School Mobility in the Early Elementary Grades: Frequency and Impact From Nationally-Representative Data

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Executive Summary

<u>What is School Mobility and Why is it Important?</u>

Efforts by educational researchers, policy makers, and educators to improve the quality of learning and teaching in our nation's schools include a host of approaches, including large-scale policy initiatives (e.g. No Child Left Behind) and local efforts (e.g. teacher professional development, curricular reform, using assessment to inform subsequent instruction, among others). The implicit assumption common to almost all educational policies, goals, and reforms is that the initiative or activity will be implemented and have an influence on a constant population of children within a district, school, or classroom (Kerbow, 1996). However, this assumption is often false — in reality, school populations in the United States are constantly shifting. We know that children in the United States are much more likely to change residences than children in other industrialized countries (GAO, 1994; Long, 1992). Very often, these relatively common residential moves are coupled with school changes. Research supports the relatively common nature of school mobility. One nationally representative study of 15,000 third-graders in 235 elementary schools found that by the end of third grade, 40% of children had moved once and 17% of children had attended two or more schools (GAO, 1994). In urban centers, school mobility is even more pervasive (de la Torre & Gwynne, 2009; Kerbow, 1996; Pianta & Early, 2001).

Children who frequently change schools tend to share background characteristics that are known to be markers of disadvantage. Frequent school mobility is associated with low-income status (Alexander, Entwisle, & Dauber, 1996; de la Torre & Gwynne, 2009; GAO, 1994; Kerbow, 1996; Pianta & Early, 2001; Pribesh & Downey, 1999; Rumberger, Larson, Ream, & Palardy, 1999), race/ethnicity (Alexander, Entwisle, & Dauber, 1996; de la Torre & Gwynne, 2009; GAO, 1994; Kerbow, 1996; Pianta & Early, 2001), inner-city residence (GAO, 1994), single parent households (Nelson, Simoni, & Adelman, 1998), migrant status (GAO, 1994), speaking English as a second language (Mao, Whitset, & Mellor, 1997), stressful life events (e.g. death, divorce, remarriage in the family) (Pribesh & Downey, 1999), grade repetition (Simpson & Fowler, 1994), and behavioral difficulties in school (Nelson, Simoni, & Adelman, 1998).

Reasons for School Change

In thinking about whether school change may be beneficial or detrimental, it is important to consider *why* children might change schools. In some cases, children are required to change schools due reasons related to two different structural aspects of the school system. One reason for school change related to structure happens when children change schools because a school does not service the next grade, as in the case of pre-primary schools (including pre-kindergarten and kindergarten children), primary schools (often including kindergarten through second grade children), or other types of school grade structures. Another structural reason for school change happens when an entire school closes and all children must change schools.

Although structural reasons for changing schools do occur, and are therefore important to attend to, it is equally important to consider reasons for school change that are related to the family. One family reason for school change is what Rumberger and his colleagues (1999) has called "strategic" school change. These types of school changes are characterized as purposeful, planned changes "made to achieve some desired end," which is often to attend a better school. In contrast, these authors have identified another family-related reason for changing schools, which they call "reactive." Reactive school changes happen when negative events, beyond the control of the student or family, occur that necessitate a school change. Reactive changes may occur when conditions at the school are unacceptable academically or socially, causing the family to feel that they have no choice but to remove the child from the situation. School changes also may occur as a result of residential mobility due to a change in the family's situation; this could include positive changes, such as a better job, a better residence, or moving to be near family (Crowley, 2003) or negative disruptions within the family, such as divorce, job loss, economic downturns, or death in the family (among others) (Crowley, 2003; Rumberger et al., 1999).

Summary of Past Research

Taken together, the majority of the literature on school mobility suggests that school change has a negative influence on academic achievement, academic progress, and non-academic outcomes. However, it is important to consider these findings in light of methodological or other limitations inherent in many studies of this phenomenon.

First, much of this research has been of a local nature at the district, city, or state level rather than at using nationally representative datasets. Though these studies are certainly important, their external validity and generalizability are limited.

Second, many of the existing studies neglect to control for crucial cognitive (e.g. initial achievement) and socio-demographic (e.g. minority status and SES) characteristics of children. Because mobility is highly related to both initial achievement and socio-demographic factors, this oversight can severely bias results. It is important to conduct studies that carefully account for children and families' background characteristics.

Third, much of the literature on mobility is cross-sectional rather than longitudinal (Temple & Reynolds, 1999). This is likely because of the nature of the population being studied--children who change schools – makes it difficult and costly to adequately conduct a longitudinal study on the effect of school change. Though it is clear why cross-sectional data have been the main focus of empirical investigation on this topic, this causes difficulty in drawing causal inferences using this type of data.

Finally, most of the research on this topic has focused on how changing schools influences children in later elementary school, middle school, or high school. Very few studies focus on the critical early childhood years (between kindergarten and third grade). Because we know children's academic success during their early years is strongly associated with achievement in later years (Snow, Burns, & Griffin, 1998), it is important to explore the influence of mobility on children in the early elementary grades.

Researching Mobility Rates With ECLS-K

The current study addresses these gaps in the literature by focusing on the impact of school change on children from kindergarten to third grade using a nationally representative sample of children who were followed longitudinally. The longitudinal nature of our analysis allows us to control for initial achievement (a serious albeit common omission in past research). In this study, we use the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) dataset to investigate the following research questions:

1. *Who changes schools and who does not change schools?* For children aged 5-8, which children move from one school to another?

2. *What is the broad nature of the school move?* To what extent do children change schools *during* the school year as opposed to *between* school years? To what extent do children change schools for *structural* reasons (they have completed the highest grade available in their school and must transfer for the next school year) as opposed to *family* reasons (residential relocation or the family's desire or need for a different school)?

3. *What is the impact of moving on children's mathematics and reading achievement?* Are children who change schools negatively impacted by school mobility after accounting for such important factors as social class, minority status, and prior achievement? Is the impact of the school mobility related to the timing and the motivation for the school change?

4. *Is the impact of school mobility conditioned by other characteristics of the child or family?* More specifically, is the effect of school mobility different for girls than for boys? For children of different social, racial, ethnic, or language backgrounds?

The data we used in this study were drawn from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 [ECLS-K], sponsored by the National Center for Education Statistics [NCES]. More information on the ECLS-K sampling design is available in the ECLS-K User's Manual (NCES, 2000). The full ECLS-K data set permits the investigation of three distinct time periods in addition to changes across the entire four years: (1) school changes during the kindergarten year; (2) school changes from the end of kindergarten to the end of first grade (combining both a possible between-school-years change and a within-school-year change); (3) school changes from the end of first grade to the end of third grade (combining two possible instances of between-school-years change and two possible instances of within-school-year change); and (4) school changes from the beginning of kindergarten to the end of third grade.

Summary of Main Results

Unsurprisingly, over time, school mobility becomes increasingly the norm, due in some part to how U.S. schools are structured. Family decisions play a larger role, however, in determining school changes during the first four years of schooling. By the end of third grade, just over half of America's kindergartners (55%) remain in the same school they started in four years earlier, and nearly 36% change schools only once. Multiple school changes (three or more times) during the first four years of schooling are quite rare.

School change is more common between school years than during school years: 7% of children change schools during the kindergarten year. School mobility rates are higher for time spans that include the summer: 22.9% of children change schools between the end of kindergarten and the end of first grade, and 27.5% of children change schools between the end of first grade and the end of third grade.

School changes due to *family* reasons are far more common than school changes due to *structural* reasons during these early grades. For example, 5.2% of children change schools after kindergarten for structural reasons (i.e., their kindergarten school did not include a first grade) but 17.7% of children change schools after kindergarten for family reasons.

Mobility rates are similar for males and females during the first four years of schooling, although young boys are slightly more likely to change schools for family reasons than are young girls. Traditionally disadvantaged children (e.g., lower-SES and Black children) experience higher levels of school mobility, underscoring (1) the importance of understanding the impact of changing schools on young children's cognitive and social development during the first four years of schooling and (2) the importance of including controls for race/ethnicity, SES, and prior achievement. Except for school changes due to structural reasons, Black children consistently exhibit the highest mobility rates of all racial/ethnic groups. Overall, only 45% of Black third graders are enrolled in their kindergarten school, as compared to nearly 60% of White and Asian third graders. Mobility rates are related to family socioeconomic status: socially disadvantaged children change schools more frequently than their more advantaged peers, especially during their first two years in school. Disadvantaged children (i.e., lower SES and black racial group membership) are especially likely to be associated with school change for family reasons.

By looking only at main effects (without interactions) adjusting for child and family background, the broad picture appears mostly benign. Changing schools during the kindergarten year has a small but lingering main effect on reading development and negatively impacts mathematics development by the following year (ES ≈ -.15). Changing schools between the end of kindergarten and the end of first grade (for whatever reason) has only a negligible impact on cognitive development (either non-significant or ES magnitude less than .05, whether positive or negative). Changing schools between the end of first grade and the end of third grade (for whatever reason) has no overall impact on cognitive development. Changing schools once during the first four years of schooling (for whatever reason) has no impact on cognitive development. Changing school two or more times during the first four years of schooling (for whatever reason) has a small positive impact on cognitive development (ES ≈ .10). Changing schools during the first two years of schooling somewhat increases the risk of immediate grade retention.

A substantially more complex picture emerges when investigating conditional effects. Lower-SES children experience even larger cognitive deficits when they change schools during kindergarten. Children who repeat kindergarten may experience some cognitive benefits of changing schools. Certain children in pre-primary schools (who must change schools in order to enroll in first grade) experience cognitive difficulties in first grade. Children receiving special education services are typically harmed by changing schools. Children who change schools twice during the first two years of schooling experience greater cognitive difficulties.

