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Effects of student mobility on the academic achievement of mobile and nonmobile students

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EFFECTS OF STUDENT MOBILITY ON THE ACADEMIC ACHIEVEMENT OF MOBILE AND NONMOBILE STUDENTS

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ABSTRACT

Students who move between schools often have more social, psychological, and academic problems than their peers whose enrollment is stable. However, the negative effects may also be felt among classrooms and schools. To date, much of the student mobility research do not control for demographics or prior achievement, and utilized a sample size of one school or district. The current study examined a statewide database to determine which student variables predict mobile status. Analyses also investigated the relationship between mobility and academic achievement for mobile students, as well as classrooms and schools, while controlling for demographics and prior achievement. The logistic regression analyses using demographics, special education status, attendance, and prior achievement as predictors were able to correctly predict less than 1% of mobile students, indicating that key predictors of mobility were not captured in state databases. Results of the HLM analyses showed that the composite variable encompassing all types of moves, in district move, between years, within year, and promotional move variables was associated with poorer achievement. A negative association was also found for classrooms and schools containing students who moved within the school year, indicating that negative effects are felt among stable students attending classrooms and schools with mobile students.

INTRODUCTION

Student mobility is exceedingly common in the United States. The U. S. Census Bureau (2001) observed that 13.6 million children ages 1 to 19 moved residences with a sizeable portion of those moves requiring a change in schools between 1999 and 2000. The U.S. General Accounting Office study (1994) found 24 percent of third graders nationally changed schools at least once since their first grade year, and 17 percent of third graders changed schools at least twice during that time. Furthermore, data from the National Assessment of Educational Progress' (NAEP) Math Assessment (2000) indicated that 19 percent of fourth graders and 12 percent of eighth graders nationally changed schools once during the previous two school years. NAEP (2000) found that 9 percent of fourth graders and 4 percent of eighth graders nationally changed schools three or more times during the previous two years.

Although there is not one generally accepted definition, student mobility generally refers to any change in school enrollment. Students can change schools in a variety of ways. Students can make a between years move, completing the school year at one school and enroll in another school the following year. Students can make a within year move, changing schools before the school year has ended. Students who face certain disciplinary actions may be forced to leave the school and enroll in another. Student mobility can also include the distance a student moves. Students can transfer between schools considered being close in distance, while still remaining within district lines. Students who transfer between schools that are farther apart and are no longer inside the district constitute an out of district move. Students may also make promotional moves in which they are promoted to a grade that is not offered at their previous schools, as seen in moves to junior high and high schools. Other types of mobility include students who move to and from public and private schools and students who move in and out of the state or country.

There are many reasons why students change schools. The most common cause of student mobility is a change in residence. In addition to residential mobility, several student and school-related factors also contribute to student mobility. These factors include discipline problems, nonattendance, low academic performance, and grade retention (Lee & Burkam, 1992; Rumberger, 2003; Rumberger & Larson, 1998). Additionally, students may leave a problematic environment at their previous school, pursue a better academic program at a new school, and can be promoted to a grade that is not at the current school (Kerbow, 1996; Rumberger 2003).

As a group, mobile students share some similar demographic characteristics. African Americans (Alexander, Entwistle, & Dauber, 1996; Kerbow, 1996) and students from low-income families (Alexander, Entwistle, et al., 1996; Engec, 2006; Kerbow, 1996; Rumberger, 2003; Temple & Reynolds, 1999; U.S. General Accounting Office, 1994; Wood, Halfon, Scarlata, Newacheck, & Nessim, 1993) are significantly more likely to move frequently. Students with single parents were found to move more frequently than students from two-parent families (Kerbow, 1996; Wood, Halfon, et al., 1993). Students with parent(s) who are unemployed, parent(s) with less than a high school education (Alexander, et al., 1996; Temple & Reynolds, 1999; Wood et al., 1993), and students born to a teen mother (Wood et al., 1993) have also been found to make frequent school changes. Finally, students whose parents are in the military also experience high rates of mobility (Smrekar & Owens, 2003)

Mobility has also been found to affect students behaviorally and academically. Studies have found that highly mobile students are likely to experience more behavior problems and grade retention than their stable peers, (Engec, 2006; Rumberger, 2003; Simpson & Fowler, 1994; Swanson & Schneider, 1999; Wood, et al., 1993). It has also been found that students that move have lower academic achievement prior to changing schools (Blane, Pilling, & Fogelman, 1985; Nelson, Simoni, & Adelman, 1996; Reynolds, 1989, 1991; Temple & Reynolds, 1999).

Several research studies have found that mobility generally has a negative association with academic achievement (Alexander et al., 1996; Engec, 2006; Heinlein & Shinn, 2000; Kerbow, Azcoitia, et al., 2003; Mehana & Reynolds, 2004; Rumberger, 2003; Strand & Demie, 2006; Temple & Reynolds, 1999). Mehana and Reynolds (2004) conducted a meta-analysis on studies of student mobility and estimated that mobile students were about four months behind in achievement when compared to stable students. Mobility does not appear to have a negative effect on the achievement of students from military families. Military schools have an efficient transfer of records, and when records do not arrive on time, informal assessments of students' academic needs are conducted immediately. Additionally, military schools also have high parent involvement and are nested within tightly knit military communities, which permit children to change schools with little disruption (Cramer & Dorsey, 1970; Marchant & Medway, 1987; Mehana & Reynolds, 2004; Smrekar & Owens, 2003).

Few researchers have investigated the association between different types of student mobility and student achievement (Engec, 2006; Hanushek, Kain, & Rivkin, 2004). The different types of mobility investigated have generally been categorized as a change in schools during the school year or between school years, change in schools that are either in district or out of district, and whether the change in school was due to promotion to a grade not at their previous school. Engec (2006) found students who moved within the school year had lower achievement than students who did not move within the school year. The same negative results were found for students who moved between school years (Engec, 2006). Furthermore, Hanushek and colleagues (2004) found that the negative effect of moving within the school year was at least twice as large as the effect of moving between school years (Hanushek et al., 2004). Engec (2006) also investigated the effects of promotional mobility on the academic achievement. Achievement of students who made a promotional move was only slightly, albeit significantly, lower than stable students (Engec, 2006).

Negative effects are not only seen among mobile students, but also in the classrooms and schools in which they are enrolled. All students in highly mobile schools have significantly lower achievement when compared with less mobile schools (Hanushek et al., 2004; Rumberger, Larson, et al., 1999). Schools with high rates of student turnover have also been found to have a slower pace of instruction (Smith, Smith, & Bryk, 1998) and increased administrative costs (Rumberger, 2003).

Student mobility may also affect school accountability efforts under the No Child Left Behind Act (2001). All students are assessed under NCLB, however test results of students who do not remain in one school for a full academic year do not count towards either school's adequate yearly progress (AYP) (Weckstein, 2003). This creates a motivation for schools to focus less on those students who will not be counted towards their AYP (Weckstein, 2003).

Further research on the impacts of student mobility is needed to ascertain the effects of different types of moves on academic achievement. Additionally, if a within year move is hypothesized to interrupt the instruction of students in their class, it is important to consider the effects of mobility on all students. Overall, the key purpose is to improve the empirical understanding of the impact of student mobility on academic achievement in a large state level database using a model that incorporates substantial controls for confounding variables such as demographic factors and prior achievement.

REVIEW OF THE LITERATURE

Causes of Mobility

The most common cause of student mobility is residential mobility. While some students change schools without moving and some change residences without changing schools, changes in both residences and schools commonly occur together. A change in residence can occur for a variety of reasons. Families may change to a better residence, or change due to a change in employment or the appeal of a different school. However, stressful life events, such as divorce or loss of parental employment may also prompt a change in residence (Speare & Goldscheider, 1987). While schools and districts gather many pieces of information about their students, the reason for a change in schools, especially if it is a personal reason, is often unknown to schools or that sort of data is not kept on file. Rumberger and Larson (1998) researched mobility among Chicago public school students and found that overall half of students who changed residences did so without changing schools. Furthermore, about one-third of students who changed schools did not have a change in residence (Rumberger & Larson, 1998). A study by Kerbow (1996) utilizing a similar sample of Chicago public school students, found that 58 percent of school changes were accompanied by a change in residence and 42 percent were due to school reasons, which included behavioral and academic reasons for leaving a school.

In addition to residential mobility, several reasons for student mobility include leaving a problematic atmosphere at the previous school, the appeal of a better academic program at a new school, and promotion to a grade that is not at the current school (Kerbow, 1996; Rumberger 2003). In a study of mobility among students in California, Rumberger's (2003) interview data revealed that half of parents in their sample reported changing schools because their children asked to be transferred. The most endorsed reasons for a change in schools that were family initiated included leaving a problematic environment and seeking a better educational program in a magnet or private school (Rumberger, 2003).

Several school-related factors, such as discipline problems, nonattendance, low academic performance, and grade retention also contribute to student mobility (Rumberger, 2003; Rumberger & Larson, 1998; Rumberger & Thomas, 2000). A study by Rumberger and Larson (1998) found that students with identified behavior problems were 70% more likely to change schools than a comparison group of students who were not identified as having behavior problems. Furthermore, students who had a high number of absences were found to be 40% more likely to change schools than students with low numbers of absences (Rumberger & Larson, 1998). Nationally, schools with high rates of retained students were found to also have higher rates of mobility than schools with smaller rates of retained students (Rumberger & Thomas, 2000). It is unclear as to whether grade retention may encourage students to change schools, changing schools may help create more grade retention, or whether a bi-directional relationship exists between retention and mobility. A bi-directional relationship seems plausible where low academic achievement, which would lead to grade retention, is also associated with a change in schools (Alexander et al., 1996; Blane, Pilling et al., 1985; Nelson, Simoni, & Adelman, 1996; Reynolds, 1989, 1991; Temple & Reynolds, 1999).

Characteristics of Mobile Students

Mobile students differ from their stable counterparts in reference to several demographic characteristics. Minority students are more likely to move frequently when compared to Caucasian students (Alexander, et al., 1996; Kerbow, 1996). Kerbow (1996) found that African American students in Chicago were more likely to change schools when compared to Caucasian, Latino, and Asian students. Alexander and colleagues (1996) replicated the same results in a sample of students from Baltimore, finding that African American students change schools more often than Caucasian students.

Students in low-income families were significantly more likely to move frequently (Alexander, et al., 1996; Engec, 2006; Kerbow, 1996; Rumberger, 2003; Temple & Reynolds, 1999; U.S. General Accounting Office, 1994; Wood, et al., 1993). Using a nationwide sample, Wood and colleagues (1993) examined the effects of mobility on a variety of factors including development, school failure, and behavior problems. The authors concluded that a change in residence is especially stressful for families who have limited resources to cope with the move (Wood et al., 1993). Kerbow (1996) had a similar finding in which mobile students were more likely to receive free lunch. An unexpected outcome was that the stable families in this study were still close to the poverty line with a median household income of $26,989. This suggests that a higher socioeconomic status as a protective factor for student mobility does not refer to relative affluence, but simply less economic stress (Kerbow, 1996).

Family composition is another characteristic that distinguishes mobile and stable students. Students from single-parent families were more likely to move frequently than students from two-parent families (Kerbow, 1996; Wood et al., 1993). Kerbow (1996) found that 46% of stable Chicago students were from two-parent households, and the majority of mobile students were from single-parent households. Wood et al. (1993) found that frequent relocation was associated with families headed by a single parent or a grandparent.

Frequent moves are also more common among students with parent(s) who are unemployed, parent(s) with less than a high school education (Alexander, et al., 1996; Temple & Reynolds, 1999; Wood et al., 1993), or whose mother was younger than 18 years when the child was born (Wood et al., 1993). Temple and Reynolds (1999) found that girls were less likely to experience mobility, however the estimate was only significant at the 0.10 level. Alexander et al. (1996) conducted a longitudinal study utilizing a large population of Baltimore students. School records gathered in this study provided information about school transfers, special education placements, academic achievement scores, and family socioeconomic status (e.g., free-lunch status). Information about parents' education levels was collected through interviews. A troubling picture emerged whereby the typical parent of a frequent mover was found to be a high school dropout, whereas the typical parent of a student who remained in and graduated from public education had some postsecondary education (Alexander et al., 1996). In a national sample of 9,000 students, Wood et al. (1993) found that frequent relocation was more common among children raised by parents with less than a high school education, children who were born to teen mothers, and children whose parents who were unemployed. In addition to frequently having limited financial resources, it is those families who move who are most likely to have other characteristics that negatively affect their ability to help their child adjust to a move (Wood et al., 1993).

Students who change schools also have lower academic achievement prior to moving (Alexander et al., 1996; Blane, Pilling et al., 1985; Nelson, Simoni, & Adelman, 1996; Reynolds, 1989, 1991; Temple & Reynolds, 1999). In the Alexander et al. (1996) study, achievement prior to a change in schools was investigated. Data from report card grades in reading and mathematics as well as test scores from the California Achievement Test reading and mathematics subtests were utilized. Results indicated that frequent movers had the lowest average on all four measures of academic achievement prior to moving compared to students who did not move. In discussion as to whether students' academic progress was impacted due to mobility, Alexander and colleagues (1996) indicate that it is "possibly" impacted, because mobile students on average were performing poorly academically before they changed schools, and were disproportionately from low-income minority families. Such students may struggle academically for many reasons, not solely because they move frequently (Alexander et al., 1996).

In a sample of Chicago public school students, Temple and Reynolds (1999) found that students who frequently moved between kindergarten and seventh grade had lower test scores in kindergarten. Therefore some of the differences in achievement between mobile students and their stable peers exist prior to moving. Without taking into account pre-mobility characteristics, such as low achievement prior to moving, researchers may overestimate the detrimental effects of student mobility on the academic achievement of mobile students (Temple & Reynolds, 1999).

Students with parents who are military personnel also experience high rates of mobility, with most military families spending approximately three years at one military installation before being reassigned to another (Smrekar & Owens, 2003). In a descriptive study of ten school districts in the United States, Germany, and Japan operated by the Department of Defense Education Activity (DoDEA), Smrekar and Owens (2003) collected information through school and military installation records and interviews. Records review identified information regarding curriculum and benchmark standards, student demographics, housing, health and social services, teacher quality, accountability reports, and academic policies. There are approximately 106,000 students enrolled in DoDEA schools, which is about the same number of students enrolled in school in the state of North Dakota. There are approximately an additional 600,000 children of active duty military personnel attending school in civilian public schools in the United States (Military Family Resource Center, 2001; Smrekar & Owens, 2003).

The Military Family Resource Center (2001) reports that the average military student population turnover is 37 % annually. Approximately 40 percent of these students are minorities and many of their enlisted parents have only a high school diploma (Smrekar & Owens, 2003; Military Family Resource Center, 2001). There is actually a higher percentage of African American and Hispanic students in domestic DoDEA schools than there are nationally (Smrekar & Owens, 2003). Military housing varies widely among the different installations with newer and more spacious units typically designated to higher ranking enlisted personnel or officers. The "other public housing" (Hartman & Drayer, 2002) assigned to lower ranking enlisted personnel are often the more outdated, undersized, and less-maintained units (Smrekar & Owens, 2003). While students from military families have similar background characteristics and mobility rates as students from civilian families, the effects of mobility on academic achievement are very different.

Mobility does not appear to have a negative effect on the achievement of students from military families (Cramer & Dorsey, 1970; Marchant & Medway, 1987; Mehana & Reynolds, 2004; Smrekar & Owens, 2003). This may be because most school changes are not occurring during the school year, and the way the military handles these school changes. Smrekar & Owens (2003) detailed how the Department of Defense Educational Authority (DoDEA) schools respond to high student mobility. The DoDEA employs a highly qualified teaching force that also tends to stay in one school for many years. When records do not arrive at the same time as a new student, DoDEA staff members immediately conduct informal assessments of students' needs and academic standing. There is also a records clerk at each school who is responsible for the efficient transfer of student records for each mobile student. DoDEA schools and districts have high parent involvement and are nested within tightly knit military communities. Mobility is viewed more as a "way of life" instead of a problem (Smrekar & Owens, 2003).

In an analysis of academic performance of DoDEA schools and districts, Smrekar and Owens (2003) found that students in DoDEA schools reading and writing scores that were higher than the national average. Although there is a gap in achievement between Caucasian and minority students, the gap is far smaller among DoDEA students. African American and Hispanic DoDEA students had higher reading and writing scores than the national average for both minorities (Smrekar & Owens, 2003). Even with high academic standards, teachers have a sense of personal accountability. About two-thirds of domestic and international DoDEA schools were found to have small school sizes (Smrekar & Owens, 2003), which have been linked to increased learning and decreased behavior problems (Lee & Smith, 1997; Smrekar & Owens, 2003; Wasley, Fine, Gladden, Holland, King, Mosak, & Powell, 2000).

There are many postulated reasons for the high academic achievement among DoDEA school students despite the high rates of mobility. DoDEA schools hire and retain highly qualified teachers who understand military life. Teachers are also certified to teach in their area of expertise and most have many years of experience, with only 10% of teachers having fewer than three years of teaching experience (Smrekar & Owens, 2003). Lastly, DoDEA schools are located within military installations, with families required to live on the installation in order for their students to be admitted to the schools. Nestled in a tightly knit community, military families have a cohesive network of commitment, accountability, routine, and discipline. Families are closely linked and develop a sense of shared responsibility. While some military pay levels meet federal poverty thresholds, military families have at least one steady income, housing, and health care services provided (Smrekar & Owens, 2003). It is the characteristics of military life that may function as protective factors in the educational careers of these mobile students.

