was assessed using Welch's two sample t-test. The assumptions for the Welch's two sample t-test are: the observations in the two groups are random variables, having approximately normal distributions. The source of random variability of the test scores comes from the performance of any given student on a given day. The variables are approximately normally distributed with both (mobile and non-mobile) sample sizes greater than 30 (1485 and 96 respectively).

Question two, which addressed possible differences between academic achievement of economically disadvantaged mobile students and mobile students not having economic disadvantage, was also assessed using Welch's Two Sample t-test. Additionally, a general linear model tested the effects of mobility, economic status, and the interaction of mobility and economic status on academic achievement. The assumption of variability is met, as is the approximate normality of the distributions (See Figures 4.1 and 4.2). Figure 4.1 illustrates the approximate equality of spread of scores among the various groups for the math CRT scores, and Figure 4.2 shows approximate normality of the math CRT scores .

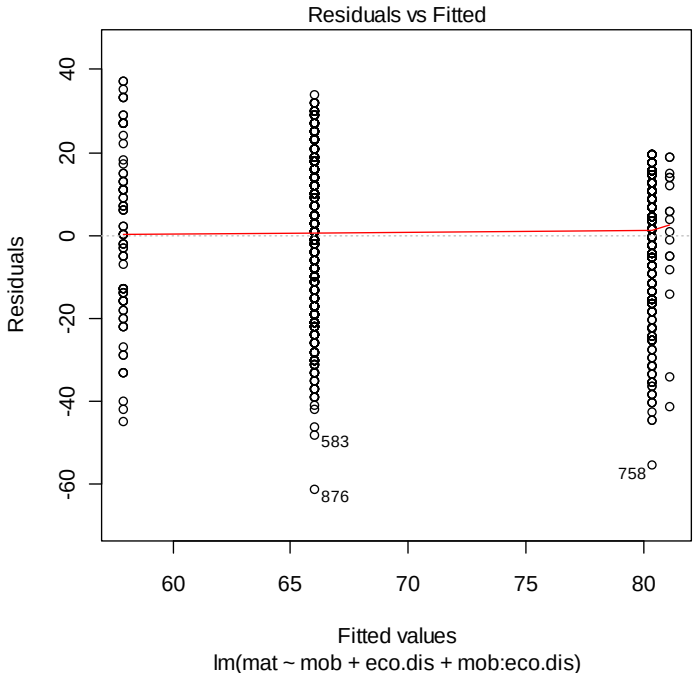

Figure 4.1. Homogeneity of variance for math CRT scores by economic level.

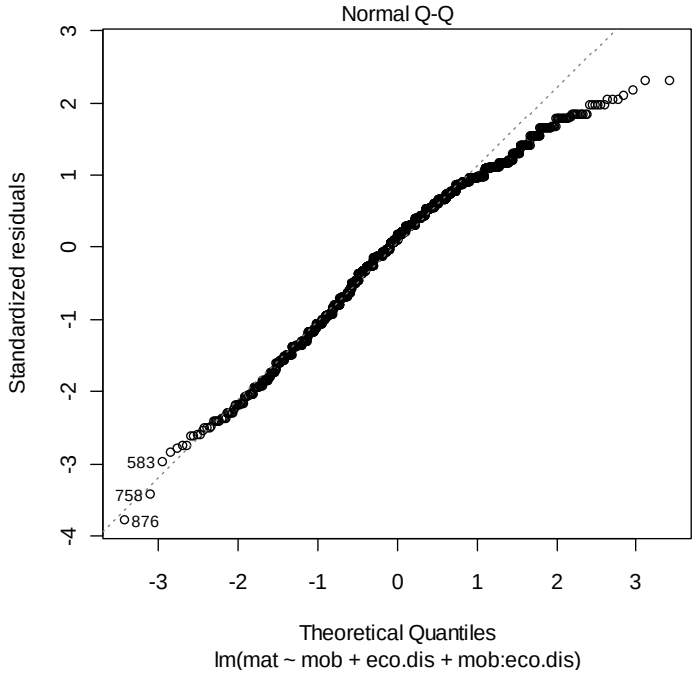

Figure 4.2. Distribution of residuals in math CRT scores by economic level.

Similarly, Figure 4.3 illustrates the approximate equality of spread of scores among the various groups for the language arts CRT scores, and Figure 4.4 shows approximate normality of the language arts CRT scores.

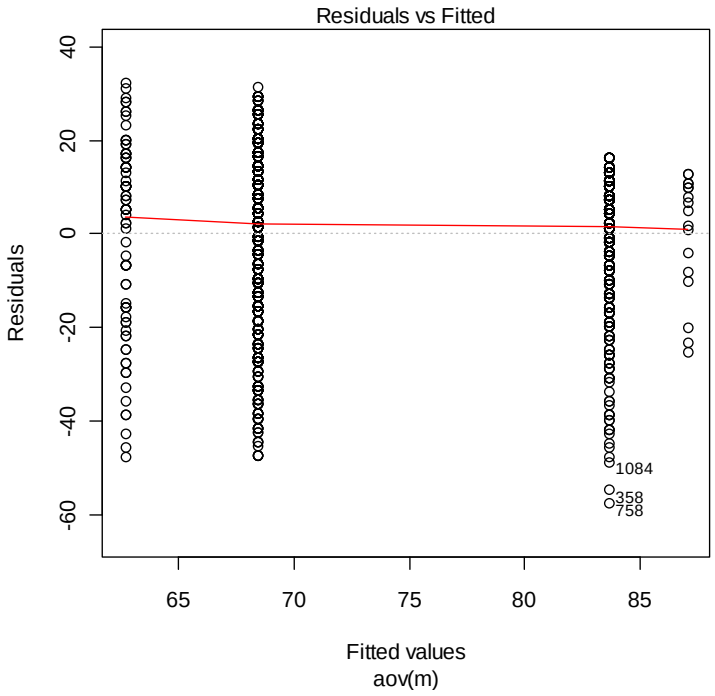

Figure 4.3. Homogeneity of variance for language arts CRT scores by economic level.