The complexity of our results makes any simple statement about the cognitive impact of school mobility impossible. Given that most prior research did not investigate conditional effects, our work here clearly demonstrates the serious inadequacy of school mobility studies that are cross-sectional and which fail to adjust such for important child and family characteristics as race/ethnicity, SES, and prior achievement.

We suggest that future research could extend our work by continuing to discriminate between types of school mobility, in particular separating the various family reasons for changing schools. This diverse set of motivations is likely to interfere with the development of a clearer picture of how school mobility might impact children's cognitive development. In today's climate of increasing school choice and the growing number of charter schools, children are now changing schools (and parents relocating their families) in pursuit of diverse educational alternatives. Some choices and rationales might lead to an improved educational experience for children, others to a worse educational experience, and finally others to a similar educational experience. Pooling results across settings with positive, negative, and neutral outcomes will often lead to very little overall differences. We believe that such is likely to be the case with school mobility studies. We suggest that studies of school mobility must focus on how this phenomenon influences particular groups of children – this involves more attention to identifying interaction effects and less to concentrating only on main effects.

Introduction

What is School Mobility and Why is it Important?

Efforts by educational researchers, policy makers, and educators to improve the quality of learning and teaching in our nation's schools include a host of approaches, including large-scale policy initiatives (e.g. No Child Left Behind) and local efforts (e.g. teacher professional development, curricular reform, using assessment to inform subsequent instruction, among others). The implicit assumption common to almost all educational policies, goals, and reforms is that the initiative or activity will be well implemented and have an influence on a constant population of children within a district, school, or classroom (Kerbow, 1996). However, this assumption is often false — in reality, school populations in the United States are constantly shifting. We know that children in the United States are much more likely to change residences than children in other industrialized countries (GAO, 1994; Long, 1992). Very often, these relatively common residential moves are coupled with school changes. Research supports the relatively common nature of school mobility. One nationally representative study of 15,000 third-graders in 235 elementary schools found that by the end of third grade, 40% of children had moved once and 17% of children had attended two or more schools (GAO, 1994). In urban centers, school mobility is even more pervasive (de la Torre & Gwynne, 2009; Kerbow, 1996; Pianta & Early, 2001).

Children who frequently change schools tend to share background characteristics that are known to be markers of disadvantage. Frequent school mobility is associated with low-income status (Alexander, Entwisle, & Dauber, 1996; de la Torre & Gwynne, 2009; GAO, 1994; Kerbow, 1996; Pianta & Early, 2001; Pribesh & Downey, 1999; Rumberger, Larson, Ream, & Palardy, 1999), race/ethnicity (Alexander, Entwisle, & Dauber, 1996; de la Torre & Gwynne, 2009; GAO, 1994; Kerbow, 1996; Pianta & Early, 2001), inner-city residence (GAO, 1994), single parent households (Nelson, Simoni, & Adelman, 1998), migrant status (GAO, 1994), speaking English as a second language (Mao, Whitset, & Mellor, 1997), stressful life events (e.g. death, divorce, remarriage in the family) (Pribesh & Downey, 1999), grade repetition (Simpson & Fowler, 1994), and behavioral difficulties in school (Nelson, Simoni, & Adelman, 1998).

There is a great deal of research that indicates that changing schools has a deleterious influence on reading and mathematics achievement (Mehana & Reynolds, 2004). We know that children who change schools are more likely to possess the risk factors described in the previous paragraph, and that many of these risk-factors have unique effects on achievement. Some researchers argue that it is these pre-existing differences between mobile and non-mobile students that explains much of the relationship between school mobility and achievement (Alexander, Entwisle, & Dauber, 1996; Pribesh & Downey, 1999; Wright, 1999). A contrasting body of research indicates that school mobility has an influence on achievement above and beyond the impact of these risk-factors (Gruman et al., 2008; Mehana & Reynolds, 2004). Disparate findings regarding the magnitude of the effect of school mobility on student achievement merit further investigation into this phenomenon.

Conceptualizing School Change for Children, Teachers, and Schools

Much of the discourse around school mobility has conceptualized school change as a negative, harmful event. From this perspective, children, teachers, and schools experience a great deal of discontinuity as a result of school change, which in turn may negatively influence school achievement. Although this may be true for many children, it is critical to consider this issue from the alternative, if rarely adopted, perspective: that school change may benefit some children. Unfortunately, we know that too many children attend under-resourced, low-performing schools. It is likely that many families, dissatisfied with their child's current educational setting, make a conscious, proactive, empowered decision to transfer their child from what they perceive to be an unacceptable educational setting to (what they perceive as) a better school. This type of school change has the potential to improve children's academic outcomes (de la Torre & Gwynne, 2009). Although the latter theory of school mobility warrants investigation, the large majority of the literature on school mobility has conceptualized it from the former perspective: that school mobility is harmful.

Reasons for school change. In thinking about whether school change may be beneficial or detrimental, it is important to consider *why* children might change schools. In some cases, children are required to change schools due to reasons related to two different structural aspects of the school system. One reason for school change related to structure happens when children change schools because a school does not offer the next grade, as in the case of pre-primary schools (including pre-kindergarten and kindergarten children), primary schools (often including kindergarten through second grade children), or other types of school grade structures. Another structural reason for school change happens when an entire school closes and all children must change schools.

Although structural reasons for changing schools do occur, and are therefore important to attend to, it is equally important to consider reasons for school change that are related to the family. One family reason for school change is what Rumberger and his colleagues (1999) has called "strategic" school change. These types of school changes are characterized as purposeful, planned changes "made to achieve some desired end," which is often to attend a better school. In contrast, these authors have identified another family-related reason for changing schools, which they call "reactive." Reactive school changes happen when negative events, beyond the control of the student or family, occur that necessitate a school change. Reactive changes may occur when conditions at the school are unacceptable academically or socially, and parents feel that they have no choice but to remove the child from the situation. They also may occur as a result of residential mobility due to a change in the family's situation; this could include positive changes, such as a better job, a better residence, or moving to be near family (Crowley, 2003) or negative disruptions within the family, such as divorce, job loss, death in the family (among others) (Crowley, 2003; Rumberger et al., 1999).

Discontinuity for mobile children. Whether a school change is strategic or reactive, when a child changes schools, he or she experiences what some researchers call an "ecological transition" (Mehana & Reynolds, 2004; Temple & Reynolds, 1999). This term, borrowed from Bronfenbrenner's ecological theory, has been defined as "changes in the settings, roles, or expectations of a developing person" (Temple & Reynolds, 1999). These changes create discontinuity in a child's academic and social environment. Academically, a child is likely to experience a mismatch between his or her old and new schools in the curriculum (Rumberger et al., 1999), teachers, academic standards, and expectations for classroom behavior (Ingersoll, Scamman, & Echerling, 1989; Mehana & Reynolds, 2004). Some researchers have suggested that these changes might be particularly harmful during early schooling, as mobile children may miss exposure to critical conceptual knowledge that forms the foundation of later learning (Kerbow, 1996). In addition to discontinuity of educational experiences, school change can also disrupt important social networks with peers, teachers, and other adults. An emerging body of researchers have adopted Coleman's notion of social capital when considering the implications of school mobility, suggesting that school moves diminish social capital by severing social relationships between children, parents, and their teachers (Gruman et al., 2008; Pribesh & Downey, 1999; South, Haney, & Bose, 2007)

Discontinuity for teachers and non-mobile children. There is no question that a school change can be disruptive for the mobile child. However, many researchers point out that school changes can also be highly disruptive for teachers and non-mobile students. Particularly in schools where a large number of children move in and out of the school, as if often the case in large urban centers, teachers may feel overwhelmed by the task of providing appropriate attention and instruction to *both* mobile and non-mobile children (Rumberger et al., 1999). Teachers in highly-mobile schools report that they find it necessary to "reteach," "backtrack," and slow the pace of instruction in order to meet the needs of the mobile children in their classrooms (Fisher, Matthews, Stafford, Nakagawa, & Durante, 2002; Kerbow, 1996; Lash & Kirkpatrick, 1990). In fact, in a study of Chicago public schools, Kerbow (1996) found that by fifth grade, curricular pace was much slower in schools with highly mobile populations as compared to schools with less mobile populations; by as much as a year in some subjects. The need for teachers to alter their entire instructional regime in the presence of high rates of student mobility may explain the empirical evidence that non-mobile students are negatively affected by the presence of mobile children in the school and classroom (Rumberger et al., 1999).

Despite the clear evidence that school mobility has the potential to disrupt the educational experience of mobile children, teachers, and non-mobile children, there is little indication that schools or districts implement any type of systematic approach to supporting teachers of mobile children or to ease the transition of children who are new to a school (Kerbow et al., 2003). Teachers in schools with high rates of mobility report that in the vast majority of cases, they are given no advance notice when a new student will arrive in their classrooms (Lash & Kirkpatrick, 1990) and no indication of a child's past or current performance in the form of records or assessments (Kerbow et al., 2003). There is little evidence that districts provide any additional support for teachers to accommodate student mobility; teachers are generally expected to take responsibility for the transition of mobile children to their new schools (Lash & Kirkpatrick, 1990) and meeting the needs of all of the children in their classroom (Kerbow et al., 2003) with little guidance or support. Just as teachers of mobile children are given little support, mobile children do not consistently experience organized or planned interventions designed to help them adjust to the new educational context (de la Torre & Gwynne, 2009; Engec, 2006).