Effects of Mobility on Students

Research has shown that mobility affects students emotionally, behaviorally, and academically. Even with a change in residence that is short in distance where parents may keep their existing supports and relationships, students may still have to change schools (Wood et al., 1993). Mobile students must find ways to cope with a new school environment (Holland, Kaplan, & Davis, 1974; Mehana & Reynolds, 2004; Rumberger, 2003; Schaller, 1975). Their social networks are disrupted and they may struggle adjusting to new peers (Pane, McCaffrey, Kalra, & Zhou, 2008).

Studies have also found that mobile students are likely to experience more behavior problems than their stable peers. Simpson and Fowler (1994) used the 1988 National Health Interview Survey of Child Health to obtain demographic, behavioral, academic, and mobility data on more than 10,000 students in grades 1 through 12. Mobility was defined as the total number of times the student changed schools in their lifetime. Behavioral data consisted of the presence of grade retention, expulsion, and suspensions during their lifetime, as well as outcomes from the Behavior Problem Index (BPI) rating scale. Results from the national survey revealed that after controlling for demographic variables, students who moved 3 or more times in their lifetime were more likely to repeat a grade, be suspended or expelled, and had higher scores on the BPI than students who never moved (Simpson & Fowler, 1994).

Grade retention is a widely used method for supporting students who are struggling academically, with the intent of catching them up with their peers. Tomchin & Impara (1992) found that teachers at every grade level see retention as a positive option, however research shows that retention has negative consequences, causing retained students to fall further behind their promoted peers. Holmes and Matthews (1984) conducted a met-analysis of over 30 studies of grade retention. Effect sizes were calculated and results indicated that the academic achievement of retained students was .44 standard deviations below a promoted peer group. A meta-analysis in recent years of grade retention research found that low achieving but promoted students fared more favorably than retained students (Jimerson, 2001). While school personnel may view grade retention favorably, the effects on retained students can be far reaching.

Engec (2006) also investigated the effects of student mobility on suspension rates. The sample of this study employed Louisiana public school students in grades 4-9 during the 1997-1998 school year. The Louisiana Public School Information System was used to collect demographic, achievement, and behavioral data for the study. Mobility was defined as either changing schools at the end of a school year or changing schools during the school year. After controlling for effects of ethnicity and grade, results indicated that students who moved within the school year had higher suspension rates than students who did not move within the school year (Engec, 2006).

Swanson and Schneider (1999) investigated the impact of mobility on the number of behavioral incidents, which was calculated based on the frequency of office discipline referrals and parents contact regarding behavior. Mobility in this study was defined as students who moved but did not change schools, students who changed schools but did not move, and students who both moved and changed schools using data from the National Education Longitudinal Study (NELS) database. The NELS database surveyed 25,000 8^{th} grade students nationally and provided follow-up survey data for these students when they were then in the 10^{th} and 12^{th} grades. The database also consisted of demographic, educational, and behavioral information.

Behavior problems were among the primary outcome variables, defined by a count of behavioral incidents. Using a regression model to predict behavior problems, results indicated that a change in schools late in the last two years of high school was associated with an increase in behavior problems (Swanson & Schneider, 1999).

Expulsion is a common disciplinary action that may directly lead to a change in schools. The reasons why students are expelled from their school will vary state by state and may cover a wide range of behaviors. Examples of reasons why a student may be expelled from school include: violence, property destruction, drugs, hate crimes, failure to attend school regularly, or persistent rebellion (Louisiana Department of Education, 2009). Furthermore, it has been found that committees are often subjective in deciding whether or not to expel a student (Rusby, Taylor, & Foster, 2007; Cameron, 2006). Specific to Louisiana, expulsion normally occurs in a variety of ways. A student can be assigned to a new classroom while remaining in the same school. Also, students can be permanently removed from their school and assigned to another school at an alternate site. Lastly, students can be permanently removed from their school with no instructional provisions made for their benefit (Louisiana Department of Education, 2009). Rausch and Skiba (2004) studied the impact of expulsion on academic achievement in a Midwestern state. After controlling for socioeconomic and minority status, results indicated that expulsion was negatively associated with academic achievement (Rausch & Skiba, 2004). Research focusing on all types of moves, including students who move within the school year, may inadvertently include students who moved due to expulsion into their analysis.

Mobility also impacts students academically. Several research studies have found that mobility has a negative association with academic achievement; however results are inconsistent dependent upon the inclusion or exclusion of important controls for demographic factors and prior achievement (Engec, 2006; Heinlein & Shinn, 2000; Kerbow, Azcoitia, & Buell, 2003; Mehana & Reynolds, 2004; Rumberger, 2003; Strand & Demie, 2006; Strand & Demie, 2007; Temple & Reynolds, 1999).

Mehana and Reynolds (2004) conducted a meta-analysis on 26 studies from 1975 to 1994 evaluating the effects of mobility on reading and mathematics achievement in students in kindergarten through sixth grade. Demographics, such as gender, socioeconomic status, and civilian status (civilian vs. military) were included. Prior achievement, however, was not utilized because the majority of studies in the meta-analysis did not include it as a predictor. Mobility was defined as any type of move. Results indicated a composite effect size of -0.25 for reading and -0.22 for math achievement. Using growth scores, the effect sizes were converted into month values based on the standard deviation of the Iowa Test of Basic Skills (ITBS), a commonly used test of academic achievement. Thus, mobile students are estimated to be about four months behind in achievement when compared to stable students. Also, mobility was linked with lower academic achievement no matter the number of predictors included. A significant limitation of the meta-analysis was that many of the included studies did not control for prior achievement in estimating the effect of student mobility. However, the few studies that did include prior achievement also found a negative effect (Mehana & Reynolds, 2004).

Heinlein and Shinn (2000) specifically sought to resolve some of the discrepancies with previous mobility research. The effect of mobility on academic achievement, with and without prior achievement controlled, was studied in a sample of 764 sixth grade students in a New York City school district. Mobility was defined as the total number of moves since kindergarten, and demographics included were gender and socioeconomic status. Results revealed a negative association between mobility and achievement; however that association became nonsignificant once prior achievement was controlled for in the analysis (Heinlein & Shinn, 2000). It is clear that key predictor variables, such as achievement prior to a change in schools, should be included in analyses attempting to find a link between mobility and achievement.

Temple and Reynolds (1999) used data from the Chicago Longitudinal Study to investigate the effects of student mobility on the academic achievement of about 1,000 low socioeconomic status African American students in kindergarten through seventh grade. Mobility was defined as the total number of moves a student made between kindergarten and seventh grade. The dependent variable was student academic achievement in reading and math in seventh grade (Temple & Reynolds, 1999). Results indicated that highly mobile students were about a year behind their stable peers, however only half of this difference was attributed to mobility. Lower achievement prior to the move and demographic variables, such as low socioeconomic status, were also responsible for low achievement. A limitation of this study is that the mobility variable did not include the number moves within the school year, and therefore, was only an index of frequent mobility. Another limitation was that the reason for moving was not available in the database (Temple & Reynolds, 1999).

Strand and Demie (2006) investigated the association between student mobility and academic achievement in a sample of 2,279 elementary school students in London, England. Mobility was defined as any change in schools during the elementary years. Both demographic variables and prior achievement were used as predictors in the model. Results indicated a negative association between mobility and achievement. However, the association decreased once demographics were added to the model and the association lost significance once prior achievement was added to the model (Strand & Demie, 2006). This study concluded that there was no link between mobility and achievement, and the authors sought to replicate these results with secondary students. Using a sample of 1,329 secondary school students, Strand and Demie (2007) investigated the association between student mobility and academic achievement. Similar to the previous study, mobility was defined as any move during the secondary years and the model included both demographics and prior achievement. Surprisingly, the results were not replicated. Student mobility was negatively associated with academic achievement, even with demographics and prior achievement controlled for. Taken together, results demonstrated that student mobility did have a negative association with academic achievement, but only for students in secondary school. Perhaps poor current achievement is better explained by poor prior achievement and disadvantageous demographics for elementary school students, but that these key predictors did not account for the effect of mobility in secondary students (Strand & Demie, 2007). It is also possible that the learning demands, social context, or developmental level are different at the secondary level, which could also explain the differences in results.

Two studies have investigated the effects of student mobility on academic achievement utilizing hierarchical linear modeling (HLM) (Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Pane, McCaffrey, Kalra, & Zhou, 2008). Gruman, Harachi, et al. (2008) investigated the effects of student mobility on academic achievement, classroom participation, and attitude towards school in a sample of just over 1,000 students in the Pacific Northwest in grades two through five. Mobility was defined as any change in school enrollment between the second and fifth grade. Class participation was obtained from a nine-item rating scale with items such as "interacts appropriately with teacher" and "cooperates with peers in group activities" (Gruman et al., 2008). Student attitude towards school was also obtained by rating scale, as well as academic performance. The authors did not utilize achievement test scores, but rather teacher ratings of student academic performance in ELA, Mathematics, and Reading with a likert scale ranging from “above average” to “needs improvement” (Gruman et al., 2008). Results indicated that mobility between second and fifth grade predicted negative classroom participation and academic achievement, but was not linked to a positive attitude towards school (Gruman et al., 2008). While Gruman and colleagues (2008) developed a sophisticated model to predict academic achievement, some of their methods are flawed. Specifically, academic achievement was taken from questionnaire data instead of test scores, which may introduce teachers’ perceived bias towards how their students are performing in class. Additionally, while the authors did control for demographic variables, they did not control for achievement prior to the change in schools. Prior achievement was a missing piece of the model in accurately estimating the relationship between mobility and achievement.

Pane, McCaffrey, Kalra, and Zhou (2008) also utilized HLM to investigate the effects of mobility on academic achievement. Mobility in this study was exclusively determined by displacement as a result of Hurricanes Katrina and Rita that hit south Louisiana in 2005. The authors focused on Louisiana students who were displaced, but remained in Louisiana public schools. This allowed the authors to estimate effects of mobility that were related to a natural disaster rather than personal issues such as child discipline problems. Results indicated a small negative effect of displacement mobility on academic achievement. However, students that transferred to higher performing schools also had higher academic achievement themselves. Results indicated that the negative effects of moving within the school year were offset by an improvement in schooling, which included increased school quality and a higher performing school group. The authors suggest that while results of this study relate to mobility due to the distress of a natural disaster, academic achievement may be sensitive to overall school performance, indicating that even in the short-term, positive changes in achievement may be related to positive changes in schooling. This result contends that student mobility is not always related to poorer achievement, especially if the move is to a school with high school quality and higher school achievement. Further examination of the qualities of these higher achieving schools could lead to important policy implications for school improvement efforts (Pane, McCaffrey et al., 2008).

While much of the research on mobility use a definition of the count of moves a student makes over a certain period of time (Heinlein & Shinn, 2000; Strand & Demie, 2006; Strand & Demie, 2007; Temple & Reynolds, 1999), few researchers have investigated the association between different types of student mobility and student achievement (Engec, 2006; Hanushek, Kain, & Rivkin, 2004). The different types of mobility investigated have generally been categorized as a change in schools within the school year or between school years, change in schools that are either in district or out of district, and whether the change in school was due to promotion to a grade not at their previous school.

Engec (2006) investigated the effects of within year and between years mobility on the effects of academic achievement in Louisiana public school students. A within year move was defined as enrolling in more than one school during the school year. A between year move was defined as a change in enrollment at the end of the school year. After controlling for ethnicity and grade, results indicated that students who moved within the school year had lower achievement than students who did not move within the school year. The same negative results were found for students who moved between school years. Analyses did not control for prior achievement (Engec, 2006).

Hanushek, Kain, and Rivkin (2004) also investigated the effects of mobility within the school year and between school years on the academic achievement of students in fourth through seventh grade in Texas. With demographics and prior achievement controlled, Hanushek and colleagues (2004) found that the negative effect of moving within the school year was at least twice as large as the effect of moving between school years. In addition, while students moving within a district had no improvement in school quality, students who moved out of a school district were found to have a small, albeit significant, improvement in school quality, which was an estimate including "the quality of staff, the available resources, peers, and the curriculum, and level of mobility in the school" (Hanushek et al., 2004). This was evident in moves from urban to suburban districts and moves between suburban districts, but was not evident in moves into an urban district. (Hanushek et al., 2004). Limiting the timing of school changes to coincide with the natural changes in school years may mitigate the negative relationship between mobility and achievement, but more research is warranted (Mao, Whitsett, & Mellor, 1997). It is also unclear as to what the effect of changing schools multiple years in a row has on academic achievement. An unpublished manuscript by Kerbow (2002) indicated that a student's achievement "recovers" if they remain in the school the following year after the move.

Prior research defining mobility simply as the count of school changes in a students' academic career may fail to consider natural changes in schools, such as when a students are promoted to grades not at their current schools. This promotional type of move has also been scarcely researched. Engec (2006) investigated the effects of promotional mobility on the academic achievement in Louisiana public school students. After controlling for ethnicity and grade, results indicated that the academic achievement of stable students were significantly different from students who made a between years move and a promotional move. Achievement of students who made a promotional move was only slightly, albeit significantly, lower than stable students. In addition, achievement of students who made a between years move was lower than students who made a promotional move (Engec, 2006).

Effects of Mobility on Classrooms and Schools

Mobility not only affects students, but also impacts the classrooms and schools that manage these mobile students. Thus, stable students may be negatively affected. Rumberger and colleagues (1999) found that all students in highly mobile schools have significantly lower achievement when compared with schools with low mobility, with socioeconomic status controlled for. Hanushek et al. (2004) confirmed the findings of Rumberger et al. (1999), and with prior achievement controlled, found that student entry within the school year reduced achievement of the entire school. Highly mobile schools have also been found to have a slower pace of instruction (Smith, Smith, & Bryk, 1998) and increased administrative costs (Rumberger, 2003).

Depending on the time of year that a student enrolls in a new school, teachers may receive little to no advanced notice that a new student will be placed into their classroom.   This would not allow teachers time to have a desk and work materials ready, change lesson plans to prepare their class for the arrival of a new student, or seek relevant background information about the new student. Lesson plans that are changed often take the form of "backtracking," designed to catch new students up to the rest of the class, and will ultimately slow down the pace of instruction (Lash & Kirkpatrick, 1990).

Kerbow (1996) outlined several ways in which student mobility, specifically student moves within the school year, can restrict instructional time. First, instructional planning becomes more difficult for teachers. Students for whom a specific unit was planned may leave during the year, or new students may not be exposed to certain parts of instruction that preceded their attendance. Second, teachers in a highly mobile school may be reluctant to adopt new practices or techniques when it is focused towards a specific composition of a class that may change throughout the year. Lastly, instruction may become more review-oriented when new students enter the class. This will ultimately lead to the disruption of instructional time for all students (Kerbow, 1996). Kerbow, et al. (2003) argue that the reduced pace of instruction caused by mobility directly affects not only the mobile students, but also their stable counterparts.

In addition, schools with a highly mobile student population face the challenge in cumulative record keeping. Records can be slow in arriving to their respective schools and in some cases, students entitled to special education services may not get support until their file has arrived at their new school (Rhodes, 2007). Student mobility presents a particular problem at the school and district level when attempting to meet accountability provisions set forth by NCLB (2001).

Student Mobility and NCLB

NCLB (2001) was enacted to "close the achievement gap with accountability, flexibility, and choice, so that no child is left behind." The overall purpose is to ensure that all children in the United States are able to meet state-mandated proficiency standards with the help of federal funding. NCLB is predicated on the assumption that setting high standards and formulating quantifiable goals can enhance student performance in school. In order to meet these requirements, students are tested annually through statewide standardized tests, and the results are used to determine whether schools and districts have made adequate yearly progress (AYP) towards their academic goals for all students (NCLB, 2001). By evaluating schools based on student outcomes on standardized tests, it is suggested that these tests measure how well the teacher and school have prepared the student. By holding the school accountable for student performance on standardized tests the assumption is adopted that if the student performs well then the school must be successful (Casbarro, 2005).

The yearly standardized tests have now taken the form of high-stakes tests, which may be positive or negative, for students, teachers, and schools based on students' performance on the standardized tests. Much of the research on high-stakes testing is focused at the classroom and school levels. Just as with students, classrooms and schools are also both positively and negatively impacted by high-stakes testing. Research has shown that teachers have been encouraged to change their instructional practices in positive ways, by matching curriculum and instruction to testing standards, making data-based decisions about instruction based on academic achievement, and increasing instructional support to lower-achieving students (Hamilton, Stecher, Marsh, McCombs, Robyn, Russell, Naftel, & Barney, 2007; Stecher, 2002; Stecher et al., 1998; Wolf, Borko, McIver, & Elliott, 1999).

Even with these positive effects, there are many negative effects of high-stakes testing on classrooms, which include negative curriculum reallocation, teach-to-test formats, and cheating (Stecher, 2002). Curriculum reallocation has taken the form of "narrowing," where the greater the stakes, the greater the narrowing of curriculum would occur (Corbett & Wilson, 1991; Romberg, Zarina, & Williams, 1989; Shepard & Dougherty, 1991). Similar to negative allocation of curriculum is the adoption of a teach-to-test format. This occurs when teachers adapt their teaching styles to make classroom instruction format more like the format of the test (Shepard & Dougherty, 1991; Smith & Rottenberg, 1991; Stecher, 2002; Stodolsky, 1988). The most extreme negative effect of high-stakes testing on classrooms is cheating, which can include providing answers and hints, suggesting revisions, and leaving related materials in view during test administration (Stecher, 2002).