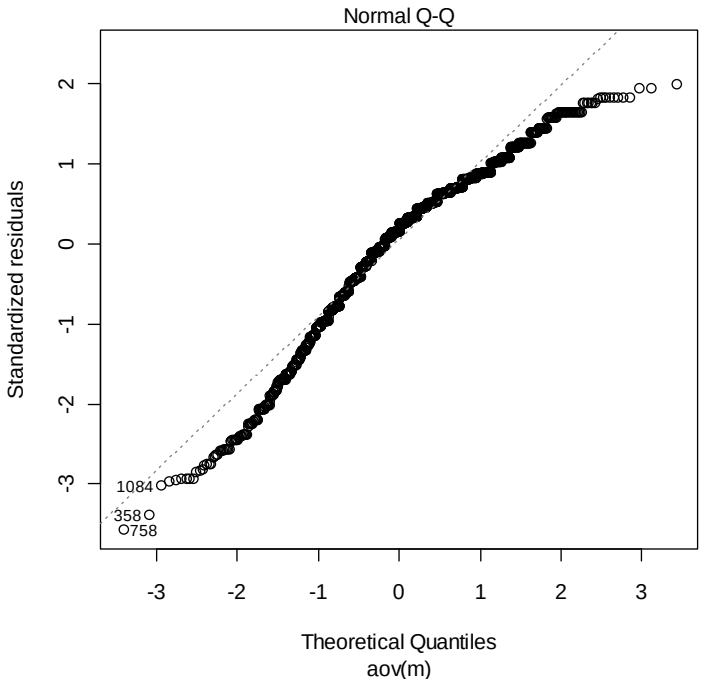

Figure 4.4. Distribution of residuals in language arts CRT scores by economic level.

Finally, the third question regarding possible differences in academic achievement according to the mobility level of the school attended was addressed using a linear regression model. The assumption here is that there is a linear relationship between the independent and dependent variables: school mean mobility and CRT scores. Graphical analysis illustrates that the relationship between the math score and school mobility mean was curvilinear (see Figure 4.5).

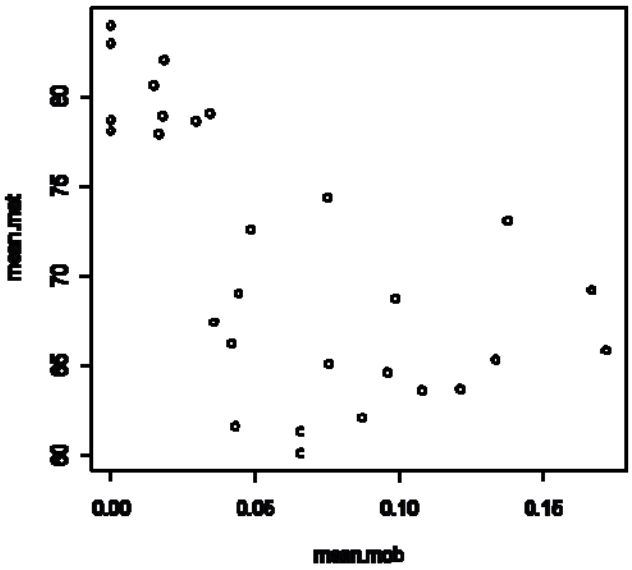

Figure 4.5. Mean mobility level of school with mean math scores.

Due to the curvilinear nature of the relationship between school mobility mean and school mean math score, a transformation was conducted. Square root of the school mobility mean was used instead of the school mobility mean, which produced the linear relationship illustrated in Figure 4.6.

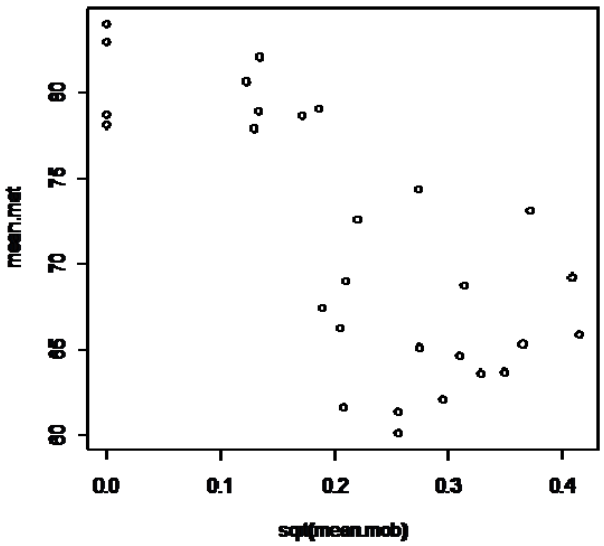

Figure 4.6. Square root of the mean mobility level of school with mean math score.

The same transformation was not indicated for language arts as the relationship between the variables was linear (see Figure 4.7).

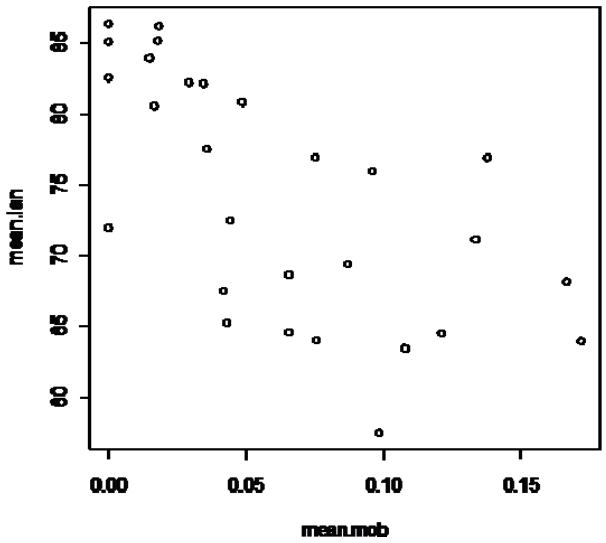

Figure 4.7. Mean mobility level of school with mean language arts score.

Academic Outcomes by Mobility

Prior to conducting tests for differences in student achievement between mobile and non-mobile students, comparisons of mobile and non-mobile students' academic outcomes were made. Descriptive statistics indicate a difference between mean test scores of mobile and non-mobile students (see Table 4.1).

Table 4.1

Mathematics and Language Arts Mean Scores

		Percent Scores		
Area	**Student Mobility**	**N**	**Mean**	**SD**
Mathematics	Non-Mobile	1,485	71.91	17.44
	Mobile	96	62.02	21.84
Language Arts	Non-Mobile	1485	74.63	17.62
	Mobile	96	66.98	21.63

Figures 4.8 and 4.9 illustrate the contrast in math and language arts CRT scores between mobile and non-mobile students.

