

The Effect of School-Based Kindergarten Transition Policies and Practices on Child Academic Outcomes

Amy B. Schulting, Patrick S. Malone, and Kenneth A. Dodge
Duke University

This study examined the effect of school-based kindergarten transition policies and practices on child outcomes. The authors followed 17,212 children from 992 schools in the Early Childhood Longitudinal Study–Kindergarten sample (ECLS-K) across the kindergarten school year. Hierarchical linear modeling revealed that the number of school-based transition practices in the fall of kindergarten was associated with more positive academic achievement scores at the end of kindergarten, even controlling for family socioeconomic status (SES) and other demographic factors. This effect was stronger for low- and middle-SES children than high-SES children. For low-SES children, 7 transition practices were associated with a .21 standard deviation increase in predicted achievement scores beyond 0 practices. The effect of transition practices was partially mediated by an intervening effect on parent-initiated involvement in school during the kindergarten year. The findings support education policies to target kindergarten transition efforts to increase parent involvement in low-SES families.

Keywords: kindergarten transition, parent involvement, socioeconomic status, academic achievement

The importance of a successful transition to kindergarten cannot be overstated. Kindergarten marks a child's entry into formal schooling, and performance in kindergarten paves the way for future academic success or failure. The relation between children's performance during early elementary school and their later academic achievement has been well documented (Ensminger & Slusarcick, 1992; Entwisle & Alexander, 1998; Entwisle & Hayduck, 1988; Gutman, Sameroff, & Cole, 2003). Recognizing the importance of early school success, the vast majority of schools in the United States implement policies and practices to ease children's transition to kindergarten, but in varying degrees. Commonly used transition practices include meeting with parents, phoning or sending home information about the kindergarten program, and inviting parents and children to visit the kindergarten classroom prior to the start of the school year (Pianta, Cox, Taylor, & Early, 1999). These policies are implicitly designed to nurture parental involvement, especially for disenfranchised families. However, despite the widespread use of transition practices, at present, there is no empirical evidence linking such practices to improved child outcomes (Early, Pianta, Taylor, & Cox, 2001). Therefore, the purposes of this study were to examine whether transition practices have an incremental effect on child outcomes during kindergarten; whether this effect varies across socioeconomic groups; and how this effect is mediated.

The transition to kindergarten can be challenging as it represents a shift on many fronts. Children are moving from a preschool,

daycare center, or their own home, where different rates of development had been acceptable, to an elementary school requiring mastery of specific academic skills by predetermined deadlines. These deadlines are becoming increasingly inflexible in this era of heightened school accountability. Under the recently adopted No Child Left Behind Act, children must meet the academic expectations of each grade level by the end of the school year or face sanctions that include summer school and retention (Neill, 2003). Furthermore, against the recommendations of early childhood educators, children are being tested as early as kindergarten and preschool in preparation for the high-stakes testing required by the No Child Left Behind Act (Neill, Guisbond, Schaeffer, Maddon, & Legoros, 2004). In addition to the pressure of academic deadlines and future high-stakes testing, children must also adjust to the formal instruction and behavioral expectations of kindergarten, which often differ from those in the preschool and home environments (Rimm-Kaufman & Pianta, 2000).

Not all children are successful in making the transition to formal schooling. Rimm-Kaufman, Pianta, and Cox's (2000) national survey of problems identified by teachers during the transition to kindergarten revealed that teachers reported that 48% of children had difficulty adjusting to school. Approximately one third (32%) of children were reported to have "some problems" during the transition, and 16% of children were identified as having a "difficult or very difficult" entry into kindergarten characterized by "serious concerns or many problems" (Rimm-Kaufman et al., 2000, p. 154). In addition, over one third of teachers reported that problems such as difficulty following directions, difficulty working independently, and a lack of academic skills characterized over half the students in their class.

Although teachers in this study reported an alarmingly high rate of transition difficulties in the general population of kindergartners, problems during the entry to kindergarten are even more prevalent among children of low socioeconomic status (SES).

Amy B. Schulting, Patrick S. Malone, and Kenneth A. Dodge, Center for Child and Family Policy, Duke University.

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Correspondence concerning this article should be addressed to Amy B. Schulting, Center for Child and Family Policy, Duke University, Durham, NC 27708. E-mail: amy.schulting@duke.edu

Children from low SES backgrounds have more difficult transitions to school characterized by early and persistent school failure, behavior problems, low levels of parental involvement, and a widening gap between their academic achievement and that of their more affluent peers (Gutman et al., 2003; Rimm-Kaufman et al., 2000).

The Developmental Basis of Kindergarten Transition Policies

The transition to kindergarten has been characterized in a variety of ways in the literature, each with different theoretical underpinnings leading to different intervention strategies. One way of explaining children's success or failure during the transition to kindergarten is as a function of child-level factors, often collectively referred to as the child's "readiness" for school. The school readiness construct gained national attention when the first of the National Education Goals, or "Goals, 2000," asserted that "all children in America will start school ready to learn" (National Education Goals Panel, 1998, p. 1). This goal is predicated on the belief that children's abilities and skills at kindergarten entry determine their success or failure during the transition to formal schooling (Meisels, 1999). Therefore, interventions based on the notion of readiness emphasize the importance of remediating skills deficits or other deficiencies inherent in the child.

Child factors, such as academic skills, behavior patterns, and maturity, have been found to play a role in children's adjustment to kindergarten and in subsequent performance (Ensminger & Slusarcick, 1992; Gutman et al., 2003; Pallas, Entwisle, Alexander, & Cadigan, 1987). However, children's academic and cognitive abilities measured in preschool have been found to account for less than 25% of the variance in academic outcomes in kindergarten (LaParo & Pianta, 2000). The primary limitation of the readiness construct is that it lacks any consideration of the contextual factors that play an equally important role in children's transition to and success in kindergarten (Pianta, Rimm-Kaufman, & Cox, 1999). Consequently, the notion of child readiness as the primary determinant of kindergarten success has been replaced over time by more dynamic, social-ecological approaches (Pianta & Walsh, 1996; C. T. Ramey & Ramey, 1999). The developmental model of transition, which is based on Pianta and Walsh's (1996) contextual systems model and Bronfenbrenner and Morris's (1998) bioecological model, emphasizes the importance of fostering positive relationships among the home, school, community, and peer group to support the child throughout the transition to kindergarten (Pianta & Kraft-Sayre, 2003). Transition practices based on this model are those that "facilitate an ongoing relationship process among all partners" (Pianta & Kraft-Sayre, 2003, p. 9). This model recognizes that the child is embedded within a group of interacting systems. Successful transitions are not considered solely contingent on the skills a child brings to kindergarten, but they are believed to be the result of close, collaborative, and supportive relationships among the family, school, peers, and community (Pianta & Walsh, 1996; S. L. Ramey & Ramey, 1994).