There is no ambiguity about who is subject to high-stakes testing under NCLB, however results of mobile students are not counted towards AYP in the same way as other student groups (Weckstein, 2003). Test results of students who do not remain in one school for a full academic year do not count towards either school's AYP. If a student changes schools and remains in the same district, their assessment results will count towards the district's AYP, but not the schools' AYP. If a student changes schools, does not remain in the same district, and remains in the same state, their assessment results will count towards the state's AYP, but not the district or school's AYP. Weckstein (2003) explains this as a "balancing of interests, " where schools are not held accountable for the performance of students not at their schools for a full year, but districts and/or states are accountable where the student was taught for a full year. This creates a motive for schools to focus less on those students who will not be counted towards their AYP, namely those students who enroll after the start of the school year (Weckstein, 2003).

Title I of NCLB has created some "escape hatches" for students attending failing schools that may promote mobility (Center for Law and Education, 2002; Weckstein, 2003). Students are allowed to transfer to other public schools or receive supplemental services from a public or private school if their school fails to make AYP for a certain number of years (NCLB, 2001). However, there may be loopholes for schools that push certain students out to avoid accountability.

Schools may attempt to circumvent accountability issues with NCLB by excluding achievement of certain students towards their AYP. For example, students who are expelled or suspended for a length of time and students receiving special education services at another public or private school outside of their regular school for a period of time may not be considered enrolled for a full academic year, thus excluding their achievement scores in their schools' AYP. Enrollment for a "full academic year" is defined by each state, and parts of the definition may be used to exclude difficult students. Schools also run the risk of persuading low-achieving students to transfer to other schools during the school year or encouraging low-achieving students to drop out or unregister for a short time after the assessment has taken place. This discounts their assessment results towards the school's AYP (Weckstein, 2003). While the aforementioned may occur for reasons unrelated to NCLB, mobility for any reason presents a problem for school accountability.

While much of student mobility is due to residential changes, a large portion is due to schools and districts (Kerbow, 1996). Rhodes (2007) outlined several possible changes at the school and district level to manage student mobility. District-level solutions include establishing a task force to examine student mobility to find possible patterns, discontinue disciplinary transfers, restriction of transfers during a semester, adoption of electronic student records, and the promotion of state and regional discussion of mobility. School-level solutions include establishing a mobility committee, mandate exit interviews for transfers, start a "buddy" system for new students, alert teachers before a new student arrives, give new students a tour of their new school, and challenge the assumption that "school would improve without Problem Child X" (Rhodes, 2007). Many of these changes are presently utilized in Department of Defense Educational Authority military schools and districts (Smrekar & Owens, 2003). While students at persistently failing schools are allowed to transfer to better performing schools under NCLB, there are presently no boundaries as to the time of year this can happen. Without restrictions, sending and receiving schools are likely to face an increase in mobility (Rhodes, 2007).

Rhodes (2005) investigated the intricate relationship between mobility, demographics, and NCLB accountability performance ratings. The sample utilized was students from eight urban school districts in Ohio during the 2003-2004 school year. Mobility was defined as enrollment at one school for less than half of the school year. Results of the analysis indicated that schools with high mobility rates, high numbers of minority and low socioeconomic status students were associated with being assigned to the two lowest NCLB accountability rankings. Results are interpreted with caution; however, due to the fact that test scores from students who were enrolled less than 120 days in a school were not used in the accountability results. Therefore, the inclusion of students who moved within the school year from the analysis could have indicated a stronger negative association. However, high rates of mobility significantly predicted NCLB accountability status. While high rates of minority and low socioeconomic status students also significantly predicted NCLB accountability status, the effect was not as large as student mobility (Rhodes, 2005).

Intervention Strategies and Prevention Efforts Addressing Mobility

Despite a great deal of research indicating a negative link between mobility and student achievement, many schools and districts do not have systems in place to support students when they transition into a new school. There are several intervention strategies and prevention efforts intended to mediate the probable negative effects of mobility on the academic success of students (Adelman & Taylor, 1992; Kerbow et al., 2003; Nelson, Simoni, et al., 1996). To assist single parent and low-income families maintain stable employment, before and after-school day care could be provided to minimize negative effects of moving to a new school. A preventative approach would be a change in district policy that would allow a student to remain in their school if they changed residences within their current school district, at least through the current school year (Kerbow et al., 2003; Nelson, Simoni, et al., 1996). Given that many families decide to change schools due to dissatisfaction, involving families in social ties within their school could better enable parents to resolve matters of disagreement with their school allowing their child to remain in that school. In addition, the flow of information between schools should be as seamless as practical, so that the new schools can better place students and identify potential gaps in knowledge that can be addressed straightaway (Kerbow et al., 2003). Other prevention strategies involve employing social supports for incoming students designed to provide a welcoming atmosphere (Adelman & Taylor, 1992; Nelson et al., 1996).

An example of civilian district-level changes in response to student mobility is the “Staying Put” campaign in Chicago Public Schools (Kerbow et al., 2003). The initiative makes parents and educators aware of the effects of student mobility on achievement, and counselors interview parents of transferring students to gain information about the reasons for transfer. They are given an “If You Move…” brochure detailing educational setbacks related to student mobility. It also details suggestions about alternatives to changing schools when a move can be avoided and tips on how to handle moves that are unavoidable. District-level changes in Chicago also enable students who change residences the opportunity to complete the school year without having to transfer until the next school year commences (Kerbow et al., 2003).

Another Chicago initiative aimed at reducing student mobility is the Community Schools program (Kerbow et al., 2003). The comprehensive community schools operate as a community outreach center offering not only classes, but also medical and dental care, after school programs, and counseling services. Community schools are open early mornings, afternoons, evenings, weekends, and summers. Two studies have found positive outcomes of community schools (Azcoitia, 2000; Whalen, 2002). Furthermore, average student mobility rates declined during a three-year period after the Community Schools initiatives were implemented (Whalen, 2002). Comprehensive initiatives involving schools, districts, and families have the potential to reduce the negative effects of student mobility in order to facilitate improved academic careers of all students.

In conclusion, it is well documented that student mobility is negatively linked to many social, psychological, and academic outcomes for mobile students. However, the probable effects of student mobility could extend beyond mobile students themselves to classrooms and schools. This means that student mobility may have a negative association with the achievement of stable students who attend the same schools. Furthermore, a change in residence only accounts for roughly half of all student moves, which leads to the conclusion that school and district level policies contribute to why students change schools. By considering student mobility to affect all students, policy changes specifying when and why students change schools could contribute to better academic careers of all students and facilitate school improvement efforts.

RATIONALE AND PURPOSE OF THE CURRENT STUDY

While many previous studies of student mobility simply count the total number of schools a student has attended before a certain time period (Astone & McLanahan, 1994; Benson, Haycraft, Steyaert, & Weigel, 1979; Blane, Pilling, & Fogelman, 1985; Branz-Spall Rosenthal & Wright, 2003; Fernandez, 1987; Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Hefner, 1994; Mantzicopoulos & Knutson, 2000; McLeod, Heriot, & Hunt, 2008; Pribesh & Downey, 1999; Rumberger & Larson, 1998; Simpson & Fowler, 1994; Wood et al., 1993), few have examined different types of moves, such as within and between years moves (Engec, 2006; Mao et al., 1997) and in and out of district moves (Hanushek et al., 2004; Wright, 1999). It is also unclear as to whether previous studies tallying the number of school changes included promotional moves in their calculation.

There have also been only a few analyses of mobility utilizing hierarchical linear modeling (Gruman et al., 2008; Pane et al., 2008). Hierarchical linear modeling allows for the nesting of students within classrooms and classrooms within schools and is an ideal analysis when attempting to investigate the association between mobility and achievement among students, classrooms, and schools. Pane and colleagues' (2008) study was limited to mobility due to hurricane displacement and Gruman and colleagues (2008) did not have an objective measure of achievement in order to predict the effects of mobility. The current study investigated the more commonly occurring types of mobility and had an objective measure of academic achievement.

Much of the research on student mobility suggests that overall mobility negatively impacts academic achievement. However, there are flaws in methodology when studies do not have adequate statistical controls (Audette, Algozzine, & Warden, 1993; Demie, 2002; Engac, 2006). A major limitation to Mehana and Reynolds' (2004) meta-analysis was that prior achievement was not included due to a lack of studies controlling for it. This is likely a key reason for the inconsistent findings of previous mobility studies. Previous studies determining the association between mobility and achievement while controlling for prior achievement have not found a statistically significant association (Heinlein & Shinn, 2000), significant negative association (Strand & Demie, 2007), and a significant negative association with only half of the association due to mobility (Temple & Reynolds, 1999). The current study included demographic and prior achievement data in analyses and the different types of school moves were criterion variables instead of a composite variable that includes all moves. This also allowed for an estimate of the impact of a promotional move on student academic achievement.

The current study builds upon the existing research base utilizing longitudinal datasets in examining the effects of student mobility on academic achievement (Gruman et al., 2008; Hanushek et al., 2004; Heinlein & Shinn, 2000; Kerbow, 1996; Temple & Reynolds, 1999). Only two previous studies (Gruman et al., 2008; Pane et al., 2008) have utilized Hierarchical Linear Modeling (HLM). Gruman et al. (2008) investigated mobility within one school district in the Pacific Northwest and Pane et al. (2008) investigated natural disaster-related mobility due to Hurricanes Katrina and Rita within the state of Louisiana in 2005.

HLM is a statistical technique that has been useful for analyzing datasets where there is a naturally nested data structure. It allows the variance in outcome variables to be analyzed at multiple hierarchical levels, whereas in linear regression all effects are modeled to occur at a single level (Raudenbush, Bryk, Cheong, Congdon, du Toit, 2004). HLM is an appropriate statistical method for the current investigation given that it captures the nesting of students within classrooms and it allows the appropriate modeling of variables at multiple levels such as student, classroom, and school (Noell, Porter, and Patt, 2007).

The purpose of the current study was to investigate the effect of different types of student mobility on the academic achievement of mobile students and their stable peers. Several different types of moves were investigated including promotional, within year, between years, within district, and out of district. An analysis was conducted to determine the relationship between the different types of mobility on the standardized English Language Arts, Reading, and Mathematics achievement scores of mobile students, as well as the effect of mobility across school years. Given that within year mobility has been found to have a particularly negative impact on the pace of classroom instruction and achievement of all students in their school (Hanushek et al., 2004; Kerbow, et al., 2003; Rumberger, Larson, et al., 1999), the effect of within year mobility on stable students was also investigated at the classroom and school levels. Additional variables such as prior achievement and demographic variables were included in the analyses.

METHODOLOGY

Participants

The current study used a large pre-existing multivariate longitudinal database, with adjustments used to meet the needs to the current investigation. The data used to construct the database was obtained from the Louisiana Department of Education. The current study examined data for students in Louisiana enrolled in grades 4 through 9 for the academic school year of 2008-2009. These grades were selected in order to include the grades in which standardized tests are administered and the availability of one-year prior achievement data (e.g., grade 3 achievement data for grade 4 students).

Measures

The Louisiana Educational Assessment Program for the 21st Century (LEAP-21) and the Integrated Louisiana Educational Assessment Program (*i*LEAP) are standardized tests given to students in the state of Louisiana to measure academic achievement in the state content standards.

LEAP-21. The LEAP-21 is a criterion-referenced test that was initiated in 1997 to align with new state content standards (Mitzel & Borden, 2000). The LEAP-21 test is validated based on content validity, where a content review committee verifies whether the test aligns with state standards. Reliability for the LEAP-21 was assessed using a traditional, Cronbach's alpha, and ranges from .87 to .94 (Louisiana Department of Education, 2006a). Reliability coefficients above .85 are considered excellent, and thus the LEAP- 21 has excellent reliability (Louisiana Department of Education, 2006a). Please refer to the following website at the Louisiana Department of Education for more information regarding detailed reliability, validity, and test development data for the LEAP-21: http://www.doe.state.la.us/lde/saa/2273.html.

Students in 4th and 8th grades are tested in English Language Arts, Mathematics, Science, and Social Studies. The LEAP-21 is designed and implemented to ensure that grade 4 and grade 8 students have adequate knowledge and skills before moving on to the next grade. Students taking the LEAP-21 test do not receive either a passing or failing score; instead, they receive one of the following five achievement ratings: (1) *Advanced:* superior performance beyond the level of mastery (2) *Mastery:* demonstrated competency over challenging subject matter and is well prepared for the next level of schooling (3) *Basic:* demonstrated only the fundamental knowledge and skills needed for the next level of schooling (4) *Approaching Basic:* only partially demonstrated the fundamental knowledge and skills needed for the next level of schooling (5) *Unsatisfactory:* has not demonstrated the fundamental knowledge and skills needed for the next level of schooling.

Beginning in spring 2004, grade 4 students are required to score at least a minimum score *"Basic"* or above on either the English Language Arts or the Mathematics test and a minimum score of *"Approaching Basic"* or above on the other to progress to grade 5. The current standard (since 2006) for grade 8 students is that they must score *"Basic"* or above on either the English Language Arts or the Mathematics test and *"Approaching Basic"* or above on the other test to progress to grade 9. Thus the LEAP-21 is a high stakes test, where students who do not meet certain criteria at these critical high-stakes years are retained. Intensive summer remediation is required to be offered to students who do not score at the achievement level required for promotion and those students have the opportunity to retest after remediation concludes in the summer.

iLEAP. The Integrated Louisiana Educational Assessment Program (*i*LEAP) was developed in 2006 in response to the NCLB's requirement that individual state assessments be aligned to their state specific content standards and that student results be expressed in terms of the state's performance standards (e.g. Louisiana's five achievement levels, ranging from *Unsatisfactory* to *Advanced*). The *i*LEAP tests are administered within the Louisiana public school system to students in grades three, five, six, seven, and nine. The *i*LEAP English Language Arts and Mathematics tests are administered all grades the *i*LEAP is administered, while Science and Social Studies tests are only administered at grades three, five, six, and seven.

All items were specifically developed for the *i*LEAP according to the Louisiana state content standards benchmarks. The criterion referenced component of *i*LEAP measures how well a student has mastered the state content standards where each student's results are reported by the same achievement levels as the LEAP-21 (*Advanced, Mastery, Basic, Approaching Basic,* and *Unsatisfactory)*, scaled scores, and content standard scores. The norm referenced component of *i*LEAP measures student performance in English Language Arts and Mathematics, which provides normative scores including standard score, national percentile rank, national stanine, and normal curve equivalent scores.

Evidence for the validity of the *i*LEAP is similar to the LEAP-21 test (e.g. content validity). Reliability for the *i*LEAP was also assessed using Cronbach's alpha and ranges from .80 to .96 (Louisiana Department of Education, 2006b). Again, reliability coefficients above .80 are considered good while those above .85 are considered excellent (Louisiana Department of Education, 2006b). More information regarding test development, reliability, and validity data for the *i*LEAP can be found at the Louisiana Department of Education's website at: http://www.doe.state.la.us/lde/saa/2273.html.

Student Mobility. Student mobility status can be classified into numerous categories. For the purposes of the current study, five different mobility categories were examined.

“Between year move” refers to students completing the school year at one school and enrolling in another school the following year. “Within year move” refers to students who change schools before the school year has ended. “In district move” refers to students who change schools that are within district lines. “Out of district move” refers to students who transfer to another school that is not inside the district lines. “Promotional move” refers to students who are promoted to a grade that is no longer at their previous schools. The total count of schools attended during one school year, as well as students who move multiple years in a row were also examined.

Constructing the Database

The database in the current investigation linked data points from Louisiana’s student achievement and curriculum databases. The student database includes student demographic information and testing information for the academic year. Student demographic information in the database included the student’s race, gender, poverty level (as indicated by free/reduced lunch status), grade, gifted status, special education status, information about what school and district the student attended, and all of the study specific mobility variables. The curriculum database was used to obtain information regarding classes each student took and the teacher who instructed the course.

Preliminary work was conducted in order to resolve the issue of duplicate records that described the same student. Following this work, the LEAP-21 and *i*LEAP data files were merged followed by an additional round of duplication resolution. Students’ data were then linked based upon unique matches on multiple identifiers used in each stage of the matching process. The current investigation used a matching process that was developed and implemented by the Louisiana Department of Education to ensure that all unique cases are included.

In addition to achievement data, a number of additional variables were gathered and/or computed from the available database. As in previous studies examining student achievement, the following variables were created at the student level to be used in the analyses: free and reduced lunch status, gifted status, special education status, 504 accommodation status, limited English proficiency, gender status, attendance, and minority status.

Specific to the current investigation, several mobility variables were created. Students whose site codes between school years do not match were given a “between year move” designation. Students who have multiple site codes during the same school year received a “within year move” designation. Also, the total number of schools that a student attended during one school year was calculated. An “out of district move” designation was given to those students who had different site codes and different district codes either between or within school years. An “in district move” designation was given to students who had different site codes but the same district codes either between or within school years. A “promotional move” designation was given to students who had different site codes between school years and the grade at the former school was the highest grade at that school. Students who change schools multiple years in a row also received designations. These designations included students who changed schools prior to and two years prior to the current school year, which will be evident in students with different site codes between school years.

At the classroom level, the percentage of a class with all of the aforementioned variables as well as the mobility variables was created to determine the relationship of being in a class with different percentage of individuals with the variables of interest on individual student achievement. At the school level, the percentage of school with all the aforementioned variables including the mobility variables was created to determine the relationship different percentage of schoolmates with the variables of interest has on individual student achievement.

Procedure and Analysis

Two analyses were used to analyze the data: logistic regression and hierarchical linear modeling (HLM).