Analytic Frameworks for Investigating School Mobility

Due to the complex nature of this issue, school mobility researchers have adopted a wide range of analytic frameworks for investigating how school mobility influences children's outcomes, including investigating the following: (a) the differential effects of changing schools during the school year and changing schools between grades (de la Torre & Gwynne, 2009; Egnec, 2006; Mao, Whitset, & Mellor, 1997), (b) how structural reasons for school change may influence achievement differently from family-based reasons for school change (Engec, 2006), (c) comparing the effects of a residential change only, a school change only, or a combination of a residential and a school change (Pribesh & Downey, 1999; Swanson & Schneider, 1999), (d) comparing how school mobility influences younger children differently than older children (Ingersoll, Scamman, & Eckerling, 1989), (e) investigating differences between inter- and intra-district mobility (Alexander, Entwisle, & Dauber, 1996; Mao, Whitset, & Mellor, 1997), and (f) one of the most common approaches to conceptualizing school mobility, by looking at how increasing numbers of school changes influence children's outcomes (Engec, 2006; Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Mao, Whitset, & Mellor, 1997; Nelson, Simoni, & Adelman, 1996; Simpson & Fowler, 1994; Temple & Reynolds, 1999).

In sum, there are complex causes of school mobility as well as myriad ramifications of school mobility on the continuity of educational experiences for mobile children, teachers, and non-mobile children. Due to the complexity of this issue, researchers have adopted widely varying frameworks to guide their investigations of school mobility. However, common across all of these analytic frameworks is a focus on the impact of school mobility on such important child outcomes as academic achievement, academic progress (including promotion and graduation rates), and behavioral outcomes.

Impacts of School Mobility

Influence of mobility on academic achievement. Investigating how mobility influences academic achievement has been the focus of the majority of school mobility research. Overwhelmingly, this body of research indicates that school mobility has a negative influence on both reading and mathematics achievement. In a meta-analysis of 37 studies conducted between 1975 and 1994 that focused on achievement in kindergarten through sixth grade, Mehana and Reynolds (2004) estimated that school mobility had a negative influence on both reading achievement (composite ES = -.25) and mathematics achievement (composite ES = -.22). The authors found that among the studies included, those with higher proportions of minority students found larger deficits in reading and mathematics achievement as a result of school mobility. The authors also found that studies that investigated the influence of less frequent school changes compared to more frequent changes, as opposed to studies that only compared students who changed schools to those who didn't, found a larger influence of school mobility on reading and mathematics achievement (Mehana & Reynolds, 2004).

In addition to the analytic findings that resulted from their meta-analysis, Mehana and Reynolds (2004) also engaged in a more qualitative critique of the body of school mobility literature included in their study. They found that, across studies, there was no consistent definition of mobility, making comparisons from one study to the next difficult. In addition, they found that although all of the studies investigated the relationship between school mobility and student achievement, the inclusion of important additional background variables (e.g. socioeconomic status [SES]) was widely varying and inconsistent across studies. Studies that did include important demographic predictors (e.g. SES or minority status), as compared to those that neglected to do so, tended to find a smaller influence of school mobility on student achievement but a larger effect for children from low-SES backgrounds (Mehana & Reynolds, 2004).

One of the most important critiques the authors made of the school mobility literature was that very few studies investigated the influence of school mobility on student achievement over time; rather, studies tended to be cross-sectional and correlational. In addition, very few controlled for the influence of prior achievement (Mehana & Reynolds, 2004). Because the literature indicates that mobile children are likely to be minorities and from low-SES backgrounds, and both SES and minority status are also related to lower initial achievement, neglecting to control for initial achievement is likely to produce spurious results regarding the relationship between school mobility and achievement.

Since Mehana and Reynold's (2004) review appeared, many studies have investigated the relationship between school mobility and achievement. A large proportion of these studies have replicated Mehana and Reynolds' overall finding -- that school mobility negatively influences achievement. However, many more recent studies suffer from some of the same methodological limitations cited by Mehana and Reynolds about studies published prior to 1994, such as failing to account for important background variables (initial achievement, SES, or minority status) and using cross-sectional rather than longitudinal data.

A group of studies that replicated Mehana and Reynolds' findings, but also suffered from methodological limitations, were conducted in local contexts using cross-sectional data. In addition to using cross-sectional data, which limits interpretation of results to correlations, these studies suffer by neglecting to include important background variables. For example, in a cross-sectional study of all first through 12th grade public school children in Louisiana during the 1997-98 school year, Engec (2006) found that school mobility has a significant and negative influence on achievement (as measured by the Iowa Test of Basic Skills, or ITBS) after controlling for minority status and grade level. However, the author controlled for neither SES nor initial achievement. In a cross-sectional study of students of public school students in Texas from grades 3 through 11, Mao and colleagues (1997) found similar results: school mobility is negatively related to academic achievement. Although these authors state generally that they included important "individual student socio-demographic and contextual factors" in their multivariate analyses, they neglected to specify *which* variables they included.

Another group of studies have investigated the relationship between school mobility and achievement in local contexts using longitudinal data. In a study following 2,669 Chicago public elementary students from 1983 to 1989, Kerbow (1996) found mobile children showed less academic growth in mathematics(as measured by the ITBS) than their stable counterparts, with the effects increasing as school changes increase. Although the longitudinal nature of these data is rigorous, it is unclear what cognitive and socio-demographic background variables the author accounted for. Perhaps the most methodologically sound study of mobility in local contexts was done by Gruman and her colleagues (2008), who applied growth curve analysis to longitudinal data from a sample of 1,003 second through fifth grade children in 10 elementary schools in the Pacific Northwest. The authors found that changing schools has a significant, unique, and negative influence on teacher's reports of academic performance. Importantly, this was after controlling for initial teacher reports of academic performance, gender, low-income status, anti-social and shy behavior, and stressful family events.

Though much fewer in number, studies using nationally representative samples have yielded similar results, but suffered from some of the same problems as the majority of the local studies. Using data from a nationally representative, cross-sectional study of 15,000 third graders in 235 elementary schools, the General Accounting Office (1994) found that within each income stratum, mobile children are more likely to be below grade level in reading and mathematics than non-mobile children. However, this study was entirely descriptive in nature, and therefore did not control for initial achievement, SES (a more comprehensive measure of disadvantage than income status), or minority status. In a nationally representative sample of 3,595 kindergarten teachers in public schools, Pianta and Early (2001) found that in classrooms with high turnover, teachers report higher percentages of children with academic problems. Like the GAO (1994) study, this study was cross-sectional and did not control for prior achievement, SES, or minority status.

Without considering some of the inherent methodological problems, the studies described in the preceding paragraphs suggest a large and unique influence of school mobility on achievement. However, another body of research suggests that the relationship is not as pronounced as some might believe. In a study of third and fourth grade students in 33 elementary schools located in a Midwest urban center during the 1996-97 school year, Wright (1999) found that the influence of school mobility on achievement is smaller in magnitude than that of ethnicity and family income. In another study, Nelson, Simon, and Adelman (1996) investigated the relationship between school mobility and achievement using a sample of 2,524 kindergarten and first graders from 24 elementary schools in a large, urban, and predominantly minority school district. They found that mobile students tended to have lower achievement before they changed schools and did not find any influence of mobility on achievement. In addition, in a study of elementary students in 20 Baltimore public city schools, Alexander, Entwisle, and Dauber (1996) found that the influence of school mobility on achievement was explained after taking initial school performance and background characteristics into account. Importantly, unlike the studies that found larger effects, the studies described in this paragraph carefully controlled for initial achievement and socio-demographic characteristics like SES/income level and minority status. Generally speaking, these researchers suggest that the relationship between school mobility and achievement may be primarily attributed to preexisting differences in cognitive and socio-demographic characteristics between mobile and non-mobile children.

Though drawing a much less frequent conclusion, one notable study suggests that some types of school mobility may be beneficial for school achievement. Using a nationally representative sample of high school students from the National Education Longitudinal Survey (NELS) from 1988-92, Swanson and Schneider (1999) found that students who change schools in the eighth, ninth, and tenth grades in high school have higher gains in mathematics than their non-mobile counterparts, after controlling for prior achievement.

Influence of mobility on academic progress. Although most of the research on school mobility focuses on academic achievement, some studies focus on the influence of school mobility on such other academic outcomes as grade retention, suspension, and dropping out. For example, in a nationally representative study of high school students using NELS data, Rumberger and Larsen (1998a) found that even children who made only one school change in high school were twice as likely to drop out of high school as non-mobile students. In addition, in a study of elementary students in 20 Baltimore public city schools, Alexander, Entwisle, and Dauber (1996) found that mobile children were more likely to be retained than their non-mobile peers. In another study of all first through twelfth grade public school children in Louisiana during the 1997-98 school year, Engec (2006) found that suspension rates were higher for children who changed schools during the school year than for children who changed between school years or who didn't change schools.

Influence of mobility on non-academic outcomes. In addition to investigating how school mobility influences academic achievement and progress, another body of research investigates the extent to which school mobility influences non-academic outcomes such as behavioral and psychological development. Some of these studies suffer from the same methodological issues as the previous studies cited. For example, in a cross-sectional study, Nelson, Simoni, and Adelman (1996) found that changing schools had a negative influence on work habits and cooperation in a sample of kindergarten and first graders in a large urban school district. However, analyses were done using cross-tabulations, and thus did not control for SES, minority status, initial academic performance, or initial work habits or cooperation. In another study using a nationally representative, cross-sectional sample of 10, 362 first through twelfth graders, Simpson and Fowler (1994) found that children who had changed residences three or more times were 2.3 times more likely to have emotional or behavioral problems and 2.2 times more likely to have received psychological help than children who have never changed residences (after controlling for gender, age, minority status, region of the country, mother's marital status, mother's level of education, and poverty level). Notably, this study did not control for initial emotional behavior. It is important to note that though these authors did not indicate when residential moves were coupled with school changes, significant proportions of residential moves are surely accompanied by school changes.

A somewhat more rigorous investigation of the influence of mobility on non-academic outcomes was conducted by Gruman and her colleagues (2008), employing growth-curve analysis using data from a sample of 1,003 second through fifth grade children in 10 elementary schools in the Pacific Northwest. The authors found that the total number of school changes a child made across the four years has a negative influence on classroom participation, after controlling for initial classroom participation, gender, initial anti-social behavior, and initial low-income status.