Consistent with a social-ecological approach, the National Education Goals Panel (1998) began emphasizing the importance of "ready schools." The first principle of ready schools states that "ready schools smooth the transition between home and school" (National Education Goals Panel, 1998, p. 5). In recognition of the

importance of contextual factors and the significance of relationships across contexts during the transition to kindergarten, the National Education Goals Panel encouraged schools to implement transition practices that create closer connections with families, preschools, and the community. Pianta, Cox, et al. (1999) described the transition practices of ready schools as those that (a) reach out to establish links with families and preschools, (b) reach backward in time to establish connections prior to the first day of kindergarten, and (c) reach with appropriate intensity to establish personal connections to children and families through strategies such as home visiting.

In concordance with the National Education Goals Panel's emphasis on ready schools, the vast majority of schools in the United States now utilize at least some transition practices in an attempt to ease children's transition to kindergarten. Pianta, Cox, et al.'s (1999) survey of a national sample of kindergarten teachers regarding their use of 21 transition practices revealed that 95% of teachers talked with parents after school had started, 88% sent a letter home after school started, and the majority of teachers sent home a flyer about kindergarten before (69%) or after (77%) school had started. A majority of teachers also reported offering an open house before (62%) or after (82%) the beginning of the school year. Less commonly used transition practices involved making personal or phone contact with the family, child, or preschool prior to the beginning of school, with only 5%-17% of teachers reporting use of these practices. It is interesting that teachers in high-poverty districts reported even fewer intensive or individualized transition practices and higher rates of impersonal, low-intensity practices such as sending a letter home or holding an open house. The only exception to this pattern was that teachers in high-poverty districts conducted home visits more frequently than did teachers of more affluent students. It is important to note that low-income children, who are at highest risk of failure during the transition to kindergarten and therefore in need of higher levels of intervention during this time, were found to receive more generic and lower intensity transition practices than their more affluent counterparts (Pianta, Cox, et al., 1999; C. T. Ramey & Ramey, 1999).

The developmental model of transition and the ready schools construct provide theoretical support for transition policies that reach out to families prior to the beginning of the school year to support a positive home-school relationship in order to increase kindergarten success (National Education Goals Panel, 1998; Pianta & Kraft-Sayre, 2003). However, to our knowledge, there is currently no empirical evidence linking transition policies to improved child outcomes during kindergarten. Given the widespread use of such practices, it is important to determine whether the transition policies used by schools and teachers have a positive impact on kindergarten outcomes.

The Current Study

The current study examined data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K; National Center for Educational Statistics, 2001), which has the largest and most nationally representative body of information regarding kindergarten transition policies and practices available. Over 21,000 children in 992 schools participated in this study. Three hypotheses were tested:

Hypothesis 1: Schools that implemented policies of active support to ease the transition to kindergarten would have students who achieved at higher levels by the end of the kindergarten year.

Because selection biases are likely to lead economically advantaged children to populate schools with more transition practices, statistical controls are necessary to test the incremental effect of school transition policies on student outcomes. Even with these controls, a positive effect of transition policies was hypothesized.

Hypothesis 2: Given that transition policies have been implemented to help parents and children become more familiar with the culture and practices of the school, we expected that these policies would exert the strongest effects on those families that were least likely to be acculturated into school procedures initially.

SES is a reasonable proxy for this factor, given that children from low-SES groups are most likely to experience preschool backgrounds that differ from school culture (Gutman et al., 2003). These children also experience the greatest difficulty with the kindergarten transition, have parents who are least involved in school, and have the poorest academic outcomes (Rimm-Kaufman et al., 2000). Thus, we hypothesized that kindergarten transition practices would partially close the socioeconomic achievement gap.

Hypothesis 3: We expected that kindergarten transition policies would have a positive effect on parent-initiated involvement at school and that this involvement would mediate the effect of transition policies on child academic outcomes.

In the current study, we sought to understand the mechanism of any effect of transition practices on child outcomes through mediation analyses. A fundamental factor in a child's academic success is parental involvement in the child's education through expression of interest in learning, support for the teacher, and knowledge and monitoring of the child's performance at school to reinforce school achievement in the home environment (Hill, 2001). Parent-initiated school involvement has been positively associated with academic success and low behavior problems (Hill et al., 2004; Kohl, Lengua, McMahon, & the Conduct Problems Prevention Research Group, 2000). In contrast, teacher-initiated parent involvement that occurs only after the child has displayed behavior problems is associated with negative outcomes (Kohl et al., 2000) because this involvement reflects the child's problems rather than the parent's initiation of preventive intercession. Implicit in the design of kindergarten transition practices is the proximal goal of increasing parent-initiated involvement before any problems arise.

Method

Participants

The current study used data from ECLS-K. The ECLS-K is a longitudinal study following a nationally representative cohort of 21,260 children from kindergarten through Grade 5. The first wave of data collection for the ECLS-K began in 1998–1999, when participating children entered

kindergarten. Four additional waves of data were completed by the spring of 2004. The current study used data from the first two waves collected during the fall of kindergarten in 1998 (between September and December) and the spring of kindergarten in 1999 (between March and July).

Kindergarten students. Data for 17,212 children are included in the public-use data files used in these analyses. The sample was 51% boys, 49% girls; 57% White, 14% Black, 17% Hispanic, 6% Asian, 1% Native Hawaiian or other Pacific Islander, 2% American Indian or Alaskan Native, and 3% more than one race; 20% of children were reported as living below the poverty line. On average, children in this sample were 5 years 7 months old when assessed during the fall of their kindergarten year.

Kindergarten teachers of ECLS-K students. The ECLS-K includes data from 2,991 teachers from 992 schools. Six percent of the teachers identified their race as Black, 4% Hispanic, 2% Asian, 1% Native American, 74% White, 5% identified more than one race, and 8% of teachers did not respond. The sample was 98% women, and they had an average of 1.2 years of experience teaching prekindergarten, 8.5 years of experience teaching kindergarten, and 3.1 years of experience teaching Grade 1–Grade 5. Teachers' years of experience in kindergarten ranged from 1 year (16% of teachers) to 30 years (1.4%). Sixty-eight percent of teachers had 10 or fewer years of experience teaching kindergarten, 23% had 10.5 to 20 years of experience, and 9% had over 20 years of experience as a kindergarten teacher.