Logistic Regression. Logistic regression is a statistical technique that is used to predict a discrete outcome from a set of predictors that can be continuous, discrete, and dichotomous or a combination. While it is similar to discriminant analysis and multiple regression with a dichotomous dependent variable, logistic regression is a more flexible technique. Unlike discriminant analysis, predictors in logistic regression do not have to be normally distributed, linearly related, or have equal variance in each group. Unlike multiple regression, logistic regression cannot produce negative predicted probabilities (Tabachnick & Fidell, 2007). Logistic regression also formulates odds ratios, which is an effect size estimate for categorical data (Fields, 2005; Tabachnick & Fidell, 2007).

Logistic regression was chosen for this analysis in order to determine the significant student level predictors on the dichotomous outcome of being a mobile student or not. The specific dichotomous criterion variables were mobile status, between years move, within year move, in district move, and out of district move. Mobile status in this analysis was only comprised of between and within year moves. Promotional moves were not included in the calculation of mobile status because these particular students changed schools because they were promoted to a higher grade not offered at their previous school. Each logistic regression was run by progressively adding blocks of conceptually meaningful predictor variables in order to examine the relationship and the predictive power of each block of variables. Student achievement test scores were standardized to a mean of zero and a unit standard deviation depending on grade and year. All demographic variables were entered as indicator codes ("1" =

yes or present, “0” = no or absent). The variables of interest were prior achievement and student demographic variables.

Hierarchical Linear Modeling (HLM). HLM is a multi-level analysis, which allows variance in outcome variables to be analyzed at multiple hierarchical levels. Thus, HLM is appropriate for the current investigation because of the nested structure of the data. There are three levels of random variation: variation among students within classrooms, variation among classrooms within schools, and variation among schools (Raudenbush, Bryk, Cheong, Congdon, & duToit, 2004).

“HLM or mixed linear models have several important advantages over traditional analytic approaches. First, they readily capture the grouping of students within classrooms. Second, they permit appropriate modeling of variables at multiple levels such as student, teacher, and school. Third, they provide a model in which estimates of teacher effectiveness can be adjusted to account for unreliability of estimates” (Noell, Porter, & Patt, 2007, p. 12).

The modeling approach for the current study followed similar procedures as in Noell et al., (2007), Noell, Porter, Patt, and Dahir (2008), and Noell, Gansle, Patt, and Schafer (2009). The model used in the current analysis was a three-level structure. Students were grouped within classrooms, and those classrooms were grouped within schools. Figure 1 below depicts the nesting structure that was employed. This three-layer model was chosen for several reasons. First, the school building level was used to account for the variance component at the school building level. Previous analyses have confirmed that although this effect may be small, it is still important (Noell, 2006). Next, the classroom level allowed for the analysis of various classroom characteristics that may affect the student score. Finally, the student level containing student scores on academic testing was examined to see how it was affected by factors at level two (Noell, 2006).

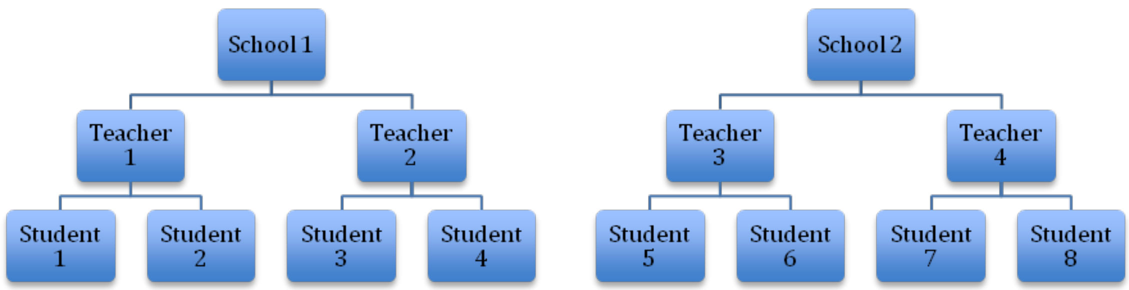

Figure 1: Nesting Structure of Students within Teachers and Teachers within Schools (Figure reprinted with permission from Noell, Porter, & Patt, 2007).

The same approach was used for English Language Arts, Reading, and Mathematics. Error at each level (student, classroom, and school) was assumed to be normally distributed, with a mean of zero and common variance at that level. First, an initial three level model was specified in which achievement was modeled with no prior predictors to use as a basis for comparison with more complex models. Next, prior achievement was added in blocks as fixed effects. Then, demographic variables were added as a one block. Variables were removed one at a time in order of the lowest *t* value until only variables with significant effects ($p = .01$) remain. This was conducted for each level. The variables that were examined at each level are presented in Tables 1, 2, and 3.

A basic presentation of the models that were used is provided below. In the equations presented below, $\sum$ is used to indicate summing across the p, q, and s coefficients at the student, classroom, and school levels of the model respectively (Noell et al., 2007). The equation for the student file is divided into two parts for presentation purposes only. In the actual equation, all of the mobility coefficients were included with the student level predictor coefficients.

Level 1: Students

$$Y_{ijk} = \pi_{0jk} + \sum(\pi_{pjk})a_{pijk} + \sum(\pi_{M\bullet jk})\, a_{M\bullet ijk} + e_{ijk}$$

where

Y_{ijk} is the achievement of student i in class j at school k in the target subject

π_{0jk} is the mean achievement for classroom j at school k

π_{pjk} are the *p* coefficients that weight the contribution of the student level data in the prediction of Y for $p = 1$ to the total number of coefficients

a_{pijk} are the student level data (prior achievement, demographic variables, attendance, etc.) that predict achievement for $p = 1$ to the total number of data points for all variables other than mobility

$\pi_{M\bullet jk}$ the coefficient for mobility summed across the j classrooms and k schools

$a_{M\bullet ijk}$ student level data indicating mobility

e_{ijk} the student level random effect, the deviation of the predicted score of student i in classroom j in school k from the obtained score

Level 2: Classroom

$$\pi_{0jk} = \beta_{00k} + \sum(\beta_{q0k})X_{q0jk} + r_{0jk}$$

where

π_{0jk} is the mean achievement for classroom j at school k

β_{00k} is the mean achievement for school k

β_{q0k} are the q coefficients that weight the relationship between the classroom characteristics and π_{0jk}, q = 1 to the total number of coefficients

X_{q0jk} are the classroom level data that are used to predict achievement

r_{0jk} the classroom level random effect, the deviation of classroom jk's measured classroom mean from its predicted mean

Level 3: School

$$\beta_{00k} = \gamma_{000} + \sum(\gamma_{s00})W_{s00k} + u_{00k}$$

where

β_{00k} is the mean achievement for school k

γ_{000} is the grand mean achievement in the target subject

γ_{s00} are the s coefficients that weight the relationship between the school characteristics and β_{00k} for s = 1 to the total number of coefficients

W_{s00k} are the school level data that are used to predict achievement

u_{00k} the school level random effect, the deviation of school k's measured classroom mean from its predicted mean

Once the final models for student achievement independent of the variables of interest to the current study for English Language Arts, Reading, and Mathematics were extracted, models were developed to examine the particular research questions targeted by the current study. All of the mobility variables were included at Level 1 in the model and were modeled as fixed across

Table 1: Student Level Variables Examined

Variables
Prior Year ELA, Reading, Mathematics, Science, and Social Studies
Gender (Male)
African American
Asian American
Hispanic
Native American
Receiving Free Lunch
Receiving Reduced Price Lunch
Gifted
Special Education
Section 504 Identification
Limited English Proficiency
Student Attendance
Mobile Status
Between Year Move
Within Year Move
Out of district Move
In district Move
Promotional Move
Number of schools attended in current school year
Move two years in a row
Move three years in a row

Table 2: Classroom Level Variables Examined

Variables
Class mean prior achievement in ELA, Reading, Math, Science & Social Studies
Percentage of students who are male
Percentage of students who are minorities
Percentage of students who received free lunch
Percentage of students who received reduced priced lunch
Percentage of students who were identified as gifted
Percentage of students who were identified as Special Education
Percentage of students who received 504 accommodations
Percentage of students who exhibited limited English proficiency
Percentage of students who moved within the school year

Table 3: School Level Variables Examined

Variables
School mean prior achievement in ELA, Reading, Math, Science & Social Studies
Percentage of students who are male
Percentage of students who are minorities
Percentage of students who received free lunch
Percentage of students who received reduced priced lunch
Percentage of students who were identified as gifted
Percentage of students who were identified as Special Education
Percentage of students who received 504 accommodations
Percentage of students who exhibited limited English proficiency
Percentage of students who moved within the school year

higher-level units. Percentages of classrooms with mobile students were included at Level 2, and percentages of schools with mobile students were included at Level 3.

Coefficients were scaled to a standard deviation of 50, which approximates the standard deviation of the iLEAP and LEAP standardized tests, and were evaluated to determine the effects on student achievement scores. A negative coefficient will represent a negative relationship on student scores, and a positive coefficient will represent having a positive impact on student scores. For example, if the coefficient for within year mobility status in the final model is -5.00 that would mean that students who moved within the school year would be predicted to have a score that is 5 points lower than those who did not move within the school year.

RESULTS

Sample Descriptive Statistics

Percentages of cases in each of the mobility variables of interest in the current study are presented below in Table 4. Mobile status is a composite variable consisting of students who made either a between year, within year or promotional move. Since students can move between school years and move within the current school year (or make a promotional move and within year move), the percentages in these subgroups are slightly higher than the mobile status variable. This is due to some students receiving a designation in both between year and within year (or promotional and within year move) variables. The same is true for the in and out of district move variables, since they are comprised of students moving between and within the school year. Additionally, the between years and promotional variables both include students who changed schools between school years, however students only received a promotional

Table 4: Sample Descriptive Statistics

	ELA	**Mathematics**	**Reading**
Mobile Status	36%	37%	30%
Between Years Move	13%	13%	11%
Within Year Move	4%	4%	4%
Promotional Move	21%	22%	17%
In District Move	10%	10%	8%
Out of District Move	3%	3%	3%
Total Sites			
One Site	96%	96%	96%
Two Sites	4%	4%	4%
Three Sites	< 0.01%	< 0.01%	< 0.01%
Four Sites	< 0.01%	< 0.01%	< 0.01%
Five Sites	< 0.01%	< 0.01%	< 0.01%
Moved Two Years in a Row	5%	5%	5%
Moved Three Years in a Row	1%	1%	1%

designation if they left the highest grade at their previous school. Students could only receive one designation in either the between years or promotional variable. Furthermore, students moving two and three years in a row consist of between and within year moves in the current and previous years. Finally, the total sites variable is the count of the number of schools a student was enrolled in during the 2008-2009 school year. The vast majority of students remained in one school throughout the school year and approximately 4% of students attended two schools, meaning that they changed schools once within the school year. A very small percentage of students in the sample attended more than two schools during the school year. To give an example of students in the ELA analysis, 469 students attended three schools, 32 students attended four schools, and 7 students attended five schools in the 2008-2009 school year. Percentages are similar in Mathematics and Reading analyses.

Logistic Regression Results

A series of logistic regression (LR) analyses were run in order to predict a dichotomous mobility outcome from a set of continuous and categorical student level predictors. The five dichotomous outcome variables included in the analyses were: mobile status (excluding promotional moves), between years move, within year move, in district move, and out of district move. Blocks of conceptually meaningful predictor variables were entered into each LR in order to determine the contribution of individual predictor variables, in addition to, the contribution of each block of predictors to the overall fit of the model.

All LR analyses included two blocks of predictors: student prior year achievement and student demographic variables. Students' achievement in the prior year for ELA, Mathematics, Reading, Science, and Social Studies were included in the first block of predictors. Student demographic variables comprised the second block of predictors and included the following:

gender (male), ethnicity (African American, Caucasian, Hispanic, and Native American), free and reduced price lunch, emotionally disturbed, specific learning disability, mild mental retardation, other health impaired, speech and language disorder, special education other, gifted, Section 504 accommodation, limited English proficiency, and student absences. All categorical demographic variables were coded as "1" indicating the variable is present or "0" indicating the variable was not present. For example, an African American girl would have a "1" for the African American variable and a "0" for the gender (male) variable. Results for all LR analyses are described below.

Overall there were 273,030 cases included in the LR analyses, with more females (52%) than males (48%) in the sample. African American was the largest minority (43%) and Native American was the smallest minority (0.01%). Among the other demographic variables, Gifted (4%) and Specific Learning Disability (3%) had the highest percentages and Mild Mental Retardation (0.002%) had the smallest percentage in the sample. Students receiving free lunch accounted for a large portion of the sample (52%), indicating that just over half of the sample had an indicator of poverty.

Only significant predictors ($p < .01$) are reported, including corresponding odds ratios and confidence intervals. Exp(B) provides the odds ratio, indicating that for every one unit of change in the predictor variable the odds either increase or decrease the odds of membership in the outcome variable. Therefore, all values greater than one indicate that for every one unit in change in the predictor variable, you can expect to see odds increase by the percent difference; and a value less than one would indicate that for every one unit in change in the predictor variable, you can expect to see odds decrease by the percent difference (Field, 2005). For example, an Exp(B) of 1.44 for the predictor Free Lunch would indicate that students identified as receiving free lunch would have a 44% greater odds of mobility compared to students who had paid lunch.

The first LR examined the extent to which individual predictors significantly predicted "mobile status." While the "mobile status" variable in the HLM analysis includes all types of moves, students making a promotional move were not included in this LR analysis because the reason for moving was apparent. After adding the first block of predictors (prior achievement) there was an R^2 of .022 indicating that 2.2% of the variance in mobile status is shared with the first block of predictors. After adding the second block of predictors (demographics), the R^2 improved to .039 increasing the shared variance to 3.9% as well as indicating significant contribution of this block of predictors ($p < .01$). The contributions of individual predictors are presented below.

The LR results for "mobile status" are shown below in Table 5. Overall, the results showed that the variables with the highest significant odds ratios were African American (Exp(B) = 1.44) and Emotionally Disturbed (Exp(B) = 1.33). These values indicate that students identified as African American and Emotionally Disturbed will increase an individual's odds of making any type of move (excluding promotional) by 1.44 times and 1.33 times respectively. The variables with the lowest significant odds were Special Education Other (Exp(B) = 0.66) and Mild Mentally Retarded (Exp(B) = 0.62). These values indicate that students identified as Special Education Other and Mild Mentally Retardation will decrease their odds of making any type of move (excluding promotional) by 34% and 38% respectively.

Table 6 shows a classification table indicating how well group membership can be predicted for those who moved and those that did not. Based on these data, we can correctly predict 99.8% of those individuals who do not move, and can correctly only predict .6% of those

Table 5: LR Results for Mobile Status

Predictor	B	Exp(B)	(CI)
Prior Year ELA	-.100	.905	(0.89, 0.92)
Prior Year Mathematics	-.060	.942	(0.93, 0.96)
Prior Year Science	-.066	.937	(0.92, 0.95)
Prior Year Social Studies	-.069	.934	(0.92, 0.95)
Gender (Male)	-.107	.898	(0.88, 0.92)
African American	.364	1.440	(1.41, 1.47)
Native American	-.151	.860	(0.77, 0.96)
Asian	.227	1.254	(1.15, 1.37)
Hispanic	.279	1.322	(1.23, 1.42)
Free Lunch	-.079	.924	(0.9, 0.95)
Reduced Lunch	-.197	.822	(0.79, 0.85)
Emotionally Disturbed	.282	1.326	(1.12, 1.57)
Specific Learning Disability	-.203	.816	(0.77, 0.86)
Mild Mental Retardation	-.481	.618	(0.5, 0.77)
Other Health Impaired	-.138	.871	(0.8, 0.95)
Speech and Language	-.276	.759	(0.73, 0.79)
Special Education Other	-.412	.662	(0.62, 0.71)
Section 504	-.301	.740	(0.71, 0.77)
Gifted	.091	1.095	(1.03, 1.16)
Student Absences	.017	1.017	(1.02, 1.02)

who did move. While the overall correct classification based on the model resulted in 78.5% correct classification of all cases, the significant finding of the Hosmer-Lemeshow statistic indicates a poor fit of the model.

Table 6: LR Classification Results for Mobile Status

		Predicted		
		No Mobile Status	Yes Mobile Status	Correct %
Actual	No Mobile Status	214,029	389	99.8
	Yes Mobile Status	58,240	372	.6
			Overall %	78.5

The next LR examined the extent to which individual predictors significantly predicted a "between years move." After adding the first block of predictors (prior achievement) there was an R^2 of .026 indicating that 2.6% of the variance in a between years move is shared with the first block of predictors. After adding the second block of predictors (demographics), the R^2 improved to .043 increasing the shared variance to 4.3% as well as indicating significant contribution of this block of predictors ($p < .01$). The contributions of individual predictors are presented below.

The LR results for "between years move" are shown below in Table 7. Overall, the results showed that the variables with the highest significant odds ratios were African American (Exp(B) = 1.53) and Asian (Exp(B) = 1.56). These values indicate that students identified as African American and Asian will increase an individual's odds of making a between years move by 1.53 times and 1.56 times respectively. The variables with the lowest significant odds were Special Education Other (Exp(B) = 0.65) and Mild Mentally Retarded (Exp(B) = 0.54). These values indicate that students identified as Special Education Other and Mild Mentally Retardation will decrease their odds of making a between years move by 35% and 46% respectively.

Table 8 shows a classification table indicating how well we can predict group membership for those who moved between school years and those that did not. Based on these data, we can correctly predict 100% of those individuals who do not move between school years, and can correctly only predict .1% of those who did move between school years. While the overall correct classification based on the model results in 86.1% correct classification of all cases, the significant finding of the Hosmer-Lemeshow statistic indicates a poor fit of the model.