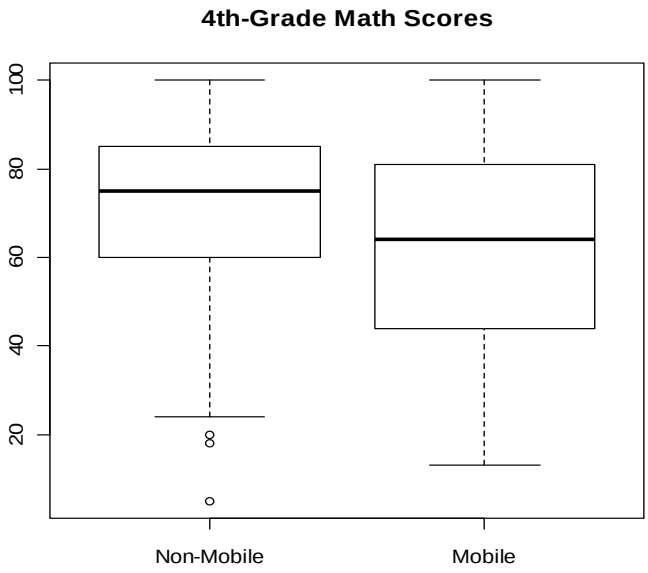

Figure 4.8. Fourth grade math scores for non-mobile and mobile students.

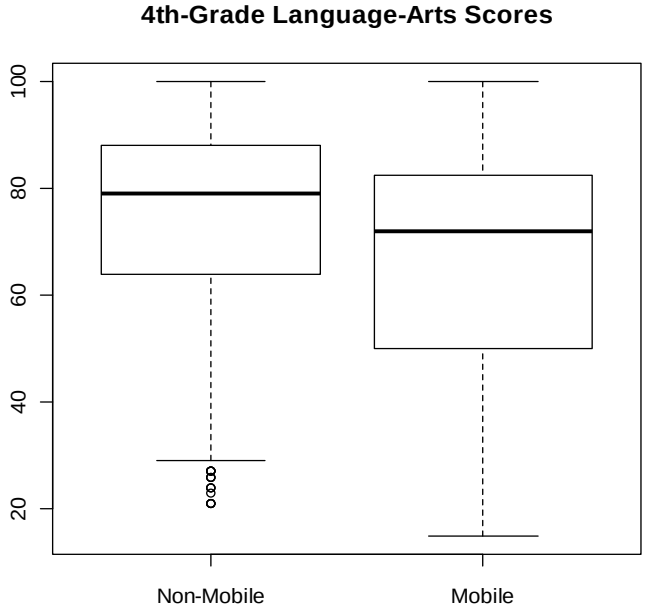

Figure 4.9. Fourth grade language arts scores for non-mobile and mobile students.

Question one was addressed using Welch's Two Sample t-test. The mean mathematics score of non-mobile students (M = 71.91, SD = 17.44, N = 1485) was significantly different (higher) from that of the mobile students (M = 62.02, SD = 21.84, N = 96), t(102.9) = 4.35, p = .000.

Similarly, the mean language arts score of non-mobile students (M = 74.63, SD = 17.62, N = 1485) was significantly higher than language arts scores of mobile students (M = 66.98, SD = 21.63, N = 96), t(103.3) = 3.39, p = .001.

Academic Outcomes by Mobility and Economic Status

Welch's two sample t-test was performed to answer the first part of the second research question regarding possible differences in student achievement of mobile students who are economically disadvantaged versus mobile students who are not. The mean math score of mobile students who were not economically disadvantaged (M = 81.12, SD = 17.18, N = 17) was significantly different (higher) from that of the mobile students who were (M = 57.91, SD = 20.58, N = 79), t (26.89) = 4.87, p = .001. Similarly, the mean language arts score of mobile students who were not from economically disadvantaged families (M = 74.63, SD = 17.62, N = 17) was significantly different (higher) from that of the mobile students who were (M = 66.98, SD = 21.63, N = 79), t(103.3) = 3.40, p = .001 (see Table 4.2).

Table 4.2

Fourth Grade CRT Scores for Mobile Students: Economically Disadvantaged and not Economically Disadvantaged

Area	Economic Status	Percent Score		
		N	Mean	SD
Mathematics	Not Economically Disadvantaged Mobile	17	81.12	17.18
	Economically Disadvantaged Mobile	79	57.91	20.58
Language Arts	Not Economically Disadvantaged Mobile	17	74.63	17.62
	Economically Disadvantaged Mobile	79	66.98	21.63

The second part of question two addressed whether or not the effect of mobility varied according to economic status of the student. This was tested through the use of a general linear model where the factors were mobility and economic status, with an interaction-term (between mobility and economic status) included.

Results revealed a significant effect on math CRT scores attributed to mobility [$f(1,1577) = 33.48$, $p = .001$], economic status [$f(1,1577) = 305.74$, $p = .001$], and the interaction between mobility and economic status [$f(1,1577) = 4.01$, $p = .045$] (see Table 4.3).

The ANOVA summary for the effect of mobility, economic status and the interaction of mobility and economic status on math CRT scores:

Table 4.3

Analysis of Variance Results for Math CRT Scores

Source	Sum of Squares	df	Mean Square	F	Sig.
					.000
Mobility	8811	1	8811	33.48	.000
Economic status	80468	1	80468	305.74	.000
Interaction between mobility and economic status	1055	1	1055	4.01	.045
Residuals	415044	1577	263		

The following box plot illustrates the different effect economic status has on mobility with respect to mathematics CRT scores (see Figure 4.10).

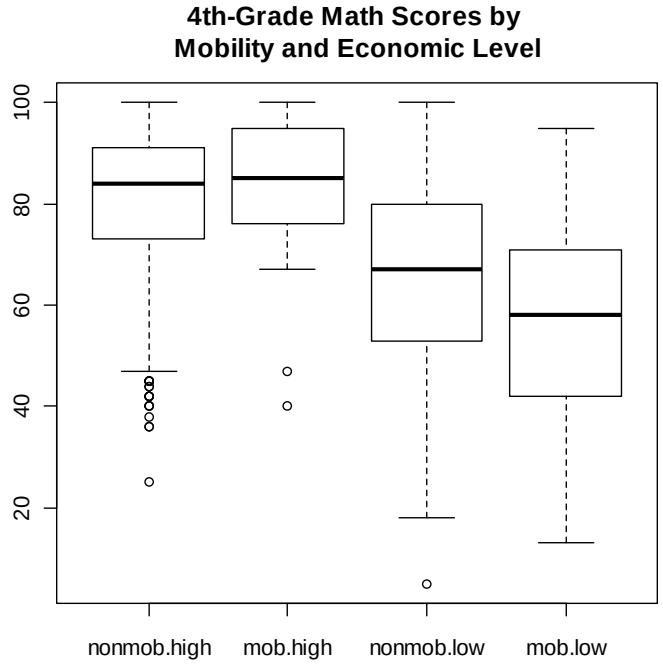

Figure 4.10. Fourth grade math scores by mobility and economic level.