Summary of Past Research

Taken together, the majority of the literature on school mobility suggests that school change has a negative influence on academic achievement, academic progress, and non-academic outcomes. Figure 1 summarizes this broad discussion of school mobility and its potential negative consequences. However, it is important to consider these findings in light of methodological or other limitations inherent in many of these studies.

First, much of this research has been of a local nature at the district, city, or state level rather than at using nationally representative datasets. Though these studies are certainly important, by their nature they lack external validity and generalizability.

Second, many of the existing studies neglect to control for crucial cognitive (e.g. initial achievement) and socio-demographic (e.g. minority status and SES) factors. Because mobility is highly related to both initial achievement and socio-demographic characteristics, this error can severely bias results. It is important to conduct studies that carefully account for background characteristics.

Third, much of the literature on mobility is cross-sectional rather than longitudinal (Temple & Reynolds, 1999). This is likely because of the nature of the population being studied -- children who change schools -- it is difficult and costly to adequately conduct a longitudinal study on the effect of school change. Though it is clear why cross-sectional data have been the main focus of empirical investigation on this topic, it is difficult to draw causal inferences using this type of data.

Fourth, part of this body of this research has focused on how changing schools influences children in later elementary school, middle school, or high school, with very few focusing on the critical early childhood years (between kindergarten and third grade). Because children's academic success during their early years is strongly associated with their achievement in later years (Snow, Burns, & Griffin, 1998), it is important to explore the influence of mobility on children in the early elementary years.

Research Questions

The current study addresses these gaps in the literature by focusing on the impact of school change on children between kindergarten and third grade, using a nationally representative, longitudinal sample of children. The longitudinal nature of our analysis allows us to control for initial achievement (a serious, albeit common, omission in past research). In this study, we use the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) dataset to investigate the following research questions:

1. *Who changes schools and who does not change schools?* For children aged 5-8, which children move from one school to another?

2. *What is the broad nature of the school move?* To what extent do children change schools *during* the school year as opposed to *between* school years? To what extent do children change schools for *structural* reasons (they have completed the highest grade available in their school and must transfer for the next school year) as opposed to *family* reasons (residential relocation or the family's desire or need for a different school)?

3. *What is the impact of moving on children's mathematics and reading achievement?* Are children who change schools negatively influenced by school mobility after taking into account such important factors as social class, minority status, and prior

achievement? Is the impact of the school mobility related to the timing and the motivation for the school change?

4. *Is the impact of school mobility conditioned by other characteristics of the child or family?* More specifically, is the effect of school mobility different for girls than for boys? For children of different social, racial, ethnic, or language backgrounds?

Method

Data and Sample

The ECLS-K data. The data used in this study are drawn from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 [ECLS-K], sponsored by the National Center for Education Statistics [NCES]. The purpose of ECLS-K is to document the educational status and progress of a nationally representative cohort of U.S. children from kindergarten through fifth grade. The ECLS-K base-year (1998) data collection had a stratified design structure: The primary sampling units were geographic areas consisting of counties or groups of counties from which 1,277 public and private schools offering kindergarten programs were selected. Finally, a random sample of approximately 24 children per school was drawn, regardless of school or kindergarten size. Sampled children were tested at each wave. Information at all waves was also collected from parents through structured interviews administered by telephone, and from each child's teacher through written surveys. Information about the school was also provided by a school administrator. More information on the ECLS-K sampling design is available in the ECLS-K User’s Manual (NCES, 2000).

Limits of using ECLS-K for school mobility studies: timing of data collection. The timing of the data collection in ECLS-K prevents the investigation of certain school mobility patterns. Children may change schools both *during* the school year and *between* school years. During the first four years of formal schooling (kindergarten through third grade), there are seven distinct periods in which a child could change from one school to another (see Figure 2a). In order to monitor all possible school mobility patterns, a researcher would need to document a child's school at the beginning and end of each of these four school years (eight time points). Unfortunately for researchers interested in school mobility, ECLS-K collected full data at only four of these eight time points (see Figure 2b): the beginning of kindergarten, the end of kindergarten, the end of first grade, and the end of third grade. No data were collected by ECLS-K at either the beginning or the end of Grade 2. Consequently, analyses using ECLS-K systematically underestimate the overall frequency of school mobility during these first four years of schooling.[1]

Given the importance of seasonal learning rates in the field of early childhood and sociology of education, the U.S. Department of Education decided to collect data on a smaller (but random) sub-sample of the ECLS-K children at the beginning of first grade. Specifically, in a random sub-sample of 30 percent of the ECLS-K schools, all children in the original ECLS-K sample were tested again in fall 1999, and their parents and schools were re-surveyed, with a focus on educational activities and resources available to the children over the summer months.

Consequently, modeling school change using the ECLS-K data is limited by the data collection schedule. The full ECLS-K data set permits the investigation of three distinct time periods in addition to changes across the entire four years (see Figure 3):

1. School changes during the kindergarten year [**Path A**];
2. School changes from the end of kindergarten to the end of first grade (combining both a possible between-school-years change and a within-school-year change) [**Path B**];

3. School changes from the end of first grade to the end of third grade (combining two possible instances of between-school-years change and two possible instances of within-school-year change) [**Path C**]; and
4. School changes from the beginning of kindergarten to the end of third grade [**Path D**].

We also make descriptive use of the summer learning sample in order to estimate school mobility rates from the end of kindergarten to the beginning of first grade [**Path B_1**] and from the beginning of first grade to the end of first grade [**Path B_2**].

<u>Limits of using ECLS-K for school mobility studies: Sampling procedures</u>. NCES established a complex process for following children who changed schools, depending in part on whether the child transferred to another ECLS-K school (unlikely) or to a school outside the original sampling frame. Although data collection was attempted for 52 percent of the located children who moved during the kindergarten year, only about a third of all the movers were successfully included in the data collection process at the end of kindergarten (NCES, 2000). With the summer learning subsample in the fall of first grade, a random 50 percent of children in each of the 30 percent of schools were flagged to be followed if they transferred from their base-year school. In the spring of first grade, all children in a random 50 percent subsample of base-year schools were flagged for data collection if they changed from their base year school. In order to maximize the amount of longitudinal data, any child flagged to be followed at one point in time continued to be followed in subsequent data collections. Furthermore, all language minority children who changed schools between the end of first grade and the end of third grade were followed (NCES, 2004).

<u>Weights</u>. Because of the complex, multi-stage stratified sampling design, ECLS-K includes weights to compensate for the stratified sampling strategy and to adjust for non-response.

Moreover, because children who transferred schools were only included in subsequent data collection efforts if they were flagged, the ECLS-K weights also include an essential adjustment for both the sampling strategy and non-response of movers. Thus, results of weighted analyses using the ECLS-K data should be generalizable to the U.S. population of kindergarten children in the 1998-99 school year and first graders in 1999-2000. We weight all of our analyses using the ECLS-K student-level weights, normalized to a mean of 1 to preserve the child sample size for statistical testing.[2]

Analytic samples. The ECLS-K data suffer from the usual problem of attrition in longitudinal studies. Although the weights offer some statistical adjustment for attrition due to non-response, in order to retain as much data as possible, we employ three different analytic samples: one to investigate Path A, one to investigate Path B, and a third one to investigate Paths C and D. For each sample, we follow a similar logic. We restrict the sample to children (1) who had sufficient information to determine their school mobility status during the period under investigation, (2) who had complete reading and mathematics kindergarten test scores at the end of the time period under investigation, (3) who entered the ECLS-K sample during the initial data collection wave (fall of the kindergarten year)[3], and (4) children who were on grade level during the time period under investigation.[4] These restrictions led to an unweighted sample of 17,745 kindergartners (for Path A), 14,943 first-graders (for Path B), and 11,975 third-graders (for Paths C and D).

Measures

Outcomes: children's achievement trajectories. Our primary outcomes are children's performance on tests in reading and mathematics at the end of each time period (see NCES, 2000 for a detailed description of the content of the reading and mathematics assessments).[5] The scores on these tests have been equated with Item Response Theory, so they may be used to measure change over time. In our multivariate models, we standardized the achievement scores into effect size [ES] units, based on the standard deviation of the achievement scores at that point in time.

Mobility status. We determined mobility status during each time point in a two-stage process. First, we identified children who transferred schools by a direct comparison of schools IDs. Second, for children who changed schools, we determined whether or not their previous schools included the appropriate grade level using grade-span information from the school administrator. Children were forced to transfer out of *pre-primary* schools (school that include pre-school and kindergarten programs only) after completing kindergarten. Children were forced to transfer out of many *primary* schools (typically K-2 or K-3) after second grade. We classified these movers as children who changed schools for *structural* reasons. We classified all others who changed schools as children who changed for *family* reasons. Although some residential information is available, there are no survey items asking parents to discuss issues related to the decision to change schools. For these analyses, we did not further classify this second group. Consequently, these children may have changed schools for any number of family-related reasons (e.g. residential relocation or preference for a different nearby school). All children who changed schools during the kindergarten year did so for family reasons.

Child and family characteristics as covariates. We drew on the past research we reviewed to identify key child and family characteristics that have been shown to be associated with school mobility. We used several measures of children's social background as covariates: *gender* (female =1, male=0); *race/ethnicity* (a series of dummy variables that captured whether the student was Asian, Hispanic, Black, or Other[6], with Whites as the uncoded comparison category); *non-English speaking household* (coded 1, English-speaking coded 0); *single-parent household* (coded 1, two-parent household coded 0); *age* (a z-score [M=0, SD=1]); and *total number in household* (a z-score [M=0, SD=1]). *Socioeconomic status (SES)* is captured on the ECLS-K data set with a composite measure (including parents' education, parents' occupational prestige, and household income). In some of our descriptive work we also employed the SES measure broken into quintiles as well as a *poverty status* indicator (coded 1 if below the poverty line, coded 0 if at or above).