Schools. The original ECLS-K sample included 914 public schools and 363 private schools with both religious and nonreligious affiliations (National Center for Educational Statistics, 2001). Each of the four different geographic regions of the United States, the Northeast, South, West, and Midwest, had approximately 25% of schools in the original sample. Participating schools enrolled students from a range of socioeconomic backgrounds as represented by the percentage of the student population eligible for free lunch. Student eligibility for free lunch was obtained only for students at public schools. Of the 914 public schools included in the original sample, 29% had 25% or fewer students that qualified for free lunch, and 17% of schools reported that 25% to 50% of students were eligible for free lunch. Over half of the student population was eligible for free lunch in a substantial number of schools. Fourteen percent of schools had between 51% and 75% of students qualifying for free lunch. Schools with over 75% of students qualifying for free lunch made up 13% of the sample. Free lunch data were missing for 27% of public schools. These data were available only for the original sample of schools and were not included on the public-use dataset. A total of 992 schools were included in the public-use dataset.

Procedure and Measures

Academic achievement. The ECLS-K used direct cognitive assessments to evaluate children's academic achievement during the fall and spring of the kindergarten year. This cognitive assessment battery measures children's competence in three subject areas: (a) reading (language use and literacy), (b) mathematics, and (c) general knowledge of the social and physical world. These untimed assessments were administered in a one-on-one setting with computer-assisted interviewing technology. For each area of competence, assessments were completed in two stages. First, children completed a routing test that included items from each ability level. Then, children were given a level test commensurate with their performance on the routing test in each subject area.

Achievement scores for each subject area are reported in the ECLS-K in a number of different formats. The current study uses the standardized scores (*T* scores) calculated for each subject area. Standardized achievement scores included in the ECLS-K database were created by transforming the item response theory estimates and then rescaling the scores to have a mean of 50 and a standard deviation of 10. Standardized achievement scores for reading, math, and general knowledge, collected in the spring of

kindergarten, were averaged to create a composite academic achievement score for each child. Cronbach's alpha coefficients indicated high internal consistency ($\alpha = .85$). This composite was then rescaled to a mean of 50 and a standard deviation of 10 for ease of interpretation.

Parent involvement. Parents reported on parent-initiated involvement at school in the spring of the kindergarten year. Parents reported how often they participated in a range of activities and events at the school over the course of the full kindergarten year that included open-house or back-to-school night, Parent-Teacher Association meetings, parent-advisory group or policy council meetings, regularly scheduled parent-teacher conferences, school or class events, volunteering at school, and fundraising activities. Responses to these seven questions were summed to produce a parent-initiated school-involvement score. Because of the skewed nature of such open-ended responses, the natural logarithm of this sum (rescaled to a minimum of 1) was taken before further calculations. Cronbach's alpha coefficients for this scale indicated moderate internal consistency ($\alpha = .52$).

Teachers reported about teacher-initiated parental involvement, including whether parents participated in regularly scheduled conferences, attended informal meetings with the teacher to discuss the child's progress, returned teacher's phone calls, and volunteered in the classroom or school when asked. Responses to these four questions were summed to produce a teacher-initiated parent involvement score. Cronbach's alpha coefficients for this scale indicated moderate internal consistency ($\alpha = .60$). Both parent-initiated and teacher-initiated parent involvement scores were converted to Z scores.

School transition practices. Information regarding transition policies and practices was reported by kindergarten teachers in the fall of 1998. Kindergarten teachers were asked to identify which of the following seven transition practices were implemented at their school to ease children's transition to kindergarten: (a) information about the kindergarten program is phoned or sent home to parents, (b) preschoolers spend time in the kindergarten classrooms, (c) school days are shortened at the beginning of the school year, (d) parents and children visit kindergarten prior to the start of the school year, (e) teachers visit students' homes at the beginning of the school year, (f) parents attend an orientation session prior to the school year, or (g) other transition activities are provided. We computed a score for each teacher by totaling the number of transition practices that were endorsed. Cronbach's alpha coefficients indicated moderate internal consistency on this index ($\alpha = .44$). This level of internal consistency is adequate for an index of this kind because implementation of all seven transition practices by one teacher is unlikely. Teachers were reporting transition practices primarily implemented at the school level; therefore, it was necessary to designate school transition scores as a school-level rather than a teacher-specific variable. Transition scores for each school were computed by averaging teacher-reported transition scores across all teachers at a particular school. For schools for which two or more teachers reported scores, the intraclass correlation was .93.

Covariates. In the fall of the kindergarten year, parents completed a questionnaire in which they answered a variety of demographic questions. The current study includes information regarding the child's race, sex, and age (in months); mother's age; home language; number of people living in the household; family type; and the SES of the family.

Family type is a nominal variable indicating whether both parents are present in the home and whether the kindergarten child has siblings living in the home. Parents indicated how many total people live in the household in a separate question. Parents also reported whether their home language was English.

SES is a continuous composite variable created by averaging the following components: (a) father or male guardian's education, (b) mother or female guardian's education, (c) father or male guardian's occupation, (d) mother or female guardian's occupation, and (e) household income. Each of these measures was standardized to have a mean of 0 and a standard

deviation of 1. Parents reported their education and occupation during the fall of the kindergarten year. Parent education level was coded as "1" if the parent completed Grade 8 or below, "2" for completion of Grades 9–12, "3" for a high school diploma or equivalent, "4" for participation in a vocational/technical program, "5" for some college, "6" for a bachelor's degree, "7" for graduate/professional school without obtaining a degree, "8" for completion of a master's degree, and "9" for a doctorate or professional degree. Occupational prestige was coded according to the General Social Survey prestige scores (National Center for Educational Statistics, 2001).

Race for teachers, parents, and children was obtained in the fall of the kindergarten year. Teachers reported their race; parents reported both their race and their kindergarten child's race. For this nominal variable, parents and teachers were presented with seven different racial groups including Caucasian, Black/African American, Hispanic (of both specified and unspecified ethnicity), Asian, Native Hawaiian/Pacific Islander, and American Indian or Alaska Native. Respondents were given the opportunity to select each of the seven racial categories to allow for the option of identifying membership in more than one racial group.

In addition to race, this study also included a number of other teacher-level variables. In the fall of the year, teachers completed a questionnaire in which they answered a variety of demographic questions, in addition to questions about their beliefs, their teaching practices, and their classrooms. The current study includes information regarding teachers' age, sex, years of teaching experience, years teaching at their current school, type of certification, education level, beliefs about teaching, and class size.