Similarly, the varied effect of mobility on language arts scores according to income level was tested with a linear model using mobility, economic status, and an interaction effect between mobility and economic status as factors.

Results revealed a significant effect of mobility [f (1,1577) = 20.15, p = .001], economic status [f(1,1577) = 347.17, p = .001], and the interaction between mobility and income level [f(1,1577) = 4.28, p = .045] (see Table 4.4).

The ANOVA summary for the effect of mobility, economic status and the interaction of mobility and economic status on language arts CRT scores:

Table 4.4

Analysis of Variance Results for Language Arts CRT Scores

Source	Sum of Squares	df	Mean Square	F	Sig.
Mobility	5280	1	5280	20.15	.000
Economic status	90975	1	90975	347.17	.000
Interaction between mobility and economic status	1122	1	1122	4.28	.039
Residuals	413251	1577	262		

The following box plot illustrates the effect economic status has on mobility with respect to language arts CRT scores (see Figure 4.11).

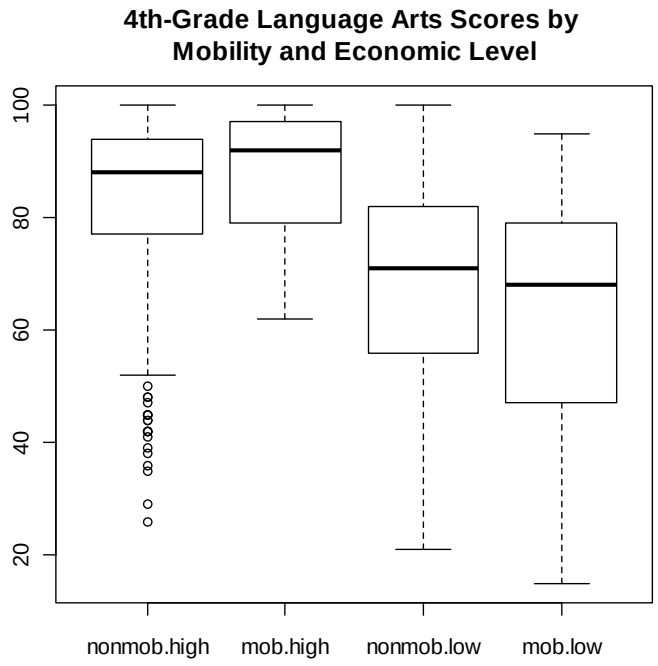

Figure 4.11. Fourth grade language arts scores by mobility and economic level.

Question three regarding the possible relationship between CRT scores and mean mobility level of the school attended was tested with a simple linear regression. The relationship between math CRT scores and mean mobility level of the school was curvilinear (see Figure 4.1), therefore this measure was transformed to the square root of mean level of school mobility which did produce a linear relationship (an assumption for linear regression) (see Figure 4.6). CRT scores constitute the response variable, with square root of the mean mobility level of the school, the continuous explanatory variable (Note that both CRT scores and square root of the mean mobility level of the school are interval variables).

Further, to illustrate that the assumptions of approximate normality of scores and similar standard deviations for the linear regressions of math scores and square root of mobility mean, see Figures 4.12 and 4.13.

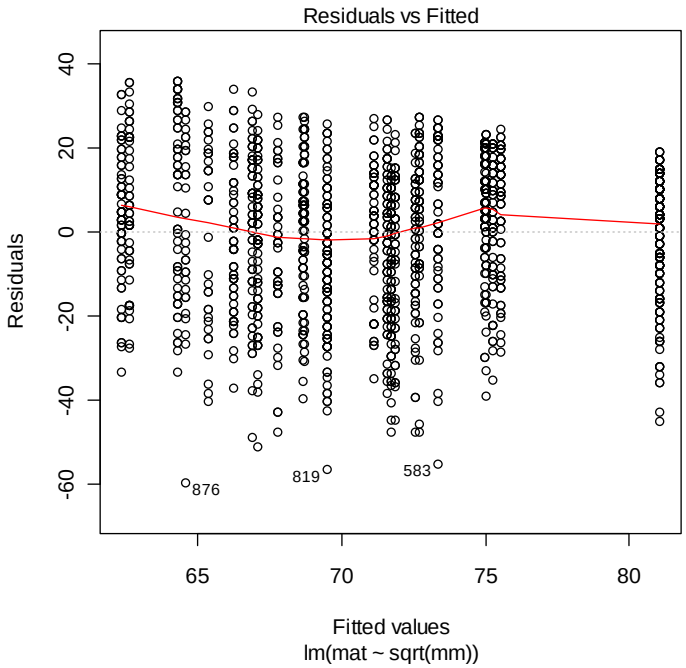

Figure 4.12. Variability of math scores with square root of school mobility mean.

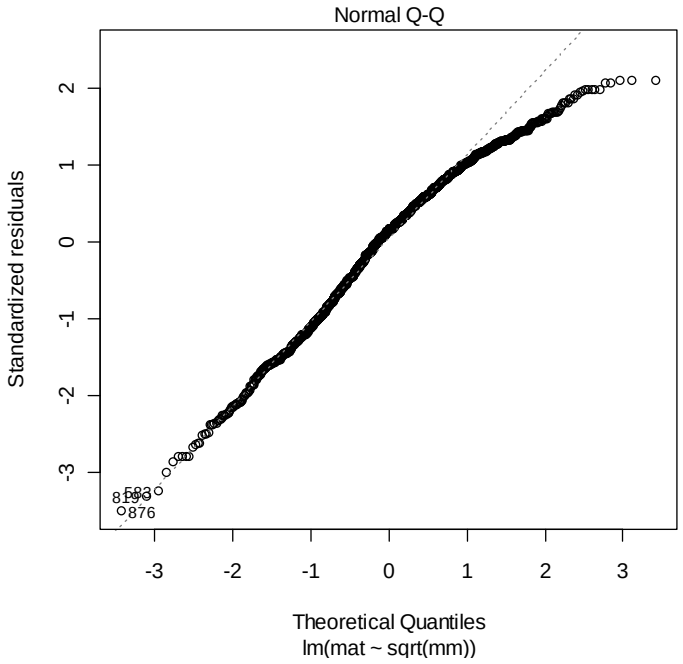

Figure 4.13. Distribution of math scores with square root of school mobility mean.