Prior achievement was captured by IRT test scores at the beginning of each time period in reading and mathematics, also as z-scores. There is substantial variation in the timing of the cognitive assessments. Fortunately, we know the date when each child was tested (for children in the same school were not always tested on the same day). Thus, we can compute the time between assessments quite accurately for each child, and we include these adjustments in all multivariate models (see Burkam, Ready, Lee & LoGerfo, 2004 for a discussion of these measurement issues).

As additional controls for children's academic program during the school years, we included an indicator for enrollment in *repeating kindergarten* (coded 1, first-time kindergartner coded 0), and enrollment in *special education programs* at various time points (coded 1, regular programs coded 0).[7]

Analytic Method

OLS regression models. School mobility studies offer important methodological challenges. The question of whether or not the cognitive impact of a child changing schools is attenuated or magnified by school characteristics is certainly an interesting one, but also well beyond the scope of our current study. Moreover, there are several serious methodological challenges behind this simple question. Use of a two-level students-nested-in-schools Hierarchical Linear Model [HLM] (the common approach for school effects studies) presupposes that students remain in the same school; students cannot be nested in two different schools in the same model.

By definition, however, children who change schools are “nested” in at least two different schools. Moreover, children who move out of one of the original ECLS-K schools can find themselves the only sampled member of the new school – a common phenomenon with these data but a problematic condition for HLM modeling.

For this study we focus on the cognitive impact of school mobility on the child and how that impact might be conditioned by other characteristics of the child and his or her family. Consequently we employ an OLS regression-based pre-test/post-test ANCOVA framework, with school mobility status as the primary treatment group.[8]

Types of results. In addition to presenting descriptive information about mobility patterns and the samples for each investigation, we present results from four pairs of regression models: (1) the effect of school mobility during the kindergarten year on reading and mathematics achievement [Path A of Figure 3], (2) the effect of school mobility between the end of kindergarten and the end of first grade on reading and mathematics achievement [Path B of Figure 3], (3) the effect of school mobility between the end of first grade and the end of third grade on reading and mathematics achievement [Path C of Figure 3], and (4) the effect of cumulative school mobility between the beginning of kindergarten through the end of third grade [Path D of Figure 3]. The first set of analyses compares children who move schools to children who do not move schools (all children are moving for family-related reasons). The second and third sets of analyses compare children who move schools for structural reasons and children who move for family reasons to children who do not move. The final set of analyses compares children who move two or more times (for any reason) and children who change one time (for any reason) to children who never moved.

All analyses follow a common approach. At step 1, we estimated the *unadjusted achievement differences* for the groups. At step 2, we estimate *adjusted achievement differences* for the groups, controlling for the social, academic, and behavioral background of the children (and for previous school mobility). At step 3, we investigate possible *differential effects* of school mobility by creating interaction terms, and entering them into the regression model.

We follow the strong advice of Aiken and West (1991) toward model parsimony. Thus after introducing all second-order (interaction) effects, we eliminated all statistically non-significant interaction terms, until only significant interaction terms remain. Step 3 of our regression models reflects the final, parsimonious model, and includes all the first-order (main effect) achievement differences for the groups, and the significant second-order (interaction) effects. In order to confirm these results, we verified that a forward-stepwise procedure (starting with no interaction terms and adding significant terms in to the equation) resulted in the same models as the backward-stepwise procedure.[9]

Providing all the tables reporting a full set of our analyses, as well as a full written description of them, would result in an extremely long and technical report. Thus, here we present the major findings from this complex study in summary form, hopefully in a format that is accessible to all readers. Descriptive differences responding to Research Questions 1 and 2 were not tested for statistical significance. Samples sizes are large and virtually all differences were statistically significant. However, in our analyses the explored the impact of mobility on children's achievement (Research Questions 3 and 4) we tested all first- and second-order effects for statistical significance. We report those results in effect-size (ES) units, as well as the probability levels associated with them.

Summary of Main Results

Estimates of Overall Frequency of School Mobility Using ECLS-K (see Tables 1 and 2)

- School change is more common between school years than during school years: 7% of children change schools *during* the kindergarten year (the ECLS-K summer learning subsample suggests that 5- 6% of the children change during the first-grade year). School mobility rates are higher for time spans that include the summer: 22.9% of children change schools between the end of kindergarten and the end of first grade, and 27.5% of children change schools *between* the end of first grade and the end of third grade.

- School changes due to *family* reasons are far more common than school changes due to *structural* reasons during these early grades. For example, 5.2% of children change schools after kindergarten for structural reasons (i.e., their kindergarten school did not include a first grade) but 17.7% of children change schools after kindergarten for family reasons.

- By the end of third grade, just over half of America's kindergartners (55%) remain in the same school they started in four years earlier, and nearly 36% change schools once. Multiple school changes (three or more times) are quite rare.

School Mobility Rates by Gender, Race, and Social Class (see Table 3)

- Mobility rates are similar for males and females, although young boys are slightly more likely to change schools for family reasons than are young girls.

- Except for school changes due to structural reasons, Black children consistently exhibit the highest mobility rates of all racial/ethnic groups. Overall, only 45% of Black third graders are enrolled in their kindergarten schools, as compared to nearly 60% of White and Asian third graders.

- Mobility rates are related to family socioeconomic status: socially disadvantaged children change schools more frequently than their more advantaged peers, especially during their first two years in school.

- Disadvantaged children (i.e., lower SES and Black racial group membership) are especially likely to be associated with school change for family reasons.

School Mobility During the Kindergarten Year (tables not included)

Frequency of Mobility

- Seven percent of children change schools during the kindergarten year, with low-SES and Black children especially mobile during this first year of formal schooling.

Impact on Kindergarten Reading Achievement

- Children who change schools during the kindergarten year exhibit lower achievement by year's end (**ES = -.39**, $p<.001$). On average, changing schools during the kindergarten year has *a small negative* impact on a child's reading achievement, even after controlling for other child and family characteristics (**ES = -.15**, $p<.001$).

- The impact of mobility, however, is conditioned on a small number of child characteristics. For example, changing schools is more detrimental for lower-SES children and less detrimental for higher-SES children (interaction term = **.11**, p <.001).

Impact on Kindergarten Mathematics Achievement

- Children who change schools during the kindergarten year exhibit lower mathematics achievement by year's end (ES = **-.33**, p<.001). On average, however, changing schools during the kindergarten year has *no significant impact* on a kindergartners' mathematics achievement, after controlling for other child and family characteristics.
- Conditional effects do exist, however; some groups are impacted by the school change negatively, others positively. Once again, changing schools is more detrimental for lower-SES children and less detrimental for higher-SES children (interaction term = **.11**, p <.001).

Impact on Grade Retention

- Changing schools during the kindergarten year leads to a higher risk of immediate grade retention. Only 4% of children who remain in the same school for the entire kindergarten year are not promoted to first grade whereas 12% of kindergartners who change schools during the year are not promoted to first grade. A multivariate logistic regression model confirms that kindergartners who change schools are less likely to be promoted, even after controlling for other child and family characteristics.

Mobility Between the End of Kindergarten and the End of First Grade (tables not included)

Frequency of Mobility

- School changes due to family reasons are far more common than school changes due to structural reasons: nearly 18% of kindergartners changed schools by the end of first grade due to family reasons, whereas fewer than 6% of kindergartners changed schools because their kindergarten school did not offer first grade (the so-called "pre-primary" schools).

Impact on First Grade Reading Achievement

- Even without controlling for other child and family characteristics, there are no significant reading achievement differences between children who change schools (for whatever reason) and children who remain in the same school. Children who changed schools during the kindergarten year continue to exhibit a cognitive reading deficit at the end of first grade (**ES = -.43**, $p<.001$).
- When including covariates in the model, the harmful effect on achievement of changing schools during the kindergarten year endures; it continues to impact children's reading achievement through first grade (**ES = -.14**, $p < .001$).
- When including the covariates in the model, on average, changing schools for *structural reasons* continues to have *no impact* on a child's reading achievement. Conditional effects do exist, however. Some groups are harmed by the school change, most notably children from non-English-speaking households (interaction term = **-.58**, $p< .001$). Contrary to past research, Hispanic children and lower-SES children *benefit* from leaving their pre-primary schools (interactions terms = **.30** and **-.18**, respectively, both $p < .001$).[10]

- After including covariates in the model, on average, changing schools for *family reasons* has *a slight negative* impact on a child's reading achievement (**ES = -.04**, p<.01). Certain children are especially harmed by this school change in terms of reading achievement, including children who receive special education services (interaction term = **-.30**, p< .001) or who also changed schools during the kindergarten year (interaction term = **-.33**, p<.001).

<u>Impact on First Grade Mathematics Achievement</u>

- Even without including controls for other child and family characteristics, there are no significant mathematics achievement differences between children who change schools (for whatever reason) and children who remain in the same school. Children who changed schools *during* the kindergarten year continue to exhibit a cognitive deficit at the end of first grade (**ES = -.37**, p<.001).
- When including covariates in the model, the harmful effect of changing schools *during* the kindergarten year has enduring negative consequences for children's mathematics achievement during first grade (**ES = -.15**, p < .001).
- When including covariates in the model, on average, changing schools for *structural reasons* has *no significant impact* on a child's *mathematics* achievement. Conditional effects do exist, however, and many groups are harmed by the school change, most notably children who receive first-grade special education services (interaction term = **-.44**, p<.001), and girls (interaction term = **-.17**, p< .01. Because this school change is unavoidable, these results raise important concerns about the pre-primary schools.[11] First-graders who had repeated kindergarten in those pre-primary schools benefited from moving to a different school (interaction term = **.38**, p < .001).