Table 7: LR Results for Between Years Move

Predictor	B	Exp(B)	(CI)
Prior Year ELA	-.100	.904	(0.89, 0.92)
Prior Year Mathematics	-.056	.946	(0.93, 0.96)
Prior Year Science	-.097	.908	(0.89, 0.93)
Prior Year Social Studies	-.101	.904	(0.89, 0.92)
Gender (Male)	-.117	.890	(0.87, 0.91)
African American	.427	1.533	(1.49, 1.58)
Asian	.446	1.563	(1.41, 1.73)
Hispanic	.404	1.497	(1.38, 1.62)
Free Lunch	-.038	.963	(0.94, 0.99)
Reduced Lunch	-.112	.894	(0.85, 0.94)
Specific Learning Disability	-.255	.775	(0.73, 0.83)
Mild Mental Retardation	-.620	.538	(0.41, 0.7)
Other Health Impaired	-.149	.861	(0.78, 0.95)
Speech and Language	-.253	.776	(0.74, 0.81)
Special Education Other	-.438	.645	(0.6, 0.7)
Section 504	-.310	.733	(0.7, 0.77)
Gifted	.110	1.116	(1.04, 1.2)
Limited English Proficiency	-.022	.978	(0.88, 1.09)
Student Absences	.016	1.016	(1.02, 1.02)

Table 8: LR Classification Results for Between Years Move

		Predicted		
		No Between Years	Yes Between Years	Correct %
Actual	No Between Years	235,027	76	100.0
	Yes Between Years	37,894	33	.1
			Overall %	86.1

The next LR examined the extent to which individual predictors significantly predicted a "within year move." After adding the first block of predictors (prior achievement) there was an R^2 of .048 indicating that 4.8% of the variance in a within year move is shared with the first block of predictors. After adding the second block of predictors (demographics), the R^2

improved to .202 increasing the shared variance to 20.2% as well as indicating significant contribution of this block of predictors ($p < .01$). The contributions of individual predictors are presented below.

The LR results for "within year move" are shown below in Table 9. Overall, the results showed that the variable with the highest significant odds ratio was Student Total Absences (Exp(B) = 1.01). These values indicate that students identified as having an increased amount of absences will increase an individual's odds of making a within year move by 1.01 times. The variables with the lowest significant odds were Hispanic (Exp(B) = 0.30) and Reduced Lunch (Exp(B) = 0.19). These values indicate that students identified as Hispanic and Reduced Lunch

Table 9: LR Results for Within Year Move

Predictor	**B**	**Exp(B)**	**(CI)**
Prior Year ELA	-.330	.719	(0.7, 0.74)
Prior Year Reading	-.128	.880	(0.86, 0.9)
Prior Year Mathematics	-.135	.873	(0.85, 0.9)
Prior Year Science	-.204	.816	(0.79, 0.84)
Prior Year Social Studies	-.168	.845	(0.82, 0.87)
Gender (Male)	-1.003	.367	(0.36, 0.38)
African American	-.669	.512	(0.49, 0.53)
Native American	-.928	.395	(0.32, 0.49)
Asian	-1.207	.299	(0.23, 0.38)
Hispanic	-1.207	.299	(0.25, 0.36)
Free Lunch	-1.023	.360	(0.35, 0.37)
Reduced Lunch	-1.662	.190	(0.17, 0.21)
Specific Learning Disability	-.788	.455	(0.41, 0.5)
Mild Mental Retardation	-.674	.510	(0.36, 0.71)
Other Health Impaired	-.789	.454	(0.39, 0.53)
Speech and Language	-.859	.424	(0.39, 0.46)
Special Education Other	-.905	.405	(0.36, 0.45)
Section 504	-1.129	.323	(0.3, 0.35)
Gifted	-.972	.378	(0.32, 0.45)
Limited English Proficiency	-.902	.406	(0.32, 0.51)

will decrease their odds of making a within year move by 70% and 81% respectively.

Table 10 shows a classification table indicating how well we can predict group membership for those who moved within the school year and those that did not. Based on these data, we can correctly predict 99.8% of those individuals who do not move within the school year, and can correctly predict 9.9% of those who did move within the

Table 10: LR Classification Results for Within Year Move

		Predicted		
		No Within Year	Yes Within Year	Correct %
Actual	No Within Year	249,337	451	99.8
	Yes Within Year	20,939	2,303	9.9
			Overall %	92.2

school year. While the overall correct classification based on the model results in 92.2% correct classification of all cases, the significant finding of the Hosmer-Lemeshow statistic indicates a poor fit of the model.

The next LR examined the extent to which individual predictors significantly predicted an "in district move." After adding the first block of predictors (prior achievement) there was an R^2 of .018 indicating that 1.8% of the variance in an in district move is shared with the first block of predictors. After adding the second block of predictors (demographics), the R^2 improved to .033 increasing the shared variance to 3.3% as well as indicating significant contribution of this block of predictors ($p < .01$). The contributions of individual predictors are presented below. The LR results for "in district move" are shown below in Table 11. Overall, the results showed that the variables with the highest significant odds ratios were Hispanic (Exp(B) = 1.64), and Asian (Exp(B) = 1.67). These values indicate that students identified as Hispanic and African American have an increased odds of making an in district year move by 1.64 times and 1.67

times respectively. The variables with the lowest significant odds were Mild Mental Retardation (Exp(B) = 0.56) and Special Education Other (Exp(B) = 0.70). These values indicate that students identified as Special Education Other and Mild Mentally Retardation will decrease their odds of making an in district move by 44% and 30% respectively.

Table 11: LR Results for In District Move

Predictor	B	Exp(B)	(CI)
Prior Year ELA	-.061	.941	(0.92, 0.96)
Prior Year Reading	.021	1.021	(1, 1.04)
Prior Year Mathematics	-.054	.947	(0.93, 0.97)
Prior Year Science	-.078	.925	(0.9, 0.95)
Prior Year Social Studies	-.102	.903	(0.88, 0.92)
Gender (Male)	-.071	.931	(0.91, 0.96)
African American	.411	1.509	(1.46, 1.56)
Asian	.514	1.673	(1.5, 1.86)
Hispanic	.496	1.641	(1.51, 1.79)
Specific Learning Disability	-.216	.806	(0.75, 0.87)
Mild Mental Retardation	-.588	.556	(0.41, 0.75)
Speech and Language	-.235	.791	(0.75, 0.83)
Special Education Other	-.362	.696	(0.64, 0.76)
Section 504	-.328	.720	(0.68, 0.76)
Gifted	.104	1.110	(1.03, 1.2)
Student Absences	.016	1.016	(1.02, 1.02)

Table 12 presents a classification table indicating how well we can predict group membership for those who moved in district and those that did not. Based on these data, we can correctly predict 100% of those individuals who do not move in district, and can correctly predict less than 0.001% of those who did move in district. While the overall correct classification based on the model results in 89.0% correct classification of all cases, the significant finding of the Hosmer-Lemeshow statistic indicates a poor fit of the model.

The last LR examined the extent to which individual predictors significantly predicted an "out of district move." After adding the first block of predictors (prior achievement) there was an R^2 of .022 indicating that 2.2% of the variance in an out of district move is shared with the first block of predictors. After adding the second block of predictors (demographics), the R^2

Table 12: LR Classification Results for In District Move

		Predicted		
		No In District	Yes In District	Correct %
Actual	No In District	242,930	17	100.0
	Yes In District	30,078	5	.0
			Overall %	89.0

improved to .031 increasing the shared variance to 3.1% as well as indicating significant contribution of this block of predictors ($p < .01$). The contributions of individual predictors are presented below.

The LR results for "out of district move" are shown below in Table 13. Overall, the results showed that the variable with the highest significant odds ratio was African American (Exp(B) = 1.23). These values indicate that a student identified as African American will increase an individual's odds of making an out of district move by 1.23 times. The variables with the lowest significant odds were Limited English Proficiency (Exp(B) = 0.39) and Special Education Other (Exp(B) = 0.59). These values indicate that students identified as Limited English Proficiency and Special Education Other will decrease their odds of making an out of district move by 61% and 41% respectively.

Table 14 shows a classification table indicating how well we can predict group membership for those who moved out of district and those that did not. Based on these data, we can correctly predict 100% of those individuals who do not move out of district, and can

Table 13: LR Results for Out of District Move

Predictor	**B**	**Exp(B)**	**(CI)**
Prior Year ELA	-.207	.813	(0.79, 0.84)
Prior Year Mathematics	-.068	.934	(0.9, 0.97)
Prior Year Science	-.128	.880	(0.85, 0.92)
Prior Year Social Studies	-.081	.922	(0.89, 0.96)
Gender (Male)	-.239	.788	(0.75, 0.82)
African American	.205	1.227	(1.16, 1.3)
Native American	-.409	.665	(0.49, 0.9)
Hispanic	-.276	.759	(0.62, 0.93)
Reduced Lunch	-.294	.746	(0.68, 0.82)
Specific Learning Disability	-.273	.761	(0.67, 0.86)
Other Health Impaired	-.269	.764	(0.63, 0.93)
Speech and Language	-.279	.757	(0.69, 0.83)
Special Education Other	-.521	.594	(0.51, 0.69)
Section 504	-.243	.785	(0.72, 0.86)
Limited English Proficiency	-.939	.391	(0.28, 0.54)
Student Absences	.008	1.008	(1.01, 1.01)

correctly predict 0% of those who did move out of district. While the overall correct classification based on the model results in 95.1% correct classification of all cases, the significant finding of the Hosmer-Lemeshow statistic indicates a poor fit of the model.

Table 14: LR Classification Results for Out of District Move

		Predicted		
		No Out of District	Yes Out of District	Correct %
Actual	No Out of District	264,071	0	100.0
	Yes Out of District	8,959	0	.0
			Overall %	96.7

HLM Results

The final base models for each HLM were specified based on the content analyzed (e.g., ELA, Mathematics, and Reading) and were utilized as a point of comparison in evaluating the HLM model minus the study specific mobility variables against the HLM model including the mobility variables. Before entering the study specific variables, coefficient values were obtained from key prior achievement and demographic variables so as to create a base model. Comparing coefficients across predictors requires caution due to how the variables were scaled. Achievement scores and student absences were scaled as continuous variables and demographic variables were categorically scaled. Making direct comparisons across different types of measures is difficult due to the differences in measurement and the meaning of those measurements (Noell, 2006; Noell, Porter, and Patt, 2007). For the current study, comparisons were only made among variables that were similarly scaled. That is categorical variables were compared with other categorical variables and continuous variables were compared with other continuous variables.

In all analyses, all categorical demographic variables were coded “1” if present and “0” if absent. Prior achievement was measured in standard deviation units from the grand mean prior achievement. There were 11 additional models run after the base model was constructed for each content area (ELA, Mathematics, and Reading). The variables that were added to the base model included: mobile status, total sites, between years move, within year move, in district move, out of district move, between years-in district move, between years-out of district move, within year-in district move, within year-out of district move, promotional move, moved two years in a row, moved three years in a row. The coefficient and confidence interval (95% CI) for each of the variables are presented for the contents analyzed.

Results for the “mobile status” HLM in ELA are presented below in Table 15. Only statistically significant results ($p < .01$) are presented. At the student level, results indicate that a student’s achievement in that content in the prior year had the largest positive coefficient at 17.2. Coefficients are scaled to a standard deviation of 50, which is the approximate standard deviation of the LEAP and iLEAP tests. Students scoring one standard deviation above the mean in the prior year would be expected to score 17.2 points higher in the following year. That is students performing well on their prior year ELA test were predicted to score well on the current year’s test. Those with mild mental retardation had the lowest coefficient at -23.3. It is important to note that the coefficient for student absences is based on each day missed; whereas a student missing 20 days would score six points lower than students with perfect attendance. At the classroom level, classrooms with high percentages of gifted students had the largest coefficient and classrooms with high percentages of students with free lunch had the lowest coefficient. At the school level, schools with high percentages of positive prior year ELA scores and free lunch both had positive coefficients. Specific to this HLM model, the “mobile status” variable had a significant negative effect. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made any type of move are predicted to score 2.5 points less than those who did not move.

Results for the “mobile status” HLM in Mathematics are presented below in Table 16. Only statistically significant results ($p < .01$) are presented. At the student level, results indicate that a student’s achievement in that content in the prior year had the largest positive coefficient at 27.1. Those with mild mental retardation had the lowest coefficient at -15.8. At the classroom level, classrooms with higher percentages of gifted students had the largest coefficient and classrooms with higher percentages of special education students had the lowest coefficient. At

Table 15: HLM Results for ELA – Mobile Status Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Mobile Status	-2.5	(-3.0, -2.0)
	Prior Year ELA	17.2	(16.8, 17.6)
	Prior Year Mathematics	6.7	(6.4, 6.9)
	Prior Year Reading	5.1	(4.8, 5.3)
	Prior Year Science	2.6	(2.3, 2.8)
	Prior Year Social Studies	4.5	(4.2, 4.8)
	Gender (Male)	-10.7	(-11.0, -10.4)
	African American	1.1	(0.8, 1.5)
	Asian	5.2	(4.1, 6.3)
	Emotionally Disturbed	-6.9	(-10.5, -3.4)
	Specific Learning Disability	-14.9	(-15.9, -13.8)
	Mild Mental Retardation	-23.3	(-27.5, -19)
	Other Health Impaired	-10.5	(-11.9, -9.1)
	Speech and Language	-4.0	(-4.5, -3.5)
	Special Education Other	-7.1	(-8.2, -6.1)
	Gifted	8.9	(7.9, 9.9)
	Section 504	-7.0	(-7.8, -6.3)
	Limited English Proficiency	-3.8	(-5.1, -2.4)
	Free Lunch	-2.3	(-2.7, -2.0)
	Reduced Lunch	-1.5	(-2.0, -1.1)
	Student Absences	-0.3	(-0.4, -0.3)
Classroom Level	Mean Prior Year Mathematics	-4.9	(-6.1, -3.8)
	% Gifted	9.4	(6.5, 12.2)
	% Special Education	-12.5	(-15, -9.9)
	% Limited English Proficiency	-6.6	(-10.6, -2.6)
	% Free Lunch	-12.4	(-15.5, -9.2)
School Level	Mean Prior Year ELA	10.3	(8.6, 12.1)
	% Free Lunch	13.7	(9.8, 17.7)

the school level, schools with high percentages of high prior year Math scores had the highest coefficient and schools with high percentages of low prior year Science scores had the lowest coefficient. Specific to this HLM model, the “mobile status” variable had a significant negative effect. Similar to the ELA results, once prior achievement, demographics, poverty, and

Table 16: HLM Results for Mathematics – Mobile Status Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Mobile Status	-2.9	(-3.4, -2.3)
	Prior Year ELA	2.8	(2.5, 3.0)
	Prior Year Mathematics	27.1	(26.8, 27.3)
	Prior Year Reading	0.7	(0.5, 1.0)
	Prior Year Science	5.3	(5.1, 5.6)
	Prior Year Social Studies	2.6	(2.3, 2.8)
	Gender (Male)	2.2	(1.9, 2.4)
	African American	-5.8	(-6.1, -5.4)
	Asian	4.1	(3.2, 5.1)
	Hispanic	-1.9	(-2.7, -1.1)
	Emotionally Disturbed	-5.0	(-7.8, -2.3)
	Specific Learning Disability	-8.7	(-9.6, -7.8)
	Mild Mental Retardation	-15.8	(-19.4, -12.3)
	Other Health Impaired	-7.9	(-9.1, -6.7)
	Speech and Language	-1.8	(-2.3, -1.4)
	Special Education Other	-8.0	(-8.8, -7.1)
	Gifted	8.8	(7.9, 9.7)
	Section 504	-4.4	(-5.1, -3.7)
	Free Lunch	-2.1	(-2.4, -1.9)
	Reduced Lunch	-1.1	(-1.5, -0.7)
	Student Absences	-0.2	(-0.3, -0.2)
Classroom Level	Prior Year ELA	-4.0	(-5.8, -2.3)
	Prior Year Reading	-4.5	(-6.6, -2.4)
	Prior Year Science	3.4	(1.1, 5.7)
	% Minority	-4.4	(-8.1, -0.8)
	% Gifted	11.8	(9.2, 14.5)
	% Special Education	-13.8	(-16.4, -11.2)
	% Limited English Proficiency	-11.7	(-17.1, -6.3)
	% Free Lunch	-10.0	(-12.6, -7.4)
School Level	Prior Year Math	12.7	(9.2, 16.2)
	Prior Year Science	-7.1	(-10.9, -3.3)
	% Minority	10.3	(6.3, 14.2)
	% Section 504	6.9	(0.9, 12.9)

disabilities were accounted for students who made any type of move are predicted to score 2.9 points less than those who did not move.

Results for the "mobile status" HLM in Reading are presented below in Table 17. Only statistically significant results (p < .01) are presented. At the student level, results indicate that a student's achievement in that content in the prior year had the largest positive coefficient at 14.2.