Similarly, the assumptions of approximate normality of scores and comparable standard deviations for the linear regressions of language arts scores and mobility mean of the school are met (see Figures 4.14 and 4.15).

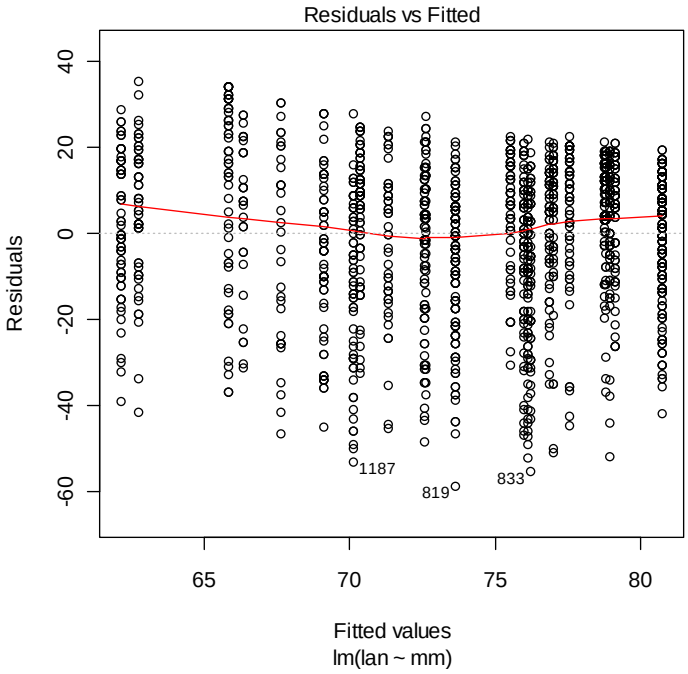

Figure 4.14. Distribution of language arts scores with square root of school mobility mean.

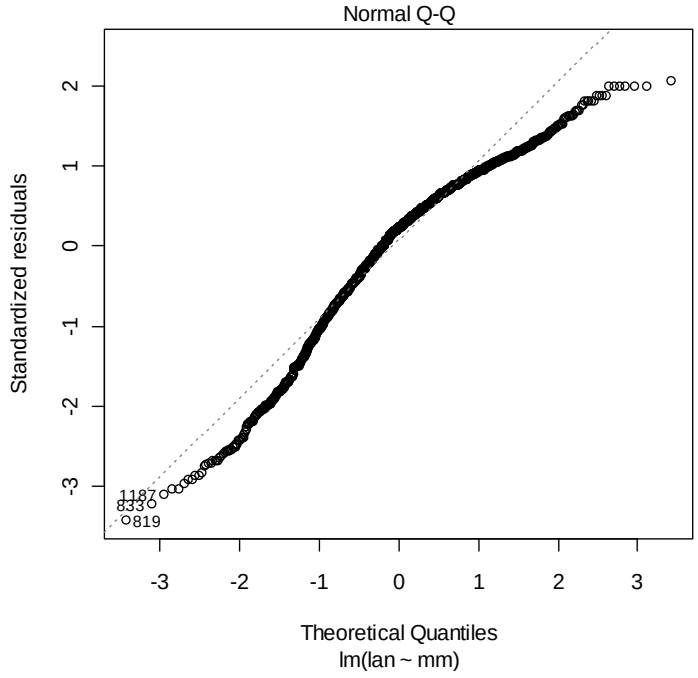

Figure 4.15. Distribution of language arts scores.

The relationship between math CRT scores and square root of the mean mobility level of school was confirmed in a regression analysis with CRT scores as the dependent measure, and square root of the mean mobility of school as the predictor. The predictor explains a proportion of the variability in the response variable. R^2 and adjusted R^2 = .09, $F(1, 1579) = 153.3$, $p < .001$.

The effect size (as reflected in the coefficient for the square root of mobility mean term) is -45.0664. For each increase of one unit in the value of square root of the mobility mean of the school attended, an approximate drop of 45 points could be predicted in the math score. In other words, if the square root of the mobility mean increases by 0.01, the predicted score drops by 0.45. The low P-value indicates confidence that the "true" value of the coefficient is not zero, and square root of the mobility mean does have a negative linear relationship with math CRT scores.

The effect of mean mobility of school on language arts scores gleaned similar results. No transformation of the mean mobility level of the school was indicated since the relationship between the variables (language arts scores and mean mobility level of the school) was linear (see Figure 4.3).

The relationship between language arts CRT scores and mean mobility level of school was confirmed in a regression analysis with CRT scores as the dependent measure, and mean mobility of school as the predictor. The predictor explains a proportion of the variability in the response variable. R^2 and adjusted R^2 = .09, $F(1, 1579) = 152.8$, $p = .001$.

The effect size (as reflected in the coefficient for the mobility mean term) is -108.1109. If the mobility mean increases by 0.01, the predicted score drops by 1.08. The

low P-value indicates confidence that the "true" value of the coefficient is not zero, and the mobility mean does have a negative linear relationship with language arts CRT scores.

Summary

Regarding question one, a significant difference was found between academic achievement of mobile and non-mobile students. This held true for math and language arts scores as assessed using Welch's Two sample t-test. Question two, which addressed differences between economically disadvantaged mobile students and students who were not economically disadvantaged (as defined in the current study), was also addressed through Welch's two sample t-test where significant differences were found. Further, a linear model revealed that the effect of mobility varied according to student income level. Economically disadvantaged students were found to suffer greater (negative) effects from mobility than students that were not categorized as economically disadvantaged. Finally, regarding the third question, mean mobility level of school was found to (negatively) affect academic outcomes.

The final chapter follows with a discussion of the results, and a summary of the study with its findings.