- When including covariates in the model, on average, changing schools for *family reasons* has *a slight positive* (but probably negligible) impact on a child's mathematics achievement (ES = **.03**, $p<.05$). Two groups, however, are harmed by this school change, including children who receive first-grade special education services (interaction effect = **-.21**, $p < .05$) and those who also changed schools during the kindergarten year (ES = **-.17**, $p< .001$). In terms of both reading and mathematics learning, the few children who change schools both during kindergarten and again by the end of first grade are impacted beyond a simple additive formula. These two school changes, in quick succession and during the first two years of appear to be particularly harmful.

Impact on Grade Retention

- Children who remained in the same school between the end of kindergarten and the end of first grade were the most likely to be on grade level two years later (94%)—regardless of subsequent school changes. Children who attended pre-primary schools (and so changed schools by the end of first grade for structural reasons) were the least likely to be on grade level two years later (87%). Children who changed schools for family reasons were slightly more likely to be retained than children who remained in the same school during those two years (91% on grade level two years later).

School Mobility Between the End of First Grade and the End of Third Grade (tables not included)

Frequency of Mobility

- Once again, school changes due to *family* reasons are far more common than school changes due to *structural* reasons: over 24% of kindergartners changed schools after first grade but by the end of third grade due to family reasons, whereas fewer than 3% of kindergartners changed schools after first grade because their first-grade school did not include third-grade classrooms (the so-called "primary" schools).

Impact on Third Grade Reading Achievement

- When including covariates in the model, on average, changing schools (for *family reasons* or for *structural reasons)* has *no significant impact* on a child's reading achievement. Conditional effects do exist, however, and certain groups are impacted by the school change (some negatively, some positively).
- Although boys are not significantly impacted by moving from a primary school, girls actually benefit from leaving their primary schools (interaction effect = **.19**, $p<.01$).
- Children who received third-grade special education services were negatively impacted by changing schools after first grade (interaction term = **-.16**, $p< .01$).
- Earlier school moves continue to impact children's achievement in complex ways, including interacting with more recent school changes.

Impact on Third Grade Mathematics Achievement

- When including covariates in the model, on average, changing schools (for *family reasons* or for *structural reasons)* has *no significant impact* on a child's *mathematics* achievement. Many conditional effects do exist (more so than for reading achievement), however, and certain groups are harmed by changing schools.
- Children who received third-grade special education services were negatively impacted by changing schools after first grade (interaction term = **-.17**, $p< .01$).

- The harmful effect of changing schools *during* the kindergarten year continues to impact children's mathematics achievement in third grade. Moreover, earlier school moves interact with more recent school moves and lead to complex patterns of effects. For example, children who changed during the kindergarten year, and then changed into a primary school that required another school change by the end of third grade experienced substantial mathematics deficits (interaction effect = **-.68**, $p < .001$).

<u>School Mobility Between the Beginning of Kindergarten and the End of Third Grade (tables not included)</u>

<u>Frequency of Mobility</u>

- By the end of third grade, just over half of America's kindergartners (almost 56%) remain in the same school they started in four years earlier.
- By the end of third grade, nearly 36% of America's kindergartners have changed schools once since entering kindergarten.
- By the end of third grade, over 8% of America's kindergartners have changed school two or more times.
- The vast majority of these schools changes are due to family reasons. Among children who changed schools once, 82% did so for family reasons. Among children who changed school two or more times, 83% did so both times for family reasons, 16% changed once for family reasons and once for structural reasons, and only 1% changed schools twice for structural reasons (these children first attended a pre-primary school, then a primary school).

<u>Impact on Third Grade Reading Achievement</u>

- Focusing only the total number of school changes during the four years, rather than on the timing and nature of the school changes, leads to simpler results.

- With or without statistical controls for child and family background, changing schools once during the first four years of schooling has *no significant impact* on most children's third grade reading achievement. There are only a few conditional effects. Most notably, for children who receive special education services at any point during the four school years there is a negative impact of changing schools (interaction effect = **-.21**, p<.001); children of mixed race and Native American background (the "other" racial comparison group) experience a positive impact of changing schools (interaction effect = **.18**, p<.01).[12]
- Without including controls for child and family background, changing schools two or more times is associated with *slightly lower* third grade reading achievement (ES = **-.09**, p<.05). When we include covariates in the model, changing schools twice during the first four years of schooling has *a small positive* impact on most children's third grade reading achievement (ES = **.10**, p<.001). This possibly surprising result is particularly important given that the majority of the prior research reported negative impacts of school mobility, yet rarely controlled for such key child characteristics as race/ethnicity, SES, and prior achievement. A few conditional effects do emerge. Children from single-parent households do not benefit from changing schools like other children (interaction effect = **-.19**, p<.01); Black children benefit even more than others from changing schools two or more times (interaction effect = **.18**, p<.01).

Impact on Third Grade Mathematics Achievement

- As with reading achievement, focusing only the total number of school changes during the four years, rather than on the timing and nature of the school changes, leads to simpler results.

- Without controlling for child and family background, changing school once is associated with slightly lower mathematics achievement (ES = **-.08**, p<.001). After including covariates, a single school change has *no significant impact* on most children's third grade mathematics achievement. Once again, this underscores the shortcoming of past research that did not include controls for such key characteristics as race/ethnicity, SES, and prior achievement. There are a few conditional effects. Most notably, children who receive special education services at any point during the four school years experience a substantial negative impact of changing schools (interaction effect = **-.37**, p<.001); children who repeated kindergarten actual experience a substantial benefit from changing schools (interaction effect = **.38**, p<.001).
- Similar to the results for reading achievement, before controlling for child and family background, changing schools two or more times is associated with *slightly lower* third grade mathematics achievement (ES = **-.11**, p<.01). When covariates are included, changing schools twice during the first four years of schooling has *a small but positive* impact on most children's third grade mathematics achievement (ES = **.09**, p<.001). There is a single significant interaction effect: higher-SES children appear to benefit even more from multiple school moves, lower-SES children appear to benefit less from multiple school moves (interaction effect = **.08**, p<.05)

Summary and Concluding Remarks

- Unsurprisingly, over time, school mobility becomes an increasingly common experience for children, due in some ways to how U.S. schooling is structured. Family decisions play a larger role, however, in determining school changes during the first four years of schooling.

- Traditionally disadvantaged children (e.g., lower-SES and Black children) experience higher levels of school mobility, underscoring (1) the importance of understanding the impact of changing schools on young children's cognitive and social development during the first four years of schooling and (2) the importance of including controls for race/ethnicity, SES, and prior achievement.
- By looking only at main effects (without interactions) adjusting for child and family background, the broad picture appears mostly benign:
  - Changing schools during the kindergarten year has a small but lingering effect on reading learning and negatively impacts mathematics learning by the following year (ES ≈ -15).
  - Changing schools between the end of kindergarten and the end of first grade (for whatever reason) has only a negligible impact on cognitive learning (either non-significant or ES magnitude less than .05, whether positive or negative).
  - Changing schools between the end of first grade and the end of third grade (for whatever reasons) has no impact on cognitive learning.
  - Changing schools once during the first four years of schooling (for whatever reason) has no impact on cognitive learning.
  - Changing school two or more times during the first four years of schooling (for whatever reason) has a small positive impact on cognitive learning (ES ≈ .10).
  - Changing schools during the first two years of schooling somewhat increases the risk of immediate grade retention.
- A substantially more complex picture emerges when investigating conditional effects:

- Lower-SES children experience even larger cognitive learning deficits when they change schools during kindergarten.
- Children who repeat kindergarten may experience some benefits in cognitive learning from changing schools.
- Certain children in pre-primary schools (who must change schools in order to enroll in first grade) experience cognitive difficulties in first grade.
- Children receiving special education services are typically harmed by changing schools.
- Children who change schools twice during the first two years of schooling experience greater cognitive difficulties.

- The complexity of our results makes any simple statement about the cognitive impact of school mobility impossible. Given that most prior research did not investigate conditional effects, our work here clearly demonstrates the serious inadequacy of school mobility studies that are cross-sectional and which fail to include statistical adjustments for such important child and family characteristics as race/ethnicity, SES, and prior achievement.
- Future research could extend our work by continuing to discriminate between types of school mobility, in particular by identifying and isolating the several family-based motivations for parents changing their children's schools. This diverse set of motivations is likely to be interfering with the development of a clearer picture of how school mobility might be impacting children's cognitive development. In today's climate of increasing school choice and the growing number of charter schools to choose from, children are now changing schools (and parents relocating their families) in pursuit of seemingly desirable educational alternatives. Some choices and rationales might lead to beneficial educational experiences for children, others might produce a worse educational experience, and finally others to a

similarly effective (or ineffective) educational experiences. Pooling results across settings with positive, negative, and neutral outcomes will often lead to very little overall differences. We believe that such is likely to be the case with school mobility studies.

Some Suggestions for Research On Mobility

Some suggestions for improved practices for conducting research on school mobility are also in order. We base our suggestions on what we have learned from our analyses of ECLS-K data: Researchers specializing in this phenomenon could clearly add to this list. To avoid an overly technical discussion, we list only a few:

- Research on the effects of mobility on children should focus on both cognitive and non-cognitive outcomes. That would require including psychometrically appropriate measures of the latter. It is clear that school mobility influences a wide range of educational outcomes. However, solid measures of non-cognitive outcomes are rare – and so impacts on these outcomes are often overlooked (as was the case in this study).
- If children who change schools are followed longitudinally – which is crucial in high-quality research on this topic – there needs to be close attention to getting full data from the children's teachers in the receiving schools, as well as solid information about the schools.
- Mobile children represent a relatively small proportion of the school population at any single time-point. Thus, data should be collected on the full sample of school-changes, not a sub-sample. Regardless of the ability to compensate for sampling down with weights, the actual sample of mobile children needs to be sufficiently large to minimize standard errors in statistical analyses.