Teachers answered three questions about their certification. They identified whether they were certified in elementary education and/or early childhood education and what type of certification they had earned. For type of certification, a nominal variable, teachers reported whether they had temporary/probational certification, alternative certification, regular certification (less than the highest), the highest certification available, or no certification. Teachers also indicated the highest level of education they had completed. They reported whether they had completed high school or had an associate's or bachelor's degree, 1 year beyond a bachelor's degree, a master's degree, an education specialist or professional diploma, or a doctorate.

Teachers were also asked to indicate the extent to which they agreed with certain statements about teaching using a 5-point scale: 1 (*they strongly disagree*), 2 (*disagree*), 3 (*neither agree nor disagree*), 4 (*agree*), and 5 (*they strongly agree*). The three statements teachers responded to were (a) "I really enjoy my present teaching job" (b) "I am certain that I am making a difference in the lives of the children I teach" and (c) "If I could start over, I would choose teaching again as my career."

In the spring, school administrators answered questions about their school and the community in which the school was located. Information regarding total school enrollment, the percentage of minority students, the percentage of students eligible for free and reduced lunch, and the percentage of students scoring at or above the national average in reading and math were included in this study. The percentage of minority students is a categorical variable that was coded as follows: 1 (<10% minority), 2 (10%–24.9%), 3 (25%–49.9%), 4 (50%–74.9%), and 5 (>75%). School enrollment responses were coded as follows: 1 (0–149 students), 2 (150–299 students), 3 (300–499 students), 4 (500–749 students), and 5 (750 students and above). Administrators also indicated the extent to which certain problems were an issue in the community where their school was located on a 4-point scale: 1 (*the issue was a big problem*), 2 (*the issue was somewhat of a problem*), 3 (*the issue was not a problem*), and 4 (*the administrator did not know if it was a problem in their community*). Administrators rated the following problems: (a) tensions based on racial, ethnic, or religious differences; (b) garbage, litter, or broken glass on the street, sidewalks, or yards; (c) selling and/or using drugs or excessive drinking in public; (d) gangs; (e) heavy traffic; (f) violent crime like drive-by shootings; (g) vacant houses and buildings; and (h) crime in the

neighborhood. Responses to these eight problems were averaged to produce a total community problems score. The Cronbach's alpha for this scale was .83.

Results

Missing Data and Imputation

The rate of missing data ranged from 11.3%–16.4% for academic achievement scores and from 10.1%–11.6% for transition activities. For the majority of child- and family-level covariates, the rate of missing data ranged from 0.1%–4.2%; however, three covariates, mother's age, total number in the household, and family type, were missing at rates between 13.5%–15.1%. There were missing data from teacher covariates at a rate of 6%–17%, and from 0.8%–16.2% for school-level variables.

We addressed the problem of missing data by multiple imputation (MI). This simulation-based approach allows full use of the available data without introducing the biases that can be created by ad hoc approaches such as listwise deletion (Schafer, 1997; Schafer & Graham, 2002). MI produces unbiased parameter estimates under conditions of the data being missing at random (MAR), as opposed to the more restrictive assumption of missing completely at random that is necessitated with listwise deletion. Under the assumption of MAR, the missingness in the data is a probabilistic phenomenon whereby the fact of being missing produces associations between the missing and the available data. Thus, the mechanisms of missingness are accounted for by relations between the available data and the pattern of missing data. The MAR assumption cannot be formally tested; however, even if the MAR assumption is not applicable, MI still outperforms listwise deletion, and a false MAR assumption may have only a minor influence on estimates and standard errors (Collins, Schafer, & Kam, 2001).

For each missing data point, a sample of values is generated from the simulation based on the estimated covariance matrix. The range of the imputed values represents the degree of uncertainty about the correct value to be imputed. The multiple imputed data sets are then analyzed, and the results are combined to generate results that appropriately incorporate the uncertainty. The combination procedures result in parameter estimates and standard errors (Little & Rubin, 1987). The degrees of freedom in the combined results indicate the precision of the imputation, as indicated by the relative magnitudes of the between- and within-imputation variances, and are not direct reflections of the sample size.

For this study, we imputed data separately by level of analysis: child–family, teacher–classroom, and school. The imputations at each level included only variables from that level; the multilevel aspect was not modeled. This is a violation of one of the assumptions of the combination rules—the combinations of results assume that the imputation model is at least as complex as the analysis model (for which we did incorporate the multilevel structure). Unfortunately, we could identify no tools for multiple imputation of a multilevel dataset with missing values scattered among all variables at all levels; even compromise strategies (e.g., dummy-coding indicators of membership in the nesting group) were impractical with a dataset of this size. We believe that the strategy applied here is the best available for accommodating the situation at hand. We discuss possible ramifications of this assumption violation later in this article.

A total of 10 imputed data sets at each level were generated using PROC MI in SAS 9.1 (SAS Institute, 2004). With 10 imputations, MI is 95% efficient with 50% missing information. Because there was no cross-level information, our sample was restricted to those students for whom there were some data at all three levels; this resulted in a sample of 15,529 students in 2,862 classrooms in 905 schools. In addition to the study variables (school transition activities, SES, and achievement outcomes), we included student race/ethnicity (eight categories), student sex, student age, and an array of additional variables at the three levels described above. Visual examination of the diagnostic plots showed that there were difficulties in the imputation process for two variables and their covariances (father's age and age of the mother at the birth of her first child); there was not excess autocorrelation between statistics from consecutive imputations. These variables were omitted from further analyses. With this exception, the inspection suggested that the imputations were independent, random draws from the distributions. Analyses were completed across these 10 imputed data sets using PROC MIANALYZE in SAS.

Descriptive Statistics

The means and standard deviations of all variables are presented in Table 1. In addition to the composite variable of SES, descriptive statistics are reported for the variables used to create this composite. As illustrated in Table 1, this sample included students with a broad range of academic achievement outcomes and SES levels. In addition, kindergarten teachers varied greatly in their use of each transition practice. The most common transition practices reported by teachers were to phone or send home information about the kindergarten program to parents (86%) and parent orientation at school (76%). The least commonly reported transition practices were home visits by the teacher (4%) and shortened school days (18%).

Table 2 lists the means and standard deviations for all variables by SES quintiles. Average academic achievement, parent involvement, and number of transition practices varied significantly across the SES quintiles. Increases in SES were associated with greater rates of parent involvement at school, higher academic achievement, and a larger number of transition practices. Finally, Table 3 shows the correlations among the student and teacher variables taken at the student level.