Chapter V

Discussion

This study researched the effect of student mobility on academic achievement. The United States Department of Education (2002) has reported ongoing concern regarding achievement gaps as demonstrated in grades, standardized-test scores, course selection, and dropout rates. Closing this performance gap has become a priority for educators. Mobility has been demonstrated to contribute to learning deficits (Kerbow et al., 2003), yet a lack of consistent findings revealing clarity of the problem and its effects has persisted. As early as 1966, Levine et al. (1966) found mobility to have an effect on academic achievement. These researchers further learned that turnover (mobility) "is highest in the low income groups who produce the greatest incidence of social and academic problems" (p. 154). Researchers have revealed similar findings in the years that followed (Engec, 2006; Hagan et al., 1996; Hanushek, Kain, Markman, & Rivkin, 2003; Rumberger, 2003). Mobility has been a relevant factor for over forty years, specifically with regard to populations of students who traditionally demonstrate achievement gaps. Greater understanding of the phenomenon could empower educators to mitigate its effects.

Organization of the Chapter

This chapter will include a brief discussion of the purpose of the study, followed by the research questions, a brief review of methods, a discussion of the interpretation of findings with analysis of the data, recommendations for policy, practice and research, limitations, and a conclusion. The format of these sections will be guided by the three research questions.

Purpose of the Study

The first purpose of this study was to add to the existing literature by exploring differences in achievement between mobile and non-mobile students. The literature reveals conflicting results. Many researchers found differences (Engec, 2006; Levine et al., 1966; Nelson et al., 1996; Rumberger, 2003), however, due to the nature of the factors involved it has been difficult to isolate the effect of mobility itself (Gershoff, Aber, Raver & Lennon, 2007; Kerbow et al., 2003). Still other studies found no relationship between mobility and academic achievement (Adduci, 1990; Blane et al., 1985). Due to the prevalence of mobility among economically disadvantaged students, the second purpose of the study was to examine the effect of mobility on that population of students compared with students who are not economically disadvantaged. Finally, the third purpose of this study was to examine the effect of aggregate mobility in a given school on academic achievement.

Research Questions

Based on the review of relevant literature on student mobility, and the purpose of this inquiry, the following research questions directed the analysis of data.

1. Is there a difference in student achievement between mobile and non-mobile students?
2. Is there a difference in academic achievement of mobile students who are economically disadvantaged versus mobile students who are not? Does the effect of mobility on academic achievement vary according to student's income level?

3. Are there differences in student achievement of fourth grade students based on the mobility level of the school they attend?

This study is descriptive in nature, with quantitative analysis of school data from the district database. Independent variables were mobility (did the student attend more than one school during the academic year 2007-2008?), economic status (did the student qualify for free or reduced lunch), and school mobility level. The dependent variable, academic achievement, was determined by the Criterion referenced test scores in mathematics and language arts (administered in the spring 2007-2008).

Discussion of Findings by Research Question

Research Question 1. Is there a difference in student achievement between mobile and non-mobile students?

Findings from this study indicate that mobility had a significant and negative impact on academic achievement. In this study the effect of mobility on CRT scores was found to be significant for both mathematics (P = .001), and language arts (P = .001) as illustrated through Welch's two sample t-test.

This is consistent with previous findings that mobility has a negative effect on achievement (Bruno & Isken, 1996; Engec, 2006; Gruman et al., 2008). Interestingly, Strand (2002) found when previous achievement was controlled; the mobility effect was negligible except for a small effect with mathematics. When Strand and Demie (2007) studied the phenomenon five years later with older students, he found mobility to have a significant effect even after controlling for prior achievement. This inconsistency of findings highlights the need for a deeper understanding of the mobility phenomenon.

The conceptual framework of the current study posits that loss of social capital, lack of continuity in curriculum, and emotional effects resulting from mobility contribute to decreased academic performance. One explanation for the reduced academic performance consistent with the conceptual framework of the current study is loss of social capital. Researchers (Coleman, 1988; Dunn, Kadane, & Garrow, 2003; Goldstein, 1999; South & Haynie, 2004) have argued that diminished social capital from changing schools has contributed to academic deficits experienced by students due to lack of support. Pribesh and Downey (1999) agreed and studied mobile students using data from the National Education Longitudinal Study (NELS) of 1988 with its 1992 follow-up data. They posited that a longitudinal study would offer insight lost in a cross-sectional study due to the fact that the negative association between achievement and mobility may be due to factors that correlate with moving such as low parental involvement instead of the mobility itself. They felt indicators of these risk factors would manifest more clearly in a longitudinal study. The social capital explanation (lack or loss of social support hurts academic achievement) held across the population studied.

Studies by Strand (2002) and Strand and Demie (2007) also lend insight into factors to be considered by educators. They posited that elementary students not only experience greater rates of mobility than older students, but a greater percentage of their mobility is within the district than for the high school students. This concept of greater mobility among elementary aged students is substantiated with studies by Kerbow (1996) and Ingersoll et al (1989). This suggests that policies considered for implementation to help mobile students should begin at the elementary level.

Research Question 2. Is there a difference in academic achievement of mobile students who are economically disadvantaged versus mobile students who are not? Does the effect of mobility on academic achievement vary according to student's income level?

The current study revealed a significant difference between CRT scores of economically disadvantaged mobile students and those of mobile students who are not economically disadvantaged ($p = .001$). Economically disadvantaged mobile students exhibited lower scores in both language arts and math than students who were not disadvantaged. Further, the effect of economic status on mobile students was significant ($p = .001$). Disadvantaged economic status was found to have a negative effect on mobile students, but mobile students who were not classified as economically disadvantaged did not exhibit a significant change in CRT scores.

Findings of the current study confirm results seen as early as 1966, where researchers examined mobility and found it to be predominant in populations of students who traditionally demonstrate achievement gaps, specifically among low-income students (Levine et al., 1966). Further, consistent with the current study, Rumberger (2003) found poverty to be a factor intricately involved with the mobility phenomenon and further suggests the degree to which poverty is implicated in the problem. Beck and Shoffstall (2005) suggested that the social, emotional and academic risk factors that often accompany poverty contribute to the difference in scores. This is consistent with the theoretical framework of the present study which suggests social and emotional elements are contributing risk factors with mobile students.

Interestingly, other researchers have found contradictory results studying the relationship between socio-economic status and mobility with respect to achievement

(Morris et al., 1961; Wickstrom, 1967). Implications for educators include examining risk factors related to poverty such as social, emotional and academic deficits. Educators should consider developing protocols that identify students in need of additional support and provide relevant programs appropriate to address student needs.

An additional noteworthy finding was that one school in the district identified by relatively high rates of mobility and predominantly economically disadvantaged students, demonstrated relatively high math test scores (comparable to the scores of the low mobile and non-disadvantaged schools). This suggests the possibility of effective interventions for minimizing the ill effects of mobility and economic disadvantage. Future research projects could investigate such programs and their viability in relevant districts.