Table 17: HLM Results for Reading – Mobile Status Model

Model Level	**Variables Entered**	**Coefficient**	**(CI)**
Student Level	Mobile Status	-1.6	(-2.3, -1.0)
	Prior Year ELA	4.0	(3.7, 4.3)
	Prior Year Mathematics	2.9	(2.6, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.7, 8.5)
	Gender (Male)	-3.1	(-3.4, -2.7)
	African American	-3.7	(-4.2, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.1	(-24.2, -16.1)
	Other Health Impaired	-10.2	(-11.9, -8.6)
	Speech and Language	-4.4	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.4)
	Gifted	6.9	(5.9, 8.0)
	Section 504	-6.9	(-7.7, -6.0)
	Limited English Proficiency	-8.2	(-9.7, -6.8)
	Free Lunch	-2.3	(-2.7, -1.9)
	Reduced Lunch	-1.4	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, -0.1)
Classroom Level	Prior Year Mathematics	-6.1	(-7.5, -4.8)
	% Gifted	7.0	(4.5, 9.5)
	% Special Education	-14.9	(-17.5, -12.2)
	% Free Lunch	-11.9	(-15.1, -8.8)
School Level	Prior Year Reading	11.3	(8.0, 14.6)
	Prior Year Mathematics	5.5	(2.4, 8.6)
	Prior Year Science	-7.4	(-10.7, -4.2)
	% Special Education	13.6	(7.0, 20.2)
	% Limited English Proficiency	10.0	(3.9, 16.1)
	% Section 504	8.7	(2.8, 14.6)
	% Free Lunch	9.6	(5.1, 14.2)

Those with mild mental retardation had the lowest coefficient at -20.1. At the classroom level, classrooms with high percentages of gifted students had the largest coefficient and classrooms with higher percentages of special education students had the lowest coefficient. At the school level, schools with high percentages of special education students had the highest coefficient and schools with high percentages of low prior year Science scores had the lowest coefficient. The negative coefficient for "mobile status" is consistent with ELA and Mathematics results, where once prior achievement, demographics, poverty, and disabilities were accounted for students who made any type of move are predicted to score 1.9 points less than those who did not move.

The next set of results presented is for the "between years move" models. Results for the "between years move" HLM in ELA are presented below in Table 18. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the ELA base model. Specific to this HLM model, the "between years move" variable had a significant negative effect on ELA achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move between school years are predicted to score about one point less than those who did not move between school years.

Results for the "between years move" HLM in Mathematics are presented below in Table 19. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Mathematics base model. Specific to this HLM model, the "between years move" variable had a significant negative effect on Mathematics achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move between school years are predicted to score about one point less than those who did not move between school years.

Table 18: HLM Results for ELA – Between Years Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Between Years Move	-0.8	(-1.4, -0.3)
	Prior Year ELA	17.2	(16.8, 17.6)
	Prior Year Mathematics	6.7	(6.4, 6.9)
	Prior Year Reading	5.1	(4.8, 5.3)
	Prior Year Science	2.6	(2.3, 2.8)
	Prior Year Social Studies	4.5	(4.2, 4.8)
	Gender (Male)	-10.7	(-11.0, -10.4)
	African American	1.1	(0.7, 1.5)
	Asian	5.2	(4.1, 6.3)
	Emotionally Disturbed	-7.1	(-10.6, -3.5)
	Specific Learning Disability	-14.9	(-15.9, -13.8)
	Mild Mental Retardation	-23.3	(-27.6, -19.1)
	Other Health Impaired	-10.5	(-12.0, -9.1)
	Speech and Language	-4.0	(-4.5, -3.5)
	Special Education Other	-7.2	(-8.2, -6.1)
	Gifted	8.9	(8.0, 9.9)
	Section 504	-7.0	(-7.7, -6.2)
	Limited English Proficiency	-3.8	(-5.1, -2.4)
	Free Lunch	-2.4	(-2.7, -2.0)
	Reduced Lunch	-1.6	(-2.0, -1.1)
	Student Absences	-0.3	(-0.4, -0.3)
Classroom Level	Mean Prior Year Mathematics	-5.0	(-6.2, -3.8)
	% Gifted	9.2	(6.4, 12.1)
	% Special Education	-12.3	(-14.9, -9.7)
	% Limited English Proficiency	-6.8	(-10.8, -2.7)
	% Free Lunch	-12.7	(-15.9, -9.5)
School Level	Mean Prior Year ELA	10.7	(9.0, 12.4)
	% Free Lunch	14.7	(10.8, 18.6)

Results for all non-mobility variables (prior achievement, demographics, etc.) in the "between years move" HLM in Reading were consistent with the Reading base model. The "between years move" variable entered in this HLM was not significant, indicating that a move between school years did not have a significant effect on Reading achievement once prior achievement, demographics, poverty, and disabilities were accounted for.

Table 19: HLM Results for Mathematics – Between Years Move Model

Model Level	**Variables Entered**	**Coefficient**	**(CI)**
Student Level	Between Years Move	-0.8	(-1.4, -0.3)
	Prior Year ELA	2.8	(2.5, 3.0)
	Prior Year Mathematics	27.1	(26.8, 27.3)
	Prior Year Reading	0.7	(0.5, 1.0)
	Prior Year Science	5.3	(5.1, 5.6)
	Prior Year Social Studies	2.6	(2.3, 2.8)
	Gender (Male)	2.2	(1.9, 2.4)
	African American	-5.8	(-6.2, -5.4)
	Asian	4.1	(3.2, 5.1)
	Hispanic	-1.9	(-2.6, -1.1)
	Emotionally Disturbed	-5.2	(-8.0, -2.5)
	Specific Learning Disability	-8.7	(-9.6, -7.8)
	Mild Mental Retardation	-15.9	(-19.4, -12.4)
	Other Health Impaired	-7.9	(-9.1, -6.7)
	Speech and Language	-1.8	(-2.3, -1.4)
	Special Education Other	-8.0	(-8.9, -7.1)
	Gifted	8.8	(7.9, 9.7)
	Section 504	-4.4	(-5.1, -3.7)
	Free Lunch	-2.2	(-2.5, -1.9)
	Reduced Lunch	-1.1	(-1.5, -0.7)
	Student Absences	-0.2	(-0.3, -0.2)
Classroom Level	Prior Year ELA	-4.0	(-5.7, -2.3)
	Prior Year Reading	-4.5	(-6.6, -2.4)
	Prior Year Science	3.4	(1.1, 5.6)
	% Minority	-4.7	(-8.4, -1.1)
	% Gifted	11.9	(9.2, 14.5)
	% Special Education	-13.6	(-16.3, -11.0)
	% Limited English Proficiency	-11.4	(-16.8, -6.0)
	% Free Lunch	-9.5	(-12.1, -7.0)
School Level	Prior Year Math	12.6	(9.1, 16.1)
	Prior Year Science	-6.8	(-10.6, -3.0)
	% Minority	10.4	(6.4, 14.4)
	% Section 504	8.1	(2.2, 14.1)

The next set of results regards the "within year move" models. Separate models were run including students who made a within year move, percentage of classrooms with students who made a within year move, and percentage of schools with students who made a within year move. Results for the "within year move" at the student level HLM in ELA are presented below in Table 20. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the ELA base

Table 20: HLM Results for ELA – Within Year Move Model (Student Level)

Model Level	**Variables Entered**	**Coefficient**	**(CI)**
Student Level	Within Year Move	-2.6	(-3.4, -1.9)
	Prior Year ELA	17.2	(16.8, 17.6)
	Prior Year Mathematics	6.7	(6.4, 6.9)
	Prior Year Reading	5.1	(4.8, 5.3)
	Prior Year Science	2.5	(2.3, 2.8)
	Prior Year Social Studies	4.5	(4.2, 4.8)
	Gender (Male)	-10.7	(-11.0, -10.4)
	African American	1.1	(0.7, 1.5)
	Asian	5.2	(4.1, 6.3)
	Emotionally Disturbed	-7.0	(-10.5, -3.5)
	Specific Learning Disability	-14.9	(-15.9, -13.8)
	Mild Mental Retardation	-23.3	(-27.5, -19.1)
	Other Health Impaired	-10.5	(-11.9, -9.1)
	Speech and Language	-4.0	(-4.6, -3.5)
	Special Education Other	-7.2	(-8.2, -6.1)
	Gifted	8.9	(8.0, 9.9)
	Section 504	-7.0	(-7.7, -6.2)
	Limited English Proficiency	-3.8	(-5.2, -2.5)
	Free Lunch	-2.3	(-2.7, -2.0)
	Reduced Lunch	-1.5	(-2.0, -1.1)
	Student Absences	-0.3	(-0.4, -0.3)
Classroom Level	Mean Prior Year Mathematics	-5.0	(-6.1, -3.8)
	% Gifted	9.2	(6.4, 12.0)
	% Special Education	-12.2	(-14.8, -9.6)
	% Limited English Proficiency	-6.9	(-10.9, -2.9)
	% Free Lunch	-12.7	(-15.9, -9.5)
School Level	Mean Prior Year ELA	10.6	(8.9, 12.3)
	% Free Lunch	14.6	(10.7, 18.5)

model. Specific to this HLM model, the "within year move" variable at the student level had a significant negative effect on ELA achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move within the school year are predicted to score 2.6 points less than those who did not move within the school year.

The next set of results presented is for the "within year move" model at the student level in Mathematics. Results for this HLM are presented below in Table 21. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Mathematics base model. Specific to this HLM model, the "within year move" variable at the student level had a significant negative effect on mathematics achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move within the school year are predicted to score 1.7 points less than those who did not move within the school year.

The next set of results presented is for the "within year move" model at the student level in Reading. Results for this HLM are presented below in Table 22. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Reading base model. Specific to this HLM model, the "within year move" variable at the student level had a significant negative effect on Reading achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move within the school year are predicted to score 1.5 points less than those who did not move within the school year. Reading results are consistent with results from ELA and Mathematics.

The next set of results presented is for the "within year move" model at the classroom level. Results for all non-mobility variables (prior achievement, demographics, etc.) in the

Table 21: HLM Results for Mathematics – Within Year Move Model (Student Level)

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Within Year Move	-1.7	(-2.3, -1.1)
	Prior Year ELA	2.8	(2.5, 3.0)
	Prior Year Mathematics	27.1	(26.8, 27.3)
	Prior Year Reading	0.7	(0.5, 1.0)
	Prior Year Science	5.3	(5.1, 5.6)
	Prior Year Social Studies	2.6	(2.3, 2.8)
	Gender (Male)	2.2	(1.9, 2.5)
	African American	-5.8	(-6.2, -5.5)
	Asian	4.1	(3.2, 5.1)
	Hispanic	-1.9	(-2.7, -1.1)
	Emotionally Disturbed	-5.1	(-7.9, -2.4)
	Specific Learning Disability	-8.7	(-9.6, -7.8)
	Mild Mental Retardation	-15.9	(-19.4, -12.3)
	Other Health Impaired	-7.9	(-9.1, -6.7)
	Speech and Language	-1.8	(-2.3, -1.4)
	Special Education Other	-8.0	(-8.9, -7.1)
	Gifted	8.8	(7.9, 9.7)
	Section 504	-4.4	(-5.1, -3.7)
	Free Lunch	-2.2	(-2.5, -1.9)
	Reduced Lunch	-1.1	(-1.5, -0.7)
	Student Absences	-0.2	(-0.3, -0.2)
Classroom Level	Prior Year ELA	-4.0	(-5.8, -2.3)
	Prior Year Reading	-4.4	(-6.6, -2.3)
	Prior Year Science	3.4	(1.1, 5.7)
	% Minority	-4.8	(-8.4, -1.1)
	% Gifted	11.8	(9.2, 14.5)
	% Special Education	-13.6	(-16.2, -10.9)
	% Limited English Proficiency	-11.5	(-16.9, -6.1)
	% Free Lunch	-9.5	(-12.1, -6.9)
School Level	Prior Year Math	12.6	(9.1, 16.1)
	Prior Year Science	-6.8	(-10.6, -3.0)
	% Minority	10.3	(6.3, 14.3)
	% Section 504	8.1	(2.1, 14.1)

"within year move" HLM at the classroom level in ELA and Mathematics were consistent with the base models. Specific to these HLM models, the "within year move" variable at the

Table 22: HLM Results for Reading –Within Year Move Model (Student Level)

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Within Year Move	-1.5	(-2.4, -0.6)
	Prior Year ELA	4.0	(3.7, 4.3)
	Prior Year Mathematics	2.9	(2.6, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.7, 8.5)
	Gender (Male)	-3.1	(-3.4, -2.7)
	African American	-3.8	(-4.2, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.1	(-24.1, -16.1)
	Other Health Impaired	-10.3	(-12.0, -8.6)
	Speech and Language	-4.4	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.5)
	Gifted	6.9	(5.9, 8.0)
	Section 504	-6.8	(-7.7, -6.0)
	Limited English Proficiency	-8.2	(-9.7, -6.8)
	Free Lunch	-2.4	(-2.8, -2.0)
	Reduced Lunch	-1.5	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, 0.0)
Classroom Level	Prior Year Mathematics	-6.2	(-7.6, -4.9)
	% Gifted	7.1	(4.6, 9.6)
	% Special Education	-15.0	(-17.6, -12.3)
	% Free Lunch	-12.2	(-15.3, -9.1)
School Level	Prior Year Reading	11.9	(8.6, 15.2)
	Prior Year Mathematics	5.3	(2.2, 8.4)
	Prior Year Science	-7.2	(-10.5, -4.0)
	% Special Education	14.7	(8.1, 21.3)
	% Limited English Proficiency	9.7	(3.6, 15.8)
	% Section 504	8.8	(2.8, 14.7)
	% Free Lunch	10.7	(6.1, 15.2)

classroom level was not significant, indicating that once prior achievement, demographics, poverty, and disabilities were accounted for classrooms with percentages of students who moved within the year did not have a significant effect on ELA and Mathematics achievement.

The next set of results presented is for the "within year move" model at the classroom level in Reading. Results for this HLM are presented below in Table 23. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior

Table 23: HLM Results for Reading – Within Year Move Model (Classroom Level)

Model Level	**Variables Entered**	**Coefficient**	**(CI)**
Student Level	Prior Year ELA	4.0	(3.7, 4.3)
	Prior Year Mathematics	2.9	(2.6, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.7, 8.5)
	Gender (Male)	-3.1	(-3.4, -2.7)
	African American	-3.8	(-4.3, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.0	(-24.0, -16.0)
	Other Health Impaired	-10.3	(-12.0, -8.6)
	Speech and Language	-4.4	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.4)
	Gifted	6.9	(5.9, 8.0)
	Section 504	-6.8	(-7.7, -6.0)
	Limited English Proficiency	-8.2	(-9.7, -6.8)
	Free Lunch	-2.4	(-2.8, -2.0)
	Reduced Lunch	-1.5	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, -0.1)
Classroom Level	% Within Year Move	-8.9	(-14.2, -3.6)
	Prior Year Mathematics	-6.3	(-7.6, -4.9)
	% Gifted	7.2	(4.7, 9.6)
	% Special Education	-14.9	(-17.6, -12.3)
	% Free Lunch	-11.8	(-15, -8.7)
School Level	Prior Year Reading	11.9	(8.7, 15.2)
	Prior Year Mathematics	5.3	(2.2, 8.4)
	Prior Year Science	-7.6	(-10.8, -4.3)
	% Special Education	15.7	(9.2, 22.2)
	% Limited English Proficiency	9.2	(3.1, 15.3)
	% Section 504	8.3	(2.4, 14.2)
	% Free Lunch	10.3	(5.8, 14.8)

achievement, demographics, etc.) were consistent with the Reading base model. Specific to this HLM model, the "within year move" variable at the classroom level had a significant negative effect on Reading achievement. Based on how the coefficient is scaled, if 100% of the students in a classroom were mobile it would be predicted to score 8.9 points lower than a similar class with no mobility. In contrast, if 10% of those students were mobile, the class mean would be predicted to be 0.89 points lower. Results are consistent with the ELA model.

The next set of results presented is for the "within year move" model at the school level. Results for all non-mobility variables (prior achievement, demographics, etc.) in the "within year move" HLM at the school level in ELA and Mathematics were consistent with the base models. Specific to this HLM model, the "within year move" variable at the school level was not significant, indicating that once prior achievement, demographics, poverty, and disabilities were accounted for schools with percentages of students who moved within the year did not have a significant effect on ELA and Mathematics achievement.

The next set of results presented is for the "within year move" model at the school level in Reading. Results for this HLM are presented below in Table 24. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Reading base model. Specific to this HLM model, the "within year move" variable at the school level had a significant negative effect on Reading achievement. Based on how the coefficient is scaled, if 100% of the students in a classroom were mobile it would be predicted to score 11.8 points lower than a similar class with no mobility. In contrast, if 10% of those students were mobile, the class mean would be predicted to be 1.18 points lower.

Table 24: HLM Results for Reading –Within Year Move Model (School Level)

Model Level	**Variables Entered**	**Coefficient**	**(CI)**
Student Level	Prior Year ELA	4.0	(3.7, 4.3)
	Prior Year Mathematics	2.9	(2.6, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.7, 8.5)
	Gender (Male)	-3.1	(-3.4, -2.7)
	African American	-3.8	(-4.3, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.0	(-24.1, -16.0)
	Other Health Impaired	-10.3	(-12.0, -8.6)
	Speech and Language	-4.4	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.5)
	Gifted	6.9	(5.9, 8.0)
	Section 504	-6.8	(-7.7, -6.0)
	Limited English Proficiency	-8.2	(-9.6, -6.7)
	Free Lunch	-2.4	(-2.8, -2.0)
	Reduced Lunch	-1.5	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, -0.1)
Classroom Level	Prior Year Mathematics	-6.2	(-7.6, -4.9)
	% Gifted	7.2	(4.7, 9.7)
	% Special Education	-15.0	(-17.6, -12.3)
	% Free Lunch	-12.2	(-15.4, -9.1)
School Level	% Within Year Move	-11.8	(-19.0, -4.7)
	Prior Year Reading	11.9	(8.7, 15.2)
	Prior Year Mathematics	5.2	(2.1, 8.3)
	Prior Year Science	-7.7	(-10.9, -4.4)
	% Special Education	16.2	(9.8, 22.5)
	% Limited English Proficiency	9.1	(3.0, 15.2)
	% Section 504	8.2	(2.2, 14.1)
	% Free Lunch	10.7	(6.1, 15.2)

The next set of results presented is for the “in district move” models. Results for the “in district move” HLM in ELA are presented below in Table 25. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the ELA base model. Specific to this HLM model, the “in district move” variable had a significant negative effect on ELA achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move in district are predicted to score 1.5 points less than those who did not move in district.