Effect of Transition Policies on Achievement Outcomes

Because of the nesting of children within classrooms and classrooms within schools, and the likelihood that children within a classroom are more alike than children across classrooms, analyses that take this nesting into account were necessary to determine the true relation between transition practices and child outcomes (Bijleveld & van der Kamp, 1998). A three-level hierarchical linear model (HLM) was used to account for the nesting of children within teachers (i.e., classrooms) and within schools (Raudenbush & Bryk, 2002). All models were estimated in PROC MIXED in SAS v.9.1, using sample weights provided with the ECLS-K public-use data (specifically, the weight variable "BYCOMW0"). HLM is essentially similar to linear regression; however, the assumption that the residuals are independently dis-

Table 1
Descriptive Statistics for All Variables

| Variable | <i>M</i> | <i>SD</i> | Range | Teacher-reported use of each practice % |
|--|----------|-----------|-------------|---|
| Academic covariates | | | | |
| School transition practices | 3.35 | 1.14 | 0–7.00 | |
| Telephone or send information | 0.96 | 0.19 | 0–1.00 | 86 |
| Child visit classroom | 0.61 | 0.49 | 0–1.00 | 39 |
| Shortened school days | 0.27 | 0.45 | 0–1.00 | 18 |
| Parent visit school | 0.90 | 0.30 | 0–1.00 | 76 |
| Home visit by teacher | 0.08 | 0.28 | 0–1.00 | 4 |
| Parent orientation at school | 0.87 | 0.34 | 0–1.00 | 76 |
| Other | 0.50 | 0.50 | 0–1.00 | 26 |
| Academic achievement | 50.00 | 10.00 | 36.77–62.17 | |
| Parent involvement (teacher report) | 4.50 | 2.02 | 2.48–7.02 | |
| Parent involvement (parent report) | 2.15 | 0.90 | 1.10–3.33 | |
| Child- and family-level covariates | | | | |
| Socioeconomic status | 0.02 | 0.80 | –0.85–1.09 | |
| Family income (\$) | 53,219 | 57,262 | 0–1,000,000 | |
| Mother's education level | 4.26 | 1.79 | 2.00–6.00 | |
| Father's education level | 4.27 | 2.03 | 2.00–7.00 | |
| Mother's occupational prestige | 42.64 | 11.77 | 33.42–61.43 | |
| Father's occupational prestige | 41.73 | 11.89 | 33.42–56.82 | |
| Child age (in months) | 68.44 | 4.31 | 63.00–74.13 | |
| Child gender | 1.49 | 0.50 | 1.00–2.00 | |
| Total no. in family | 4.55 | 1.40 | 3.00–6.00 | |
| Mother's age (in years) | 33.36 | 6.59 | 25.00–41.00 | |
| School-level covariates | | | | |
| Percentage of minority students | 2.76 | 1.57 | 1.00–5.00 | |
| Total school enrollment | 3.18 | 1.22 | 1.00–5.00 | |
| Community problems | 2.68 | 0.41 | 2.12–3.00 | |
| Percentage \geq average in math | 62.58 | 23.41 | 30.00–90.00 | |
| Percentage \geq average in reading | 61.43 | 23.89 | 28.11–90.00 | |
| Percentage eligible for free and reduced lunch | 38.97 | 31.59 | 0–84.15 | |
| Teacher and classroom-level covariates | | | | |
| Class size | 20.39 | 4.35 | 15.00–26.00 | |
| Teacher age | 41.01 | 10.10 | 27.00–54.00 | |
| Teacher gender | 1.98 | 0.15 | 1.00–2.00 | |
| Years teaching preschool | 1.16 | 2.69 | 0–4.00 | |
| Years teaching kindergarten | 8.47 | 7.51 | 1.00–20.00 | |
| Years teaching Grade 1 | 1.58 | 3.08 | 0–5.00 | |
| Years teaching Grades 2–5 | 1.88 | 3.28 | 0–6.00 | |
| Years at current school | 8.64 | 7.71 | 1.00–21.00 | |
| Early childhood certification | 0.54 | 0.50 | 0–1.00 | |
| Elementary certification | 0.85 | 0.35 | 0–1.00 | |
| Teacher enjoys teaching | 4.51 | 0.70 | 4.00–5.00 | |
| Teacher would choose teaching again | 4.35 | 0.93 | 3.00–5.00 | |
| Believes teaching makes a difference | 4.58 | 0.58 | 4.00–5.00 | |

tributed is not required. HLM, rather, assumes that residuals at one level (e.g., students) are independent and normally distributed within each higher level unit (e.g., classrooms). It is entirely possible in HLM that the student-level residuals depend on the nesting unit, and the first step we take below is the examination of the partitioning of that variance. We first examined the unconditional model, which contains no predictors. The unconditional model partitions the variance in academic achievement to each of the three levels: student, classroom, and school. Of the total variance in academic achievement, 0.1% (averaged across imputations) was attributable to school effects, 0.2% to classroom effects, and the remainder was attributable to child factors. To assess the impact of the imputation process on the clustering, we also estimated the variance components in achievement in the sample of 14,343 students who met the same

inclusion criteria (data at all levels) and had valid nonimputed data for achievement. In this analysis, 0.1% of the achievement variance was attributable to school effects, 0.2% to classroom effects, and the remainder was attributable to child factors. The very low cluster variance indicates that clustering effects are minimal; the multilevel models are still needed to model appropriate precision for effects at different levels.

Models 1, 2, and 3 were used to address the first two research questions. Model 1 tested the effect of transition practices on academic achievement, including covariates of child demographic factors, (age, gender, race, and linear and quadratic effects of SES). All nominal variables were dummy coded. Two-way interaction terms of SES (linear and quadratic effect) \times Transition Practices were included in Model 2 to test the second research

Table 2
Means and Standard Deviations for Variables by Socioeconomic Status Quintile