Research Question 3. Are there differences in academic achievement of fourth grade students based on the mobility level of the school they attend?

This study found a significant (negative) effect of mean mobility level of the school on the academic achievement of mobile students. This current finding is consistent with findings by Rumberger (2003) and Hanushek et al. (2003) who stated that mobility in schools resulted in negative academic effects for mobile and non-mobile students. Kerbow (1996) stated:

> Mobility creates a situation in which teachers are faced not only with a diversity of achievement levels but also with uncertainty about what each child actually knows and can do. This uncertainty may have broad consequences for how teachers organize the instructional activity of the classroom. (p. 17)

Several explanations deserve consideration. First, one of the predominant issues with mobility studies is mobility is associated with numerous risk factors including poverty, ethnicity, qualification for special education, limited English proficiency, and poor prior performance. Gruman et al. (2008) used the developmental science research framework to study effects of student mobility on elementary school engagement and found that time varying factors such as teacher support and peer acceptance had a significant positive influence on building positive attitudes toward school for mobile students. He studied mobility "within the context of other factors that put children at risk, including behavior problems and family stress" (p. 1833).

A second explanation may be found in a study by Beck et al. (1997) who examined mobility and the associated risks. He sought to understand the varying degrees of success with high risk students by studying "an ethic of care" (p. 344). He found that schools varied greatly in the level of care offered in terms of dignity, kindness and support given to students in general, and to transient (mobile) students in particular. Further, he studied schools experiencing success with high risk students and found that they were "attempting to respond to others on the basis of what they heard and saw, creating programs and developing teaching strategies based upon evidence gleaned from careful listening and rigorous observation and analysis of classroom activity and student work" (p. 365). The results of this study suggest the process of care takes place for mobile students more readily in highly mobile schools. Along this vein, one possible suggestion toward increased understanding and intervention for students at high mobile schools is to offer awareness programs for staff and students, along with programs to acclimate incoming students while building peer support.

A final note regarding the current study as it compares with the studies mentioned above: the mobility level of the current study ranged from 0 to 17 percent with multiple moves relatively uncommon (only five out of 1581 students moved more than once) where the mobility levels in previous studies were higher (14% and higher, with multiple moves common).

Finally, the current findings are consistent with the conceptual framework which posited that social and emotional factors contribute to the effect of mobility on students. It further offers insight into suggestions for future practice. Educators should be aware of the social and emotional effects on academic progress. Programs and policies should be in place to identify need and provide support for implicated students.

Contributions of the Study to the Field

Studies in the phenomenon of mobility have gleaned inconsistent findings, yet it has been demonstrated to be a relevant and costly problem. This study examined mobility to gain insight into the problem so as to help educators with developing strategies to mitigate its ill effects.

First, this study offered confirmation of findings by Kerbow (1996), Rumberger (2003), and Strand and Demie (2007) that mobility does have a negative effect on academic achievement. Second, by finding a significant effect of low socioeconomic status on mobile students, the current study suggests that economic disadvantage is a factor requiring more in-depth investigation. For example, Finn and Rock (1997) studied students with low-income (and minority) status and found learning deficits related to resiliency and levels of school engagement, both of which provided information for future interventions and research.

Finally, this study brought to question findings by Titus (2007) which found that students in highly mobile classrooms can succeed when appropriate practices are implemented. The study by Titus (2007) focused on students in the Department of Defense schools. The current study suggests that the phenomenon of highly mobile classrooms needs further study for broader use of effective interventions.

Recommendations Related to Policy and Practice

Three implications are suggested by this study: the effect mobility has on academic achievement, specific examination of the effect of mobility on economically disadvantaged students, and the effect of classroom mobility on its students. Wood et al. (1993) reported that highly mobile students "are at a greater risk for a number of problems including reported delay in growth or development, learning disorders, failing a grade, and 4 or more frequently occurring behavioral problems" (p.1337). The current study found a significant negative relationship between mobility and academic performance. This suggests that educators should have a system in place that: (a) monitors student records to ensure appropriate placement; (b) provides both social and academic support for new students; (c) provides support for parents and families new to the school; and (d) provides support in developing curricula for transitioning students.

The second recommendation relates to treatment of economically disadvantaged students. Gruman et al. (2008) looked at behavior indicators for success exhibited by high risk (low-income) students such as attitude toward school and engagement. This approach could be successful in identifying low-income students in need of support. Schools could design methods for intervention which would provide support for low-

income students showing signs of disengagement. Possible suggestions include involvement with extracurricular activities and social supports.

Finally, this study looked at the effect of mobility in the classroom on the academic performance of the mobile student. Findings from this study lend interesting implications as discussed by Titus (2007) with regard to the Department of Defense schools. He found systems that have demonstrated success included buddy systems for incoming students to help with academic remediation as well as social support, electronic portfolios for all students to ensure accurate placements, and a national curriculum followed by all of its schools. He also referenced a recommendation that used "Maslow's hierarchy of needs as a tool for developing strategies for welcoming new students" (p. 8).

Recommendations for Future Research

Mobility studies have been documented for over 40 years, yet the problem persists, with its varied effects. Due to the complexity of the problem, mobility studies have lacked singleness of focus, making it difficult to draw conclusions. For example, research on mobility has ranged in purpose from looking at the effect mobility has on social support (South & Haynie, 2004) to examining the effect of mobility on academic performance (Rumberger, 2003). Similarly, dependent variables studied have varied from student engagement to criterion referenced test scores. Additionally, even the operational definition varies from study to study (Ligon & Paredes, 1992). How do you draw common conclusions about a problem when existing literature is so varied in nature? Bringing clarity to the effect of changing schools within an academic year is one focus of this study.

This inquiry suggests the following for future research. First, the operational definition of mobility needs to be consistent. This study identified mobility as attending more than one school during the academic year 2007-2008. The trend in the literature supports this definition (Gruman et al., 2008; Rumberger, 2003; Strand, 2002; Titus, 2007). However numerous other definitions have been used (Ligon & Paredes, 1992) throughout the literature. In order to continue to gain insight into the problem, a clear and consistent operational definition should be used.