- Serious studies of school mobility should include carefully crafted surveys of parents of mobile children, teachers receiving mobile children in their classrooms, and perhaps the administrators of schools with high mobility rates.
- The longitudinal nature of this phenomenon is important. Thus, data should be collected at each grade level – particularly if researchers are interested in estimating the cumulative impacts of multiple school moves.
- Because children change schools both within and between school years, data would need to be collected at both the beginning and the end of the school year to differentiate the impact of the timing of school moves. Clearly, within-year moves – although less common – are more disruptive for children, teachers, and schools.
- Some choices might need to be made about where to conduct such studies. Although it is clear that school mobility is most common among disadvantaged populations, particularly those living in large cities, there is also great value in looking at the impact of this phenomenon on the U.S. population of school children, as we have in this study. However, it may be most cost-effective to concentrate research expenditures in locations where the phenomenon is most common.
- Although we specialize in quantitative research methods, we recognize the need for some solid mixed-methods studies of school mobility – the words of parents, children, and teachers would enrich the discussion of this phenomenon considerably.

Technical Notes

1. The ECLS-K data set underestimates the frequency of school mobility in at least two ways. First, confirming that a child is in the same school at two different time points will not detect children who changed to a different school only to return to the same school. Second, confirming that a child is in different schools at two different time points only proves that *at least one* school change occurred. As those time points become further apart (e.g., the end of first grade and the end of third grade), "highly-mobile" children are likely to have experience more school changes. Past mobility research suggests that both phenomena occur, but neither is captured by ECLS-K.

2. Different models called for different weights depending upon whether we were using kindergarten, first-grade, or third-data. For all models, we normalized the ECLS-K weights by dividing them by their means. The resulting normalized weights preserve the actual unweighted sample sizes for all significance testing. Because of the complex weighting scheme for mobile children in ECLS-K, the accuracy of all analyses is dependent on the validity of these weights.

3. The ECLK-K sample was freshened for the spring first-grade data collection to include current first graders who had not been enrolled in kindergarten in 1998–99 and, therefore, had no chance of being included in the ECLS-K base year kindergarten sample. We did not include these children in any of our analyses, as their prior mobility and achievement status was unknown.

4. Although we only retained children for subsequent analyses who continued on to the next grade level, we did look descriptively at how school mobility was associated with the likelihood of grade retention. These findings are included in the *Results* section.

5. ECLS-K also included five indirect assessments of children's *academic and behavioral development* reported by teacher assessments. The survey items were adapted by NCES from the widely-used Gresham and Elliott (1990) Social Rating Scale specifically for use with ECLS-K. Unfortunately, due to copyright restrictions, NCES was not permitted to publish the individual items used on the teacher questionnaire. However, NCES did indicate the general behaviors teachers were asked to evaluate, and the broad categories in which they were located: Approaches to Learning, Self-Control, Interpersonal Skills, Externalizing Problem Behaviors, and Internalizing Problem Behaviors.

   Consistent with past research, the overall frequency of most problematic behaviors is quite low, resulting in strongly skewed distributions on some measures (especially externalized and internalized behavior problems). Furthermore, teachers rated other behaviors (e.g., self-control and interpersonal skills) as quite common. In the real world of children and schools, this is good news, for it indicates that most school children exhibit acceptable school behaviors, and rarely exhibit unproductive, anti-social behavior. Psychometrically, however, this means that most of the behavioral measures suffer from substantial "floor" or "ceiling" effects, with a number of implications for anyone using these measures as dependent variables. First, investigating change in these behaviors over the school year is quite difficult. Second, using most of these behavioral measures as continuous dependent variables will result in severely attenuated effects.

Unfortunately, there are also serious problems of missing data for these measures. In general, there are more missing data on these teacher assessments than on the direct cognitive assessments, but there is substantial missing data on these measures for children who changed schools. *Often over half of the children who changed schools (at any time during the school years we are investigating) do not have teacher ratings on one or more of these measures.* Perhaps this is no surprise as teachers might feel less comfortable evaluating children's behavior when they have spent less time interacting with them in the classroom.

Unfortunately, these problems combine to seriously compromise one of the most important contributions of data sets like the ECLS-K. These large, national data sets are valued for their high level of generalizability. School mobility studies based on district or state data may yield important understandings as to the impact of school mobility in that particular setting, but may be of unknown relevance to other districts or states. The value of using ECLS-K to study school mobility is precisely to look at the large-scale patterns that are indeed generalizable to the entire U.S. school setting. But who are these children in the greatly-reduced sample of children who changed schools? Data are not missing randomly for these children and, as a result, any school mobility effects that we uncovered are just as likely to reflect serious *selection bias* as an actual impact of school change. Consequently – after considerable efforts to pursue these issues -- we decided not to make use of these measures to investigate any non-cognitive effects of school mobility.

6. The "Other" category includes all children whom parents did not designate as White, Black, Hispanic, or Asian. This small group (fewer than 5%) is composed of roughly equal numbers of Native Americans and children of a mixed racial background. Based on our many years working with these data, we have found that all of these groups are too small to sustain separate analyses (i.e., actual numbers of cases are too small and the resulting standard errors are always way too large). In our many published research articles using ECLS-K, we have either dropped these cases from our analytic sample or included them all in a single, undifferentiated group. In our more recent work, we have chosen the latter option, preferring the racial/ethnic breakdown of our analytic sample to more closely reflect the racial/ethnic breakdown of the population of America's kindergartners. We followed that strategy here.

7. Certain covariates are subject to some change over time: family SES, number of parents in the household, total number in the household, enrollment in special education services. For each of our regression models, we employed the measure associated with the latest time point.

8. The stratified sampling design of ECLS-K (mainly sampling schools first and then children within schools) suggests that standard errors of estimated effects for child-level analyses are artificially reduced, resulting in somewhat inflated significance levels of statistical tests. Use of ECLS weights does not, however, compensate for these design effects. The design effects, sizeable with simple means and bivariate comparisons, are substantially reduced in multivariate models (regression or log-linear analyses). Even in multivariate models, however,

they may not completely disappear. Although we have not adjusted our standard error estimates upward for design effects (which would differ for each social background indicator), readers may wish to adjust our results themselves—perhaps by decreasing the alpha-level, and retaining statistical significance only when $p < .01$. Indeed, reducing the alpha-level to .01 is usually a conservative response to the problem of design effects. This practice has been used before and is consistent with direct estimates of the magnitude of the design effects in multivariate models in several NCES data sources (Burkam, Ready, LoGerfo, & Lee 2004; Burkam, Lee, & Smerdon, 1997).

9. We discovered that one additional refinement of our interaction search led to much more stable results (with the desired agreement between the backward and forward methods). Instead of simultaneously looking at all possible interactions with both "structural-changers" and "family-changers," we first investigated differential effects for those who changed schools for structural reasons and then investigated differential effects for those who changed schools for family reasons.

10. The majority of children who live in non-English speaking households are Hispanic: about 70% of children in non-English speaking households are Hispanic, just over 16% are Asian, and almost 10% are White. However, fewer than 40% of Hispanic children are living in a non-English speaking household. Hence, not all non-English speaking households are Hispanic, nor are all Hispanic children living in non-English speaking homes.

    In additive linear regression models all effects are net effects—the residual "effect" of being Hispanic after controlling for membership in a non-English speaking household, the residual "effect of being in a non-English speaking household after controlling for race ethnicity. Hence, it is not necessarily "contradictory" for the Hispanic "effect" and non-English speaking household "effect" to be in opposite directions. This is curious certainly, but not contradictory. For children who are both Hispanic *and* from a non-English speaking household, we would see a certain cancellation of the two opposing effects.

11. We previously published work on pre-primary schools where we reported that children in these schools learned less during the kindergarten year than children in other schools (Burkam, Michaels & Lee, 2007). The results here suggest a lingering disadvantage for certain children in these schools one year later.

12. There appears to be some shifting in and out of special education programs during the early grades. Nearly 10 percent of children receive special education services at some point during the first four years of schooling. Of those children who received special education services during those years: 11.1% received such services only in kindergarten; 11.9% received special education services only in first grade; 45.3% received special education services only in third grade; 5.5% received special education services in kindergarten and first grade, but not in third; 4.5% received special education services in kindergarten and third grade, but not in first; 12.5% received special education services in first and third grade, but not in kindergarten; and 9.8% received special education services in kindergarten, first and third grade

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Figure 1 **Conceptual Model: Causes and Potential Negative Consequences of School Mobility in the Early Grades**

Reasons for School Mobility

Family

- *Strategic* reasons to improve educational setting
- *Reactive* reasons to unacceptable conditions at current school
- Family events leading to residential change

Structural

- School serves only certain grades
- School closes

Child & Family Characteristics Associated With School Mobility

- SES
- Race/Ethnicity
- Immigrant status
- Urbanicity
- Single parent status
- English as a second language
- Repeaters
- Have behavioral difficulties

School Mobility

- Frequency
- Timing

Discontinuity of Experiences

Educational

- Different curricula
- Different teachers
- Different academic standards
- Different academic expectations

Social

- Different peers
- Different social norms

Impact on Teachers and Schools

- Ever changing clientele often with minimal information about new students
- The need for transitional programs
- The struggle to provide for both mobile and non-mobile students