| Variable | Socioeconomic status quintiles | | | | | | | | | |
|---|--------------------------------|--------|-----------------------|--------|----------------------|--------|-----------------------|--------|----------------------|--------|
| | First (n = 2,973) | | Second (n = 3,159) | | Third (n = 3,210) | | Fourth (n = 3,471) | | Fifth (n = 3,672) | |
| | M | SD | M | SD | M | SD | M | SD | M | SD |
| Transition practices | 2.83 | 1.19 | 3.23 | 1.15 | 3.39 | 1.10 | 3.55 | 1.04 | 3.77 | 0.99 |
| Academic achievement | 41.06 | 9.00 | 46.14 | 9.15 | 49.97 | 8.51 | 53.51 | 8.49 | 57.29 | 8.36 |
| Parent involvement: teacher report | 4.01 | 2.32 | 4.36 | 2.17 | 4.59 | 2.02 | 4.67 | 1.85 | 4.71 | 1.72 |
| Parent involvement: parent report | 1.58 | 0.92 | 1.85 | 0.85 | 2.17 | 0.83 | 2.42 | 0.83 | 2.60 | 0.78 |
| Socioeconomic status | -1.16 | 0.57 | -0.55 | 0.12 | -0.12 | 0.13 | 0.44 | 0.20 | 1.31 | 0.40 |
| Components of socioeconomic status variable | | | | | | | | | | |
| Family income (\$) | 11,368 | 15,687 | 28,066 | 18,099 | 45,394 | 31,182 | 66,362 | 46,643 | 110,523 | 96,768 |
| Mother's education level | 1.96 | 0.97 | 2.99 | 0.78 | 4.18 | 1.07 | 5.16 | 1.09 | 6.64 | 1.35 |
| Father's education level | 1.79 | 1.50 | 2.96 | 0.90 | 4.01 | 1.14 | 5.18 | 1.26 | 7.14 | 1.42 |
| Mother's occupational prestige | 30.64 | 12.29 | 36.16 | 4.19 | 39.66 | 6.50 | 48.22 | 9.48 | 57.72 | 8.68 |
| Father's occupational prestige | 30.39 | 14.25 | 36.49 | 4.39 | 38.83 | 5.75 | 44.92 | 9.24 | 57.91 | 10.16 |

question, which was a hypothesis that the effect of transition practices varies as a function of the linear and/or quadratic effect of SES. Two-way interactions between transition practices and the demographic variables of race, gender, and age were also included. All covariates in Model 2 were grand-mean centered (i.e., rescaled to sample-wide means of zero, within imputation) before the nonlinear terms (the square of SES and the interaction terms with transition activities) were calculated to reduce collinearity between the linear and nonlinear terms and to improve interpretability of main effects for models including the interaction terms—that is, each main effect term is then interpretable as the effect when all other variables are at their means, and the interaction terms can be ignored, as at least one of the components is at its mean of zero. Finally, Model 3 included an array of covariates at all three levels of the analysis to screen for possible third-variable mechanisms accounting for the relations between transition practices and outcomes. The final model is indicated in the following equations:

$$y_{ijk} = \pi_{0jk} + \pi_{1jk} \times SES + \pi_{2jk} \times SES^2 + \pi_{3jk} - \pi_{11jk} \times StudentDemographics + \pi_{12jk} - \pi_{18jk} \times StudentCovariates + e_{ijk}, \quad (1)$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k} - \beta_{024k} \times TeacherCovariates + r_{0jk}, \quad (2)$$

$$\pi_{pjk} = \beta_{p0k} | p = 1 \text{ to } 18, \quad (3)$$

$$\beta_{00k} = \gamma_{000} + \gamma_{001} \times Transitions + \gamma_{002} - \gamma_{007} \times SchoolCovariates + u_{00k}, \quad (4)$$

$$\beta_{0qk} = \gamma_{0q0} | q = 1 \text{ to } 24, \quad (5)$$

$$\beta_{p0k} = \gamma_{p00} + \gamma_{p01} \times Transitions | p = 1 \text{ to } 11, \quad (6)$$

$$\beta_{p0k} = \gamma_{p00} | p = 12 \text{ to } 18. \quad (7)$$

Thus, in Model 3, student achievement is modeled as function of a random within-classroom intercept (Equation 2), fixed effects of transition practices (Equation 4), SES, SES², nine student demographic variables, seven other student-level covariates, and a ran-

dom residual (Equations 1, 3, and 7). The effects of SES, its square, and the demographic variables are predicted by their respective school-level intercepts and transition practices (Equation 6). The within-classroom intercept is a function of a random within-school intercept (Equation 4), transition practices (Equation 4), fixed effects of 24 teacher-level covariates, and a random residual (Equations 2 and 5). Finally, the within-school intercept is a function of an overall intercept, transition practices, fixed effects of six school-level covariates, and a random residual (Equation 4). Models 1 and 2 do not include the additional student-, teacher-, and school-level covariates (Equations 1, 2, and 4), and Model 1 does not include the effects of transitions on the effects of the student-level predictors (Equation 6).

Results of Model 1 indicate that school-level transition practices were a significant predictor of academic achievement at the end of kindergarten, $b = 0.51$, $SE = 0.12$, $t(20238) = 4.38$, $p < .0001$. This finding indicates that individual academic achievement will increase by .051 standard deviations with each additional school-level transition practice.

Model 2 incorporated interactions between transition practices and sociodemographic covariates. We found the hypothesized interaction between transition practices and student SES, both with SES², $b = -0.10$, $SE = 0.03$, $t(17936) = -3.06$, $p = .002$, and overall with the two components of SES, $F(2, 10859) = 5.93$, $p = .003$. The interactions between transition practices and child age, race/ethnicity, and gender were not significant, $ps > .19$.

Finally, Model 3 tested the main and interactive effects of transition practices with additional covariates included. The key results (excluding those for covariates included only for statistical control) appear in Table 4. As hypothesized, SES was found to be a significant predictor of academic achievement. Although the strength of the relation between transition practices and achievement was reduced when SES was included in the model, transition practices remained a significant predictor of academic achievement even after controlling for SES and the full set of covariates. These findings indicate that kindergarten achievement scores increased .03 standard deviations with each additional transition practice at the school level. The average school's 3.4 practices are

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associated with a .10 standard deviation increase in academic achievement scores beyond the effect for a school with no transition practices. Main effects of race, gender, and age were also significant, but the interactions were not.

As hypothesized, the interaction between SES and transition practices contributed significant unique prediction to achievement outcomes, $F(2, 7251) = 4.00, p = .018$. Figure 1 presents the predicted academic achievement scores across different levels of SES by number of transition activities. The effect of transition practices (the spacing of the plotted curves) was greater at lower SES. There was also a significant interaction effect between transition activities and the quadratic component of SES in predicting academic achievement, with children of average SES and one standard deviation below the mean of SES exhibiting the largest academic gains for each additional transition activity. The predicted achievement scores for children at the mean SES level and one standard deviation below the mean SES increased by .21 standard deviations between children offered zero transition activities and those offered seven transition activities. In contrast, for children at the highest SES level, predicted achievement scores decreased by .17 standard deviations between children offered zero versus seven transition activities.