Results for the “in district move” HLM in Mathematics are presented below in Table 26. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Mathematics base model. Specific to this HLM model, the “in district move” variable had a significant negative effect on Mathematics achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move in district are predicted to score 1.6 points less than those who did not move in district.

Results for all non-mobility variables (prior achievement, demographics, etc.) in the “in district move” HLMs in Reading were consistent with the base models in the corresponding content areas. Specific to this HLM model, the “in district move” variable entered was not significant, indicating that once prior achievement, demographics, poverty, and disabilities were accounted for a move in district did not have a significant effect on Reading achievement.

The next set of results presented is for the “out of district move” models. Results for all non-mobility variables (prior achievement, demographics, etc.) in the “out of district move” HLMs in ELA and Mathematics were consistent with the base models in the corresponding content areas. Specific to these HLM models, the “out of district move” variable entered was not significant, indicating that once prior achievement, demographics, poverty, and disabilities were accounted for a move out of district did not have a significant effect on ELA and Mathematics achievement.

Table 25: HLM Results for ELA – In District Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	In District Move	-1.5	(-2.1, -0.8)
	Prior Year ELA	17.2	(16.8, 17.6)
	Prior Year Mathematics	6.7	(6.4, 6.9)
	Prior Year Reading	5.1	(4.8, 5.3)
	Prior Year Science	2.5	(2.3, 2.8)
	Prior Year Social Studies	4.5	(4.2, 4.8)
	Gender (Male)	-10.7	(-11.0, -10.4)
	African American	1.1	(0.7, 1.5)
	Asian	5.2	(4.1, 6.3)
	Emotionally Disturbed	-7.1	(-10.6, -3.5)
	Specific Learning Disability	-14.9	(-15.9, -13.8)
	Mild Mental Retardation	-23.3	(-27.6, -19.1)
	Other Health Impaired	-10.5	(-12.0, -9.1)
	Speech and Language	-4.0	(-4.5, -3.5)
	Special Education Other	-7.2	(-8.2, -6.1)
	Gifted	8.9	(8.0, 9.9)
	Section 504	-7.0	(-7.7, -6.2)
	Limited English Proficiency	-3.8	(-5.1, -2.4)
	Free Lunch	-2.4	(-2.7, -2.0)
	Reduced Lunch	-1.5	(-2.0, -1.1)
	Student Absences	-0.3	(-0.4, -0.3)
Classroom Level	Mean Prior Year Mathematics	-5.0	(-6.2, -3.9)
	% Gifted	9.3	(6.4, 12.1)
	% Special Education	-12.3	(-14.9, -9.7)
	% Limited English Proficiency	-6.7	(-10.7, -2.7)
	% Free Lunch	-12.7	(-15.9, -9.5)
School Level	Mean Prior Year ELA	10.7	(9, 12.4)
	% Free Lunch	14.7	(10.7, 18.6)

Results for the "out of district move" HLM in Reading are presented below in Table 27. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Reading base model. Specific to this HLM model, the "out of district move" variable had a significant positive effect

Table 26: HLM Results for Mathematics – In District Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	In District Move	-1.6	(-2.3, -1.0)
	Prior Year ELA	2.8	(2.5, 3.0)
	Prior Year Mathematics	27.1	(26.8, 27.3)
	Prior Year Reading	0.7	(0.5, 1.0)
	Prior Year Science	5.3	(5.1, 5.6)
	Prior Year Social Studies	2.6	(2.3, 2.8)
	Gender (Male)	2.2	(1.9, 2.4)
	African American	-5.8	(-6.2, -5.4)
	Asian	4.1	(3.2, 5.1)
	Hispanic	-1.8	(-2.6, -1.0)
	Emotionally Disturbed	-5.2	(-7.9, -2.4)
	Specific Learning Disability	-8.7	(-9.6, -7.8)
	Mild Mental Retardation	-15.9	(-19.4, -12.4)
	Other Health Impaired	-7.9	(-9.1, -6.7)
	Speech and Language	-1.8	(-2.3, -1.4)
	Special Education Other	-8.0	(-8.9, -7.1)
	Gifted	8.8	(7.9, 9.7)
	Section 504	-4.4	(-5.1, -3.7)
	Free Lunch	-2.2	(-2.5, -1.9)
	Reduced Lunch	-1.1	(-1.5, -0.7)
	Student Absences	-0.2	(-0.3, -0.2)
Classroom Level	Prior Year ELA	-4.0	(-5.8, -2.3)
	Prior Year Reading	-4.5	(-6.6, -2.4)
	Prior Year Science	3.4	(1.1, 5.7)
	% Minority	-4.7	(-8.3, -1.1)
	% Gifted	11.9	(9.3, 14.5)
	% Special Education	-13.7	(-16.3, -11.0)
	% Limited English Proficiency	-11.3	(-16.7, -5.9)
	% Free Lunch	-9.6	(-12.1, -7.0)
School Level	Prior Year Math	12.6	(9.1, 16.1)
	Prior Year Science	-6.8	(-10.6, -3.0)
	% Minority	10.4	(6.4, 14.4)
	% Section 504	7.9	(1.9, 13.9)

on Reading achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who made a move out of district are predicted to score two points more than those who did not move out of district.

Table 27: HLM Results for Reading – Out of District Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Out of District Move	2.0	(0.9, 3.2)
	Prior Year ELA	4.0	(3.7, 4.3)
	Prior Year Mathematics	2.9	(2.6, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.7, 8.5)
	Gender (Male)	-3.1	(-3.4, -2.7)
	African American	-3.8	(-4.3, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.1	(-24.1, -16.1)
	Other Health Impaired	-10.3	(-12.0, -8.6)
	Speech and Language	-4.3	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.4)
	Gifted	6.9	(5.9, 8.0)
	Section 504	-6.8	(-7.7, -5.9)
	Limited English Proficiency	-8.2	(-9.6, -6.7)
	Free Lunch	-2.4	(-2.8, -2.0)
	Reduced Lunch	-1.5	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, -0.1)
Classroom Level	Prior Year Mathematics	-6.2	(-7.6, -4.9)
	% Gifted	7.1	(4.6, 9.6)
	% Special Education	-14.9	(-17.6, -12.3)
	% Free Lunch	-12.2	(-15.4, -9.1)
School Level	Prior Year Reading	11.8	(8.5, 15.1)
	Prior Year Mathematics	5.3	(2.2, 8.4)
	Prior Year Science	-7.1	(-10.4, -3.8)
	% Special Education	14.5	(7.8, 21.1)
	% Limited English Proficiency	9.7	(3.5, 15.8)
	% Section 504	8.6	(2.7, 14.6)
	% Free Lunch	10.7	(6.2, 15.3)

The next set of results presented is for the “total sites” models. Results for the “total sites” HLM in ELA are presented below in Table 28. Only statistically significant results (p <

.01) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the ELA base model. Specific to this HLM model, the "total sites"

Table 28: HLM Results for ELA – Total Sites Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Student Total Sites	-2.6	(-3.3, -1.9)
	Prior Year ELA	17.2	(16.8, 17.6)
	Prior Year Mathematics	6.7	(6.4, 6.9)
	Prior Year Reading	5.1	(4.8, 5.3)
	Prior Year Science	2.5	(2.3, 2.8)
	Prior Year Social Studies	4.5	(4.2, 4.8)
	Gender (Male)	-10.7	(-11.0, -10.4)
	African American	1.1	(0.7, 1.5)
	Asian	5.2	(4.1, 6.3)
	Emotionally Disturbed	-7.0	(-10.5, -3.4)
	Specific Learning Disability	-14.9	(-15.9, -13.8)
	Mild Mental Retardation	-23.3	(-27.5, -19.1)
	Other Health Impaired	-10.5	(-11.9, -9.1)
	Speech and Language	-4.0	(-4.6, -3.5)
	Special Education Other	-7.1	(-8.2, -6.1)
	Gifted	8.9	(8.0, 9.9)
	Section 504	-7.0	(-7.7, -6.2)
	Limited English Proficiency	-3.8	(-5.2, -2.5)
	Free Lunch	-2.3	(-2.7, -2.0)
	Reduced Lunch	-1.5	(-2.0, -1.1)
	Student Absences	-0.3	(-0.4, -0.3)
Classroom Level	Mean Prior Year Mathematics	-5.0	(-6.1, -3.8)
	% Gifted	9.2	(6.4, 12.0)
	% Special Education	-12.2	(-14.8, -9.6)
	% Limited English Proficiency	-6.9	(-10.9, -2.9)
	% Free Lunch	-12.7	(-15.9, -9.5)
School Level	Mean Prior Year ELA	10.6	(8.9, 12.3)
	% Free Lunch	14.6	(10.6, 18.5)

variable had a significant negative effect on ELA achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who attended multiple sites in the current school year are predicted to score 2.6 points less than those who did not attend multiple sites. Just as with the student total absences variable, the coefficient for student total sites is based on each site the student attended; whereas a student attending 5 different schools in the current school year would be predicted to score 13 points less than students remaining at the same school for the entire school year.

Results for the "total sites" HLM in Mathematics are presented below in Table 29. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Mathematics base model. Specific to this HLM model, the "total sites" variable had a significant negative effect on Mathematics achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who attended multiple sites in the current school year are predicted to score 1.6 points less than those who did not attend multiple sites.

Results for the "total sites" HLM in Reading are presented below in Table 30. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Reading base model. Specific to this HLM model, the "total sites" variable had a significant negative effect on Reading achievement. Once prior achievement, demographics, poverty, and disabilities were accounted for students who attended multiple sites in the current school year are predicted to score 1.4 points less than those who did not attend multiple sites.

The next set of results presented is for the "promotional move" models. Results for the "promotional move" HLM in ELA are presented below in Table 31. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the ELA base model. Specific to this

Table 29: HLM Results for Mathematics – Total Sites Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Student Total Sites	-1.6	(-2.2, -1.0)
	Prior Year ELA	2.8	(2.5, 3.0)
	Prior Year Mathematics	27.1	(26.8, 27.3)
	Prior Year Reading	0.7	(0.5, 1.0)
	Prior Year Science	5.3	(5.1, 5.6)
	Prior Year Social Studies	2.6	(2.3, 2.8)
	Gender (Male)	2.2	(1.9, 2.5)
	African American	-5.8	(-6.2, -5.5)
	Asian	4.1	(3.2, 5.1)
	Hispanic	-1.9	(-2.7, -1.1)
	Emotionally Disturbed	-5.1	(-7.9, -2.4)
	Specific Learning Disability	-8.7	(-9.6, -7.8)
	Mild Mental Retardation	-15.9	(-19.4, -12.3)
	Other Health Impaired	-7.9	(-9.1, -6.7)
	Speech and Language	-1.8	(-2.3, -1.4)
	Special Education Other	-8.0	(-8.8, -7.1)
	Gifted	8.8	(7.9, 9.7)
	Section 504	-4.4	(-5.1, -3.7)
	Free Lunch	-2.2	(-2.5, -1.9)
	Reduced Lunch	-1.1	(-1.5, -0.7)
	Student Absences	-0.2	(-0.3, -0.2)
Classroom Level	Prior Year ELA	-4.0	(-5.8, -2.3)
	Prior Year Reading	-4.4	(-6.6, -2.3)
	Prior Year Science	3.4	(1.1, 5.7)
	% Minority	-4.8	(-8.4, -1.1)
	% Gifted	11.8	(9.2, 14.5)
	% Special Education	-13.6	(-16.2, -10.9)
	% Limited English Proficiency	-11.5	(-16.9, -6.1)
	% Free Lunch	-9.5	(-12.1, -6.9)
School Level	Prior Year Math	12.6	(9.1, 16.1)
	Prior Year Science	-6.8	(-10.6, -3.0)
	% Minority	10.3	(6.3, 14.3)
	% Section 504	8.1	(2.1, 14.1)

HLM model, the “promotional move” variable had a significant negative effect on ELA achievement. Once prior achievement, demographics, poverty, and disabilities were accounted

Table 30: HLM Results for Reading – Total Sites Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Student Total Sites	-1.4	(-2.3, -0.6)
	Prior Year ELA	4.0	(3.7, 4.3)
	Prior Year Mathematics	2.9	(2.6, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.7, 8.5)
	Gender (Male)	-3.1	(-3.4, -2.7)
	African American	-3.8	(-4.2, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.1	(-24.1, -16.1)
	Other Health Impaired	-10.3	(-11.9, -8.6)
	Speech and Language	-4.4	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.4)
	Gifted	6.9	(5.9, 8.0)
	Section 504	-6.8	(-7.7, -6.0)
	Limited English Proficiency	-8.2	(-9.7, -6.8)
	Free Lunch	-2.4	(-2.7, -2.0)
	Reduced Lunch	-1.5	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, 0.0)
Classroom Level	Prior Year Mathematics	-6.2	(-7.6, -4.9)
	% Gifted	7.1	(4.6, 9.6)
	% Special Education	-15.0	(-17.6, -12.3)
	% Free Lunch	-12.2	(-15.3, -9.1)
School Level	Prior Year Reading	11.9	(8.6, 15.1)
	Prior Year Mathematics	5.3	(2.2, 8.4)
	Prior Year Science	-7.2	(-10.5, -4.0)
	% Special Education	14.7	(8.1, 21.3)
	% Limited English Proficiency	9.7	(3.6, 15.8)
	% Section 504	8.8	(2.8, 14.7)
	% Free Lunch	10.6	(6.1, 15.2)

for students who changed schools due to promotion out of the highest grade at their school are predicted to score 2.4 points less than those who did not.

Results for the “promotional move” HLM in Mathematics are presented below in Table 32. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Mathematics base model. Specific to this HLM model, the “promotional move” variable had a significant negative

Table 31: HLM Results for ELA – Promotional Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Promotional Move	-2.4	(-3.2, -1.7)
	Prior Year ELA	17.2	(16.8, 17.6)
	Prior Year Mathematics	6.7	(6.4, 6.9)
	Prior Year Reading	5.1	(4.8, 5.3)
	Prior Year Science	2.6	(2.3, 2.8)
	Prior Year Social Studies	4.5	(4.2, 4.8)
	Gender (Male)	-10.7	(-11.0, -10.4)
	African American	1.1	(0.7, 1.4)
	Asian	5.2	(4.1, 6.3)
	Emotionally Disturbed	-7.1	(-10.6, -3.6)
	Specific Learning Disability	-14.9	(-15.9, -13.8)
	Mild Mental Retardation	-23.3	(-27.5, -19.0)
	Other Health Impaired	-10.5	(-11.9, -9.1)
	Speech and Language	-4.0	(-4.5, -3.5)
	Special Education Other	-7.1	(-8.2, -6.1)
	Gifted	8.9	(7.9, 9.8)
	Section 504	-7.0	(-7.7, -6.2)
	Limited English Proficiency	-3.8	(-5.1, -2.4)
	Free Lunch	-2.4	(-2.7, -2.1)
	Reduced Lunch	-1.5	(-2.0, -1.1)
	Student Absences	-0.3	(-0.4, -0.3)
Classroom Level	Mean Prior Year Mathematics	-4.9	(-6.1, -3.8)
	% Gifted	9.2	(6.4, 12.1)
	% Special Education	-12.3	(-14.9, -9.7)
	% Limited English Proficiency	-6.8	(-10.8, -2.8)
	% Free Lunch	-12.5	(-15.6, -9.3)
School Level	Mean Prior Year ELA	10.6	(8.9, 12.3)
	% Free Lunch	13.9	(9.9, 17.8)

effect on Mathematics achievement, which is consistent with the ELA results. Once prior achievement, demographics, poverty, and disabilities were accounted for, students who changed schools due to promotion out of the highest grade at their school are predicted to score 3.2 points less than those who did not.