Impact on the Child

Academic

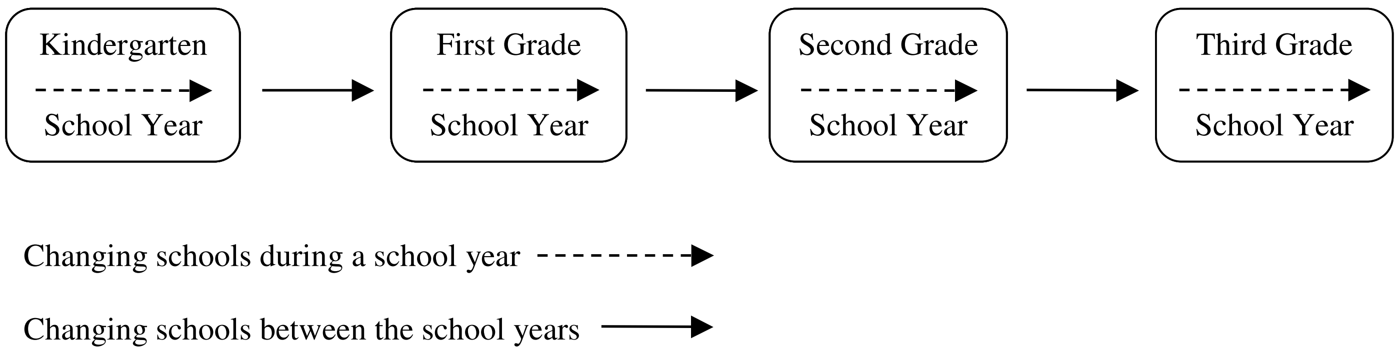
- Lower achievement
- More likely to drop out

Behavioral

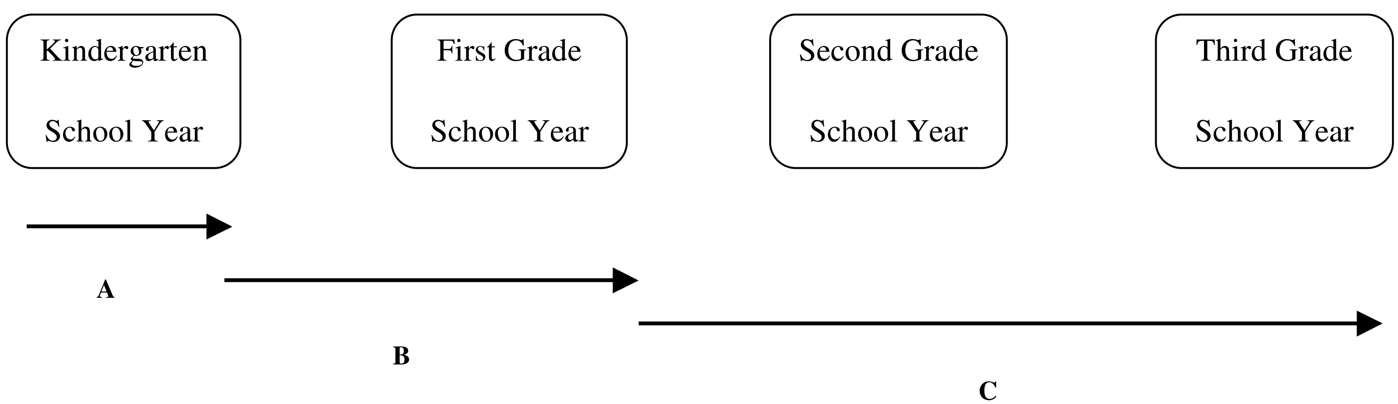
- Less effective approaches to learning
- More externalizing behavior
- More internalizing behavior

<u>Figure 2</u> Conceptualizing and Modeling School Change in the Early Grades

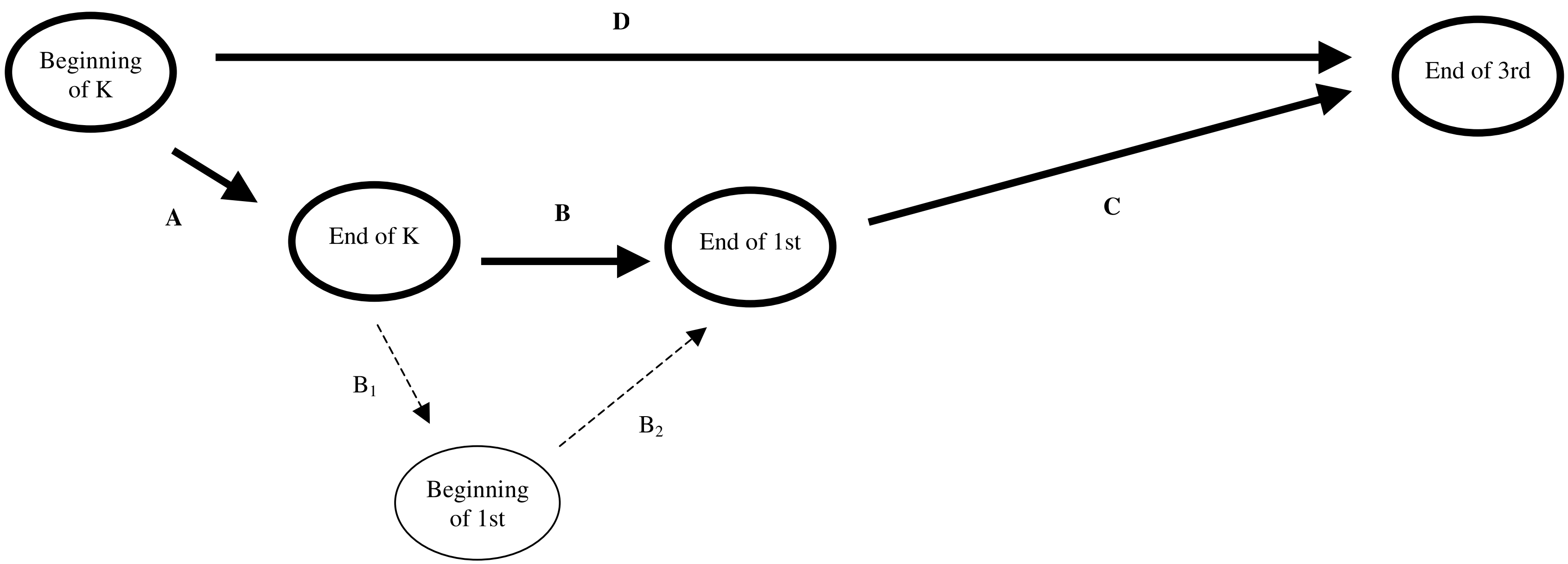
(a) Conceptualizing School Changes:



***(b) Modeling School Changes in ECLS-K*:**



<u>Figure 3</u> Modeling School Change in the Early Childhood Longitudinal Study—Kindergarten Cohort [ECLS-K]



Note: Paths B_1 and B_2 are only defined on the small summer learning subsample of ECLS-K children.

<u>Table 1</u> Frequency of Early School Mobility

A. Beginning of Kindergarten to End of Kindergarten **(descriptive, unweighted n = 17,745).**

Remain in same school	93.0%
Change schools (for family reasons)	7.0%

B. End of Kindergarten to End of First Grade **(descriptive, unweighted n = 14,943).**

Remain in same school	77.1%
Change schools for structural reasons	5.2%
Change schools for family reasons	17.7%

C. End of First Grade to End of Third Grade **(descriptive, unweighted n = 11,975).**

Remain in same school	72.5%
Change schools for structural reasons	3.1%
Change schools for family reasons	24.4%

D. Beginning of Kindergarten to End of Third Grade **(descriptive, unweighted n = 11,975).**

Remain in same school	55.7%
Change schools once	35.9%
Change schools twice	8.1%
Change schools three times	0.3%

<u>Table 2</u> An Alternative Look at Changing Schools from the End of Kindergarten to the End of First Grade (Using the ECLS-K Summer Learning Subsample)

B1. End of Kindergarten to Beginning of First Grade **(descriptive, unweighted n = 4326)**

Remain in same school	80.7%
Change schools for structural reasons	6.3%
Change schools for family reasons	13.0%

B2. Beginning of First Grade to End of First Grade **(descriptive, unweighted n = 4326)**

Remain in same school	94.5%
Change schools (for family reasons)	5.5%

B. End of Kindergarten to End of First Grade, Alternative **(descriptive, unweighted n = 4326)**

Remain in same school	78.6%
Change schools once	18.6%
Change schools twice	2.8%

<u>Table 3</u> School Mobility Rates by Gender, Race and Social Class

	Beginning of K to End of K	End of K to End of 1st		End of 1st to End of 3rd		Beginning of K to End of 3rd			
Unweighted sample size	17,745	14,943		11,975		11,975			
	Change (personal)	Change (structural)	Change (family)	Change (structural)	Change (family)	Never change	Change once	Change twice	Change 3 times
Overall	7.0%	5.2%	17.7%	3.1%	24.4%	55.7%	35.9%	8.1%	0.3%
Male	7.4%	4.5%	18.2%	3.1%	25.7%	55.1%	36.1%	8.5%	0.3%
Female	6.6%	6.0%	17.2%	3.1%	23.2%	56.2%	35.8%	7.7%	0.3%
White	5.8%	4.9%	15.5%	3.8%	20.8%	59.1%	34.2%	6.5%	0.2%
Black	11.3%	3.6%	25.2%	1.8%	35.8%	45.1%	40.8%	13.4%	0.7%
Hispanic	6.9%	8.4%	17.8%	2.6%	25.7%	53.8%	37.0%	8.9%	0.3%
Asian	5.0%	3.5%	17.2%	1.1%	23.8%	58.1%	36.0%	5.9%	0.0%
Other/Mixed	8.7%	3.7%	17.6%	2.6%	28.1%	54.0%	36.6%	9.4%	0.0%
Lowest SES Quintile	13.4%	6.7%	20.8%	3.5%	26.6%	51.2%	37.8%	10.2%	0.8%
Low-Middle SES Quintile	6.7%	4.2%	15.5%	3.1%	25.9%	54.6%	36.2%	8.9%	0.3%
Middle SES Quintile	6.5%	5.1%	17.7%	3.7%	24.4%	55.7%	35.8%	8.4%	0.1%
High-Middle SES Quintile	5.3%	5.0%	16.7%	2.9%	20.7%	59.3%	34.9%	5.8%	0.0%
Highest SES Quintile	3.6%	6.0%	13.7%	3.0%	21.0%	60.4%	33.0%	6.5%	0.1%