We repeated Model 3 with each individual transition practice (rather than the sum) as a predictor to determine whether each transition practice was related to academic achievement. Of the six specific practices (excluding "other"), only the fourth transition practice, that parents and children visit the kindergarten classroom prior to the beginning of the year, showed a significant main effect on achievement, $b = 1.26, SE = 0.48, t(2886) = 2.64, p = .009$. The use of this transition practice also interacted significantly with SES, in a pattern similar to that of the sum of transition practices—interaction with linear SES: $b = -0.58, SE = 0.35, t(1451) = -1.69, p = .091$; interaction with SES²: $b = -0.39, SE = 0.12, t(5639) = -3.34, p < .0008$; overall interaction: $F(2, 3662) = 5.53, p = .004$; none of the remaining tests of main effects of practices or their interactions with SES were significant, $ps > .12$.

Mediation of the Effect of Transition Policies

Effect of transition policies on parent–school involvement. We tested the final research question with a third set of models used to examine the effect of transition practices on parent-initiated school involvement and to determine whether this involvement mediated the relation between transition practices and academic achievement. As hypothesized, school-level transition practices were a significant predictor of parent-initiated school involvement, $b = 0.08, SE = 0.01, t(814) = 6.00, p = .0001$. Similar to academic achievement, there was a significant interaction between transition activities and the curvilinear component of SES in predicting parent-initiated school involvement, $F(2, 338) = 9.31, p < .0001$, with children of average SES and one standard deviation below the mean of SES exhibiting the largest gains in parent-initiated school involvement for each additional transition activity. Figure 2 presents the predicted parent-initiated school involvement scores across different SES groups by number of transition activities. The predicted parent-initiated school involvement scores for children at the mean SES level and one standard deviation below the mean SES increased by .59 and .56 standard deviations, respectively, between children offered zero transition activities and those of-

ferred seven transition activities. In contrast, predicted parent-initiated school involvement scores increased by only .30 standard deviations for children at the lowest SES levels and decreased by .05 standard deviations for the most affluent children between children offered zero versus seven transition activities.

The effect of transition practices on teacher-initiated parent involvement was also examined. Transition practices had a negative main effect on teacher-initiated parent involvement, $b = -0.07, SE = 0.02, t(836) = -3.64, p = .0003$; this effect did not interact with SES $F(2, 184) < 1, ns$.

Test of mediation. A final set of hierarchical linear models tested whether parent-initiated school involvement mediated the relation between transition practices and academic outcomes. We used Baron and Kenny's (1986) principles for testing mediating variables, which require that criteria be met at each of four steps to establish full mediation and that criteria be met at the first three steps to establish partial mediation (Kenny, Kashy, & Bolger, 1998). The first step is to determine whether the predictor variable is significantly correlated with the criterion variable. As reported previously (see Table 4), transition practices were a statistically significant predictor of academic achievement. In Step 2, the predictor variable must also be significantly correlated with the potential mediating variable. As reported above, the transition practices variable was found to be a significant predictor of parent-initiated school involvement. In Step 3, the criterion variable is regressed on both the potential mediating variable and the predictor variable. Criteria for Step 3 were met, as the potential mediating variable, parent-initiated school involvement, was found to be a significant predictor of the criterion variable, academic achievement, $b = 0.89, SE = 0.08, t(331) = 10.94, p < .0001$; when controlling for transition practices. The final step is to determine whether the total effect of transition practices on academic achievement is reduced when parent-initiated school involvement is included in the model. Transition practices were a marginally statistically significant predictor of achievement with parent-initiated school involvement in the model, $b = 0.22, SE = 0.12, t(4809) = 1.77, p = .08$, but the effect of transition practices was reduced from .29 to .22, indicating that parent-initiated school involvement accounted for 24% of the total effect of transition practices on academic achievement. It can be concluded that parent-initiated school involvement partially mediated the relation between transition practices and achievement.

Discussion

Although there is substantial theoretical and political support for school transition practices to ease the transition to kindergarten (National Education Goals Panel, 1998; Pianta & Kraft-Sayre, 2003; Pianta & Walsh, 1996), there had been no empirical evidence supporting the use of such practices. The purpose of this study was to address this significant gap in the literature by investigating the relation between school transition practices and kindergarten outcomes. Using a large, nationally representative sample and multilevel modeling that appropriately nests students within classrooms and schools, we found that kindergarten transition policies do indeed have a modest positive effect on students' academic achievement and on parent-initiated school involvement during the kindergarten year, even when we controlled for SES and other demographic factors related to these outcomes. This finding

Table 3
Intercorrelations Among Covariates, Composite Variables, and Their Components

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|------|------|------|------|------|------|------|------|------|------|------|
| 1. School transition practices | — | | | | | | | | | | |
| 2. Socioeconomic status | .23 | | | | | | | | | | |
| 3. Academic achievement | .21 | .48 | | | | | | | | | |
| 4. Child age | .07 | .01 | .24 | | | | | | | | |
| 5. Child gender | -.01 | .00 | .03 | -.07 | | | | | | | |
| 6. Free or reduced lunch | -.28 | -.40 | -.34 | -.05 | -.01 | | | | | | |
| 7. Percentage minority | -.43 | -.32 | -.34 | -.13 | .00 | .55 | | | | | |
| 8. School enrollment | -.20 | -.13 | -.12 | -.05 | .00 | .20 | .24 | | | | |
| 9. Community problems | .26 | .25 | .23 | .02 | .00 | -.40 | -.48 | -.16 | | | |
| 10. At or above average reading | .24 | .33 | .29 | .06 | .00 | -.59 | -.48 | -.18 | .38 | | |
| 11. At or above average math | .21 | .30 | .27 | .05 | .00 | -.53 | -.43 | -.15 | .36 | .94 | |
| 12. Class size | -.07 | -.05 | -.05 | -.04 | .01 | .08 | .16 | .21 | -.07 | -.03 | -.02 |
| 13. Years teaching Grades 2–5 | -.02 | .01 | .01 | -.03 | .00 | .01 | .03 | .01 | -.02 | -.01 | -.02 |
| 14. Years teaching Grade 1 | -.03 | -.01 | .01 | .00 | .00 | .01 | .03 | .01 | -.01 | -.02 | -.02 |
| 15. Years teaching kindergarten | .06 | .04 | .04 | .03 | .00 | -.07 | -.11 | .02 | .08 | .07 | .06 |
| 16. Early childhood certification | .05 | .03 | .03 | .03 | -.01 | .01 | .01 | .10 | .01 | .02 | .03 |
| 17. Elementary Certification | .00 | -.02 | -.01 | .00 | .00 | .03 | -.02 | .07 | -.02 | -.03 | -.02 |
| 18. Teaching Makes a Difference | .04 | .05 | .02 | .00 | .01 | -.04 | .01 | .01 | .05 | .02 | .03 |
| 19. Teacher Enjoys Teaching | .09 | .07 | .05 | .01 | .00 | -.08 | -.10 | -.04 | .07 | .09 | .08 |
| 20. Years at Current School | .05 | .01 | .02 | .02 | .01 | -.05 | -.10 | .00 | .07 | .05 | .03 |
| 21. Would Choose Teaching | .05 | .06 | .02 | .01 | .00 | -.07 | -.08 | -.07 | .05 | .05 | .04 |
| 22. Teacher Age | .04 | .05 | .04 | .01 | .00 | -.05 | -.04 | .01 | .03 | .02 | .02 |
| 23. Total no. in family | -.07 | -.09 | -.16 | .02 | .00 | .11 | .12 | .07 | -.08 | -.09 | -.09 |
| 24. Mother's Age | .08 | .30 | .20 | .04 | .00 | -.17 | -.10 | -.05 | .10 | .14 | .13 |
| 25. Father Education Level | .19 | .84 | .42 | .01 | .01 | -.35 | -.26 | -.10 | .22 | .28 | .26 |
| 26. Father Occupational Prestige | .14 | .78 | .31 | .01 | .00 | -.27 | -.20 | -.07 | .16 | .21 | .20 |
| 27. Home Language | .21 | .21 | .24 | .08 | .00 | -.19 | -.35 | -.18 | .19 | .19 | .16 |
| 28. Parent Involvement (Teacher Report) | -.04 | .10 | .14 | -.03 | .04 | -.09 | -.06 | -.07 | .05 | .06 | .05 |
| 29. Parent Involvement (Parent Report) | .17 | .35 | .30 | .02 | .01 | -.25 | -.22 | -.10 | .13 | .21 | .19 |