Table 32: HLM Results for Mathematics – Promotional Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Promotional Move	-3.2	(-4.0, -2.5)
	Prior Year ELA	2.8	(2.6, 3.0)
	Prior Year Mathematics	27.1	(26.8, 27.4)
	Prior Year Reading	0.7	(0.5, 0.9)
	Prior Year Science	5.3	(5.1, 5.6)
	Prior Year Social Studies	2.6	(2.4, 2.8)
	Gender (Male)	2.2	(1.9, 2.4)
	African American	-5.8	(-6.2, -5.5)
	Asian	4.1	(3.2, 5.1)
	Hispanic	-1.9	(-2.6, -1.1)
	Emotionally Disturbed	-5.2	(-7.9, -2.4)
	Specific Learning Disability	-8.7	(-9.6, -7.8)
	Mild Mental Retardation	-15.8	(-19.4, -12.3)
	Other Health Impaired	-7.9	(-9.1, -6.7)
	Speech and Language	-1.8	(-2.2, -1.4)
	Special Education Other	-7.9	(-8.8, -7.0)
	Gifted	8.8	(7.9, 9.7)
	Section 504	-4.4	(-5.0, -3.7)
	Free Lunch	-2.2	(-2.5, -1.9)
	Reduced Lunch	-1.1	(-1.5, -0.7)
	Student Absences	-0.3	(-0.3, -0.2)
Classroom Level	Prior Year ELA	-3.9	(-5.7, -2.2)
	Prior Year Reading	-4.6	(-6.7, -2.4)
	Prior Year Science	3.4	(1.1, 5.7)
	% Minority	-4.6	(-8.2, -1.0)
	% Gifted	11.7	(9.1, 14.4)
	% Special Education	-13.7	(-16.3, -11.0)
	% Limited English Proficiency	-12.0	(-17.4, -6.6)
	% Free Lunch	-9.9	(-12.5, -7.3)
School Level	Prior Year Math	12.7	(9.2, 16.1)
	Prior Year Science	-6.8	(-10.6, -3.0)
	% Minority	10.2	(6.3, 14.2)
	% Section 504	7.2	(1.1, 13.2)

Results for the "promotional move" HLM in Reading are presented below in Table 33. Only statistically significant results ($p < .01$) are presented. Results for all non-mobility variables (prior achievement, demographics, etc.) were consistent with the Reading base model. Specific to this HLM model, the "promotional move" variable had a significant negative effect on Reading achievement, which is consistent with both ELA and Mathematics results. Once prior achievement, demographics, poverty, and disabilities were accounted for students who

Table 33: HLM Results for Reading – Promotional Move Model

Model Level	Variables Entered	Coefficient	(CI)
Student Level	Promotional Move	-3.4	(-4.3, -2.5)
	Prior Year ELA	4.0	(3.8, 4.3)
	Prior Year Mathematics	2.9	(2.7, 3.2)
	Prior Year Reading	14.2	(13.9, 14.5)
	Prior Year Science	8.3	(7.9, 8.6)
	Prior Year Social Studies	8.1	(7.8, 8.5)
	Gender (Male)	-3.1	(-3.5, -2.8)
	African American	-3.8	(-4.3, -3.3)
	Specific Learning Disability	-14.2	(-15.4, -13.0)
	Mild Mental Retardation	-20.1	(-24.1, -16.0)
	Other Health Impaired	-10.3	(-12.0, -8.6)
	Speech and Language	-4.3	(-4.9, -3.8)
	Special Education Other	-10.5	(-11.6, -9.4)
	Gifted	6.9	(5.8, 7.9)
	Section 504	-6.8	(-7.7, -6.0)
	Limited English Proficiency	-8.2	(-9.6, -6.7)
	Free Lunch	-2.4	(-2.8, -2.0)
	Reduced Lunch	-1.5	(-2.0, -0.9)
	Student Absences	-0.1	(-0.1, -0.1)
Classroom Level	Prior Year Mathematics	-6.0	(-7.3, -4.7)
	% Gifted	6.9	(4.4, 9.4)
	% Special Education	-14.7	(-17.4, -12.0)
	% Free Lunch	-11.7	(-14.8, -8.6)
School Level	Prior Year Reading	10.9	(7.6, 14.2)
	Prior Year Mathematics	5.5	(2.4, 8.6)
	Prior Year Science	-7.3	(-10.5, -4.0)
	% Special Education	12.9	(6.2, 19.5)
	% Limited English Proficiency	9.3	(3.2, 15.4)
	% Section 504	8.2	(2.3, 14.2)
	% Free Lunch	8.9	(4.4, 13.4)

changed schools due to promotion out of the highest grade at their school are predicted to score about three points less than those who did not.

The next set of results regarding the “moved two years in a row” and “moved three years in a row” models in all contents reveal that all non-mobility variables (prior achievement, demographics, etc.) were consistent with the base models of the corresponding content areas. Specific to these HLM models, the “moved two years in a row” and “moved three years in a row” variables did not have significant effects, indicating that once all other variables were accounted for making any kind of move two and three years in a row did not have a significant effect on ELA, Mathematics, and Reading achievement. It is possible that significant effects were not detected for these low incidence cases due to small sample size. All HLM results are presented in Table 34. Coefficients and corresponding confidence intervals for each mobility variable are presented for ELA, Mathematics, and Reading.

Table 34: Summary of HLM coefficients

Variable	**ELA**	**Mathematics**	**Reading**
Mobile Status	-2.5 (-3.0, -2.0)	-2.9 (-3.4, -2.3)	-1.9 (-2.5, -1.3)
Between Years Move	-0.8 (-1.4, -0.3)	-0.8 (-1.4, -0.3)	n.s.
Within Year Move – Student Level	-2.6 (-3.4, -1.9)	-1.7 (-2.3, -1.1)	-1.5 (-2.4, -0.6)
Within Year Move – Classroom Level	n.s.	n.s.	-8.9 (-14.2, -3.6)
Within Year Move – School Level	n.s.	n.s.	-11.8 (-19.0, -4.7)
Promotional Move	-2.4 (-3.2, -1.7)	-3.2 (-4.0, -2.5)	-3.4 (-4.3, -2.5)
In District Move	-1.5 (-2.1, -0.8)	-1.6 (-2.3, -1.0)	n.s.
Out of District Move	n.s.	n.s.	2.0 (0.9, 3.2)
Total Sites	-2.6 (-3.3, -1.9)	-1.6 (-2.2, -1.0)	-1.4 (-2.3, -0.6)
Moved Two Years in a Row	n.s.	n.s.	n.s.
Moved Three Years in a Row	n.s.	n.s.	n.s.

Note: The first value is the statistically significant coefficient ($p < .01$) for that content area. The values in parentheses are the 95% confidence interval. The notation n.s. indicates that the effect for that variable was not statistically significant in the analysis.

DISCUSSION

It is well documented that student mobility is negatively linked to many social, psychological, and academic outcomes for mobile students (Pane, McCaffrey, Kalra, & Zhou, 2008; Simpson & Fowler, 1994; Wood, et al., 1993; Rumberger, 2003; Engec, 2006; Swanson & Schneider, 1999; Alexander, Entwisle, & Dauber, 1996; Temple & Reynolds, 1999; Heinlein & Shinn, 2000; Kerbow, Azcoitia, & Buell, 2003; Rumberger, 2003; Engec, 2006, Strand & Demie, 2006; Mehana & Reynolds, 2004). Few researchers have investigated the association between different types of student mobility and student achievement (Engec, 2006; Hanushek, Kain, & Rivkin, 2004). Negative effects are not only seen among mobile students, but also in the classrooms and schools in which they are enrolled. All students in highly mobile schools have significantly lower achievement when compared with less mobile schools (Rumberger, Larson, et al., 1999; Hanushek et al., 2004). Schools with high rates of turnover have also been found to have a slower pace of instruction (Smith, Smith, & Bryk, 1998) and increased administrative costs (Rumberger, 2003). Student mobility may also affect school accountability efforts under the No Child Left Behind Act (2001). All students are assessed under NCLB, however test results of students who do not remain in one school for a full academic year do not count towards either school's adequate yearly progress (Weckstein, 2003).

While the negative effects on the academic achievement of mobile students have been well documented, it is unclear as to whether the negative effects of student mobility could extend beyond mobile students themselves to classrooms and schools (Rumberger, Larson, et al., 1999; Hanushek, et al., 2004). If the negative association is extended to classrooms and schools, school and district personnel should consider mobility to affect all students, even those who remain in the same school all year. Schools and districts must have systems in place to support new students as they transition into new schools, such as allowing a student to remain in their school for the remainder of the school year if they changed residences within their current school district, therefore limiting moves to naturally occurring breaks between school years (Nelson, Simoni, et al., 1996; Kerbow et al., 2003). In addition, the problems with cumulative record keeping should be identified and corrected (Kerbow et al., 2003).

The purpose of the current study was to investigate the effect of different types of student mobility on the academic achievement of mobile students and their stable peers using a statewide database. An analysis was conducted to determine the relationship between the different types of mobility on the standardized English Language Arts, Reading, and Mathematics achievement scores of mobile students. Given that within year mobility has been shown to be particularly harmful to the achievement of all students in their school (Rumberger, Larson, et al., 1999; Hanushek et al., 2004; Kerbow, et al., 2003), the effect of within year mobility on stable students was also investigated at the classroom and school levels.

The five LR analyses consistently found that students identified as having the labels Mild Mental Retardation and lower frequency special education diagnoses had significantly decreased odds of changing schools. This finding may be due to the continuous specialized services received by these students, such as extended school day and year as well as speech, occupational, and physical therapies. Additionally, minority students had significantly increased odds of changing schools. It is important to note that while demographic and achievement variables had a statistically significant predictive relationship with mobility, the actual magnitude of the relationship is very small. Statistical significance in this case is the result of immense statistical power. It is also worth noting that this correlation between achievement and demographic factors does not suggest causation. The author is not suggesting that achievement and demographics typically have a causal relationship to mobility.

Though many predictors were found to be statistically significant, the model had very poor fit. Overall, the predictive accuracy was generally poor across all of mobility analyses. In this case, the predictive accuracy was strong when identifying specificity, or the proportion of students that did not move when they were correctly identified as such. The model was very poor at predicting sensitivity, or the proportion of students that did move when they were correctly identified as such. In all analyses the overwhelming majority of students were non-movers, and the base rates for students who made a within year, in district, and out of district move were very low (under 10% of the entire sample). Poor predictive accuracy may also suggest that demographics and prior achievement alone are insufficient in predicting students' mobility status. The reason for moving and whether the move was related to personal or disciplinary actions are probable key predictors that were not available in the database used for the current study.

Among the demographic and achievement variables, there were several consistent findings across ELA, Mathematics, and Reading HLM analyses. At the student level, prior achievement in the content analyzed (e.g., prior year ELA when analyzing current year ELA) had the highest positive predictive relationship with achievement scores. This suggests that positive performance on prior year tests predicts positive performance on current year tests. Male students consistently scored more poorly in ELA and Reading analyses after controlling for other variables; however, male students scored higher than females in Mathematics analyses. This is consistent with NAEP (2000) assessment data that found that nationally, boys outperform girls in Mathematics and girls outperform boys in Reading and ELA in all grade levels. Girls have consistently outperformed boys in Reading since the NAEP was administered in the 1970s (NAEP, 2000). Free lunch, Mild Mental Retardation, Specific Learning Disability, and student absences were significant negative predictors of student achievement. This suggests that students who are classified as one or more of these variables are predicted to have lower ELA, Mathematics, and Reading achievement test scores. These findings are consistent with studies that utilized a similar sample of students (Noell et al., 2007; Noell et al., 2008; Noell et al., 2009), as well as results from Baker and Jansen (2000) and White (1982) specific to the negative link of low socioeconomic status and high student absences. These significant predictors were statistically controlled for in order to ascertain the relative effects of mobility alone on academic achievement.

Among the study specific mobility variables utilized in the current study, there were several consistent findings. At the student level, mobile status and a promotional move were associated with poorer ELA, Mathematics, and Reading achievement test scores after controlling for other factors. Mobile status, which is any between years, within year, or promotional move during the 2008-2009 school year, was found to have a negative association with academic achievement and is consistent with the 2004 meta-analysis of a decade of research investigating the effects of "any type of move" on academic achievement (Mehana and Reynolds).

A promotional move was found to be associated with a greater loss in achievement than a between years move not associated with promotion. The finding that a student making a promotional move is more likely to have a negative impact on their achievement than students not making a promotional move is consistent with Engec (2006). However, Engec (2006) found that a between years move had a more negative impact than a promotional move, and the opposite was found in the current study. About 12% of students changed schools between school years but not due to promotion, while about 20% of students changed schools solely due to promotion. Future research should investigate differences between these two groups, specifically as to whether there are differences in free lunch status or higher or lower achievement prior to moving. Students who change schools when they are promoted to a grade that is no longer at their current school are likely to move with the same social cohort, whereas a move between years may not afford this. Starting at a new school with students one may already be acquainted with could be perceived as a protective factor. However, a promotional move also brings about certain challenges such as an increased academic workload, differing grading criteria, and differing course schedules. Future research should also investigate whether certain qualities of a promotional move are responsible for the negative association with achievement.

A between years move and an in district move were both negatively linked to ELA and Mathematics achievement. The negative association of the between years move is consistent with prior research in this area (Engec, 2006; Hanushek et al., 2004). Hanushek and colleagues (2004) also investigated the effects of a move in district and found that this type of move was not related to an increase in school quality. The current study extends this finding whereby a move in district is negatively related to academic achievement for those students. Therefore, a change in schools within a school district would likely not be a change to a higher achieving school. However, it is unclear in the current analysis as to whether the schools that “receive” the in district movers have differences in overall school achievement.

Additionally, an out of district move was positively associated with achievement in Reading. This was the only positive effect found out of all of the study variables. The finding of the current study that a student moving out of district was associated with improved reading achievement might suggest that many of these moves were associated with improved school quality or a higher performing peer group (e.g., Hanushek et al., 2004; Pane at al., 2008). However, given that this single finding is contrary in direction to the diverse and consistent findings of this study and previous research in this area; it is also possible that it is a spurious artifact of this data set. Future research could also look at the schools "receiving" mobile students, and whether or not these schools are considered higher achieving than their previous schools. The results of Pane et al. (2008) also suggest that a positive change in schools is related to positive outcomes in academic achievement even with prior achievement accounted for.

Both total sites and a within year move at the student level had negative associations with ELA, Mathematics, and Reading achievement, and a within year move at the classroom and school levels had a negative association with ELA and Reading achievement only. This finding is consistent with Engec (2006) and Hanushek and colleagues (2004) where a within year move was negatively associated with achievement, and had an effect that was larger than the effect of a between years move. The significant finding of the total sites variable indicates a compounded negative association with achievement for every subsequent change in school within the school year.

The significant findings at the classroom and school levels indicate that classrooms and schools with high percentages of students who changed schools within the school year were associated with poorer Reading achievement, after controlling for the demographic factors of those students and prior achievement. These negative findings are consistent with previous research indicating that schools with mobile students (within year) are more likely to have poorer achievement schools without mobile students (Rumberger et al., 1999; Hanushek et al., 2004). The current study extended these negative findings to the classroom level, where a move within the school year is predicts poorer achievement for the entire class. This is consistent with research that highly mobile schools have a slower pace of instruction (Lash & Kirkpatrick, 1990; Smith, Smith, & Bryk, 1998) and problems with cumulative record keeping (Kerbow, 1996) indicating that teachers may not have time to have work materials ready, change lesson plans, or seek relevant background information about new students.

Evaluation of these findings should also consider the limitations of this study. The first limitation regards the nesting structure of the data. The three-level structure employed by the current study grouped students within classrooms and those classrooms within schools. This was achieved by linking unique student identification numbers to corresponding teacher and site identification numbers. While the majority of teachers in the sample taught one class of students, many teachers taught several classes of students. For example, a middle school math teacher may teach all sixth grade classes at one school, which almost certainly includes more than one class of about 25 students each. Therefore when estimating the effects of within year mobility on classrooms, the effects are estimated for *all* students taught by a specific teacher, which may or may not include one "classroom" of students. Future research with more precise modeling could investigate the effects at the "classroom" level by examining the specific courses taught.

An additional qualification has to do with the effects of within year mobility on schools. Students who changed schools within the school year were linked to the school where they took the test, whereby the effects are estimated for the "receiving" school and not the "sending" school. Furthermore, for the very small percentage of students who changed schools multiple times within the school year, the school where they took the test may not be their "last" site. Future research should investigate the effects of within year mobility on the schools that students leave in addition to the schools that receive these mobile students.

Future research will almost certainly want to include the reason for changes in school, especially if it is related to a change in residence, change in family composition, or related to disciplinary action. While the reasons for a promotional move can be used to inform additional supports during those types of moves, it remains unclear as to what (if any) supports could be in place for the other types of moves if the reason for moving is not evident. Discipline data could prove to be a useful tool in future mobility research in that expulsion is directly linked to a change in schools. Future research should also seek to investigate the effects of mobility in the early years of school (e.g., Kindergarten through 3rd grade) as well as moves between public and private schools and moves between states.

Results for students changing schools within the school year are particularly worrisome given that the putative effects are apparent at the classroom and school levels, which contain nonmobile students. Schools and districts should have systems in place to support new students as they transition into new schools. Given the smaller effect of a between years move on academic achievement, a change in district policy could allow a student to remain in their school for the remainder of the school year if they changed residences within their current school district, therefore limiting moves to naturally occurring breaks between school years (Nelson, Simoni, et al., 1996; Kerbow et al., 2003). In addition, the problems with cumulative record keeping should be identified and corrected, that way new schools can better place students, identify potential gaps in knowledge that can be addressed promptly, and continue any individualized supports that the student was receiving at their previous school (Kerbow et al., 2003).

This study extended the literature by confirming that a composite mobility variable (mobile status) is negatively associated student achievement in addition to specific mobility variables (between years move, in district move, within year move, and promotional move) (Alexander, Entwisle, & Dauber, 1996; Temple & Reynolds, 1999; Heinlein & Shinn, 2000; Kerbow, Azcoitia, & Buell, 2003; Rumberger, 2003; Engec, 2006, Strand & Demie, 2006; Mehana & Reynolds, 2004), once statistically significant achievement and demographic variables are retained. Controlling for demographic and prior achievement variables was a key recommendation utilized from Mehana and Reynolds' (2004) meta-analysis, and the current study was able to employ this type of statistical control.

The current study was one of few to utilize a large sample, control for prior achievement, and separate the composite mobility variable into the different types of moves while using advanced statistical techniques. Findings consistently indicated a negative effect of the various mobility variables on ELA, Mathematics, and Reading achievement, once key predictor variables were controlled. It also highlighted the need for future research including vital information such as discipline rates and reasons for the change in schools. Findings can help school personnel assist in more successful transitions, especially during a promotional move.

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