Second, due to the legion of risk factors associated with mobility, it is imperative that controls are implemented (Kerbow, 1996; Rumberger, 2003). This study illustrated the effects of economic status and mobility level of the school attended. These factors have been similarly identified as pertinent by Bruno and Isken (1996), Engec (2006), Pribesh and Downey (1999), and Rumberger (2003). However, other factors related to mobility abound which were not considered in the current study. Factors examined by researchers and found to be relevant to the study of mobility include English Language Learner (ELL) status, qualification for special education, ethnicity, and education level of parents (Barrett & Noble, 1973; Engec, 2006; Kerbow, 1996; Newman, 1988; and Rumberger, 2003). Future research should encompass consideration for the many factors involved.

Further, as suggested by the findings of this study, economic status should be examined more carefully. Engec (2006) noted that though the link between poverty and low student performance has been demonstrated, there are schools with high populations of low-income students that experience academic success. Future research could identify the risks associated with poverty to better empower educators to mitigate its effects.

Related risks include single-parent families (Nelson et al., 1996), diminished parental support (Hagan et al., 1996; Rothstein, 2004), and health issues (Rothstein, 2004).

Finally, future research should include an examination of both student level mobility and classroom level mobility. By definition, the public school is a place of community education. If mobility affects the mobile student who is a member of a class, that class is affected. This is a complicated problem which affects many facets of the educational process (Kirkpatrick & Lash, 1990; Offenberg, 2004; Rumberger, 2003).

Limitations of the Study

Data for this study were collected in the academic year 2007-2008. As with all research, limitations for this study must be considered. First, many researchers have reported that mobility disproportionately affects minority populations adversely (Levine et al., 1966; Offenberg, 2004; Rumberger, 2003). The population in this study was taken from a large urban community with a district of approximately 46 percent White, 39 percent Hispanic, and a total of 15 percent of other ethnicities deeming it not representative of all districts. This district also reported a lower rate of mobility overall (range of 0 -17%) than many urban districts (Rumberger, 2003).

Additionally, there are mobile populations that this study did not take into consideration. Department of Defense schools report high levels of mobility (Titus, 2007). However, due to the many differences between those populations and the populations of public schools (e.g. mobility is attributable to the parents' work, not due to a lack of employment); this study did not include those systems.

Another limitation of the current study was the age of the subjects. Previous studies have examined students of all ages (Finn & Rock, 1997; Haveman et al., 1991;

Offenberg, 2004). However, directed by the findings of Rumberger (2003) and Ingersoll et al. (1989), this study examined elementary aged students. Specifically fourth grade students were studied due to the fact that language arts and mathematics scores from criterion referenced tests were readily available in addition to their corresponding scores from the third grade for comparisons. Another limitation relates to the fact that the criterion referenced tests were the state accountability tests. Bias may be introduced through the items used by this state accountability system.

Still another consideration is the fact that mobility occurs for a variety of reasons, in a plethora of contexts. These reasons and situations have been found to affect the impact of mobility on students (Hagan et al., 1996; Nelson et al., 1996). This study did not take into consideration the reason for the mobility nor the context (other than the context of the school). Additionally, due to the operational definition of mobility in this study (more than one admission to a school in the district), this study did not take into account students who moved into the district after the academic year started.

A final limitation of the study has to do with the operational definition of mobility. Previous work on mobility has used varied definitions and formulas (Ligon & Paredes, 1992). This study defined mobility in terms of one or more school changes within an academic year. This study may yield different results from others due to this criterion.

Summary and Conclusions

This study found that mobility significantly and negatively affects academic achievement as seen in language arts and mathematics scores from criterion referenced tests. Further, though the current study did not lend itself to a comprehensive

examination of cumulative effects, results suggest that the effect on academic performance is more acute for students classified as economically disadvantaged. This is consistent with reports by Kerbow (1996), Rumberger (2003) and Levine et al. (1966). This may be due to the fact that causes for the adverse learning effects may be attributable to other risk factors associated with poverty.

Finally, this study found mobility level of the school significantly affects the academic performance of mobile students. Kerbow (1996) reported "This level of mobility has potentially deep and pervasive consequences for the students involved and more broadly for the classrooms and schools they attend" (p. 1). He further reported "This influx and exit of students places significant constraints on the instructional approach of teachers in several ways" (p. 18). Kerbow (1996) outlined the adverse effects of mobility on the classroom to include curricular constraints, minimal use of formative assessments, and inferior strategies (due to the constant change of population).

Educational reforms are based on indices as if they were "unbiased measures of institutional change—assuming that successive sets of cross-sectional data inevitably form valid, longitudinal trends" (Offenberg, 2004). However, current levels of student mobility suggest this view is inaccurate. Mobility has been demonstrated to affect student achievement and classroom norms. It has further been shown to interact with numerous factors relevant to educational success. This study suggests the need for increased attention to student mobility and how to ameliorate its effects.

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APPENDIX A

INTERNAL REVIEW BOARD APPROVAL

UNIVERSITY OF KENTUCKY

Office of Research Integrity
IRB, IACUC, RDRC
315 Kinkead Hall
Lexington, KY 40506-0057
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EXEMPTION CERTIFICATION

MEMO: Lisa Eddy,
Education
204 Redding Road
Georgetown, KY. 40324
PI phone #: (502)867-1310

FROM: Institutional Review Board
c/o Office of Research Integrity

SUBJECT: Exemption Certification for Protocol No. 10-0445-X4B

DATE: June 28, 2010

On June 22, 2010, it was determined that your project entitled, *"The Effect Of Mobility On Student Achievement"*, meets federal criteria to qualify as an exempt study.

Because the study has been certified as exempt, you will not be required to complete continuation or final review reports. However, it is your responsibility to notify the IRB prior to making any changes to the study. Please note that changes made to an exempt protocol may disqualify it from exempt status and may require an expedited or full review.

The Office of Research Integrity will hold your exemption application for six years. Before the end of the sixth year, you will be notified that your file will be closed and the application destroyed. If your project is still ongoing, you will need to contact the Office of Research Integrity upon receipt of that letter and follow the instructions for completing a new exemption application. It is, therefore, important that you keep your address current with the Office of Research Integrity.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's Guidance and Policy Documents web page [http://www.research.uky.edu/ori/human/guidance/htm#PIresp]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [http://www.research.uke.edu/ori]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

VITA

Lisa Eddy was born on July 8, 1955 in Knoxville, Tennessee. She has earned a Bachelor's degree in Mathematics Education from Michigan State University and a Master's degree in Mathematics Education from Indiana University at South Bend. Lisa has been a teacher of mathematics since 1979, ranging from pre-school to high school.

Lisa Eddy