Note. Significance values on imputed data vary to the extent of missing data.

provides the strongest empirical support to date for school policies designed to facilitate the transition to kindergarten.

Another important finding of this study is that the relation between transition practices and achievement is moderated by SES. As hypothesized, the effect of transition practices on academic achievement was stronger for children from average- or low-income families than for children from more affluent backgrounds. High-income children were more likely to demonstrate high academic achievement in kindergarten regardless of the tran-

sition practices offered at their school. In contrast, the predicted achievement scores of average- and low-income children receiving transition practices were substantially higher than they would have been had they attended schools that did not offer such practices. This finding is especially noteworthy in light of the finding that low-income children receive the fewest transition practices. Ironically, high-income children, who are least in need of support during the transition to kindergarten and benefit least from transition practices, receive the largest number of such practices,

Table 4
Hierarchical Linear Model of Kindergarten Academic Achievement on Transition Practices, Socioeconomic Status, Child Demographic Variables, and Interaction Terms, Model 3

| Predictor | Coefficient (SE) | t | F | dfs | p |
|----------------------------|------------------|--------|-------|----------|-------|
| Intercept | 48.70 (0.45) | 109.20 | | 3556 | .0001 |
| Transition practices | 0.29 (0.13) | 2.34 | | 3656 | .019 |
| Socioeconomic status (SES) | | | 63.65 | 2, 6845 | .0001 |
| Linear (SES) | 3.2 (0.29) | 11.03 | | 3515 | .0001 |
| Quadratic (SES × SES) | 0.52 (0.11) | 4.56 | | 9342 | .0001 |
| Child gender | 1.34 (0.42) | 3.18 | | 29821 | .0015 |
| Child age | 0.53 (0.06) | 9.61 | | 533 | .0001 |
| Child race | | | 2.70 | 7, 39415 | .009 |
| SES × Transition | | | 4.00 | 2, 7251 | .018 |
| Child Gender × Transition | -.016 (0.12) | -1.33 | | 28454 | .18 |
| Child Age × Transition | -.001 (0.02) | -0.69 | | 831 | .49 |
| Race × Transition | | | 0.85 | 7, 59478 | .54 |
| SES × SES × Transition | -.009 (0.03) | -2.69 | | 16063 | .007 |

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| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | .05 | .00 | .04 | .09 | .05 | .05 | .04 | .05 | -.07 | .08 | .19 | .14 | -.04 | .17 |
| | | | | .03 | -.02 | .05 | .07 | .01 | .06 | .05 | .03 | -.09 | .30 | .84 | .78 | .10 | .35 |
| | | | | .03 | .00 | .02 | .05 | .02 | .02 | .04 | .03 | -.16 | .20 | .42 | .31 | .14 | .30 |
| | | | | .03 | .00 | .00 | .01 | .02 | .01 | -.01 | .03 | .02 | .04 | .01 | .01 | -.03 | .02 |
| | | | | -.01 | .00 | .01 | .00 | .01 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .04 | .01 |
| | | | | .01 | .03 | -.03 | -.08 | -.05 | -.07 | -.05 | -.03 | .11 | -.17 | -.35 | -.27 | -.09 | -.25 |
| | | | | .00 | -.02 | .01 | -.10 | -.10 | -.08 | -.04 | -.03 | .18 | -.10 | -.26 | -.20 | -.06 | -.22 |
| | | | | .10 | .07 | .01 | -.04 | .00 | -.07 | -.01 | -.02 | .07 | -.05 | -.10 | -.07 | -.07 | -.10 |
| | | | | .01 | -.02 | .05 | .07 | .07 | .05 | .03 | .01 | -.08 | .10 | .22 | .16 | .05 | .13 |
| | | | | .02 | -.03 | .02 | .09 | .05 | .04 | .02 | .04 | -.09 | .14 | .28 | .21 | .06 | .21 |
| | | | | .03 | -.02 | .03 | .08 | .03 | .04 | .02 | .03 | -.09 | .13 | .26 | .19 | .05 | .19 |
| | | | | .00 | .04 | .04 | -.04 | .04 | -.03 | .05 | -.03 | .00 | -.01 | -.04 | -.04 | .00 | -.04 |
| .06 | | | | -.08 | .14 | .01 | .01 | .17 | -.01 | .29 | -.01 | -.01 | .00 | .02 | .01 | .01 | .00 |
| .03 | .17 | | | -.04 | .11 | .01 | .08 | .19 | .00 | .25 | .01 | .03 | .02 | -.01 | -.01 | .01 | .00 |
| .07 | -.01 | .03 | | .05 | .06 | .07 | .05 | .67 | -.03 | .61 | .08 | -.02 | .02 | .04 | .03 | -.02 | .01 |
| .00 | -.08 | -.04 | .05 | | -.17 | .02 | .00 | -.03 | -.02 | .06 | -.02 | .01 | .03 | .02 | -.06 | -.01 | |
| .04 | .14 | .11 | .06 | | | .02 | .04 | .08 | .01 | .08 | -.01 | .02 | -.01 | -.01 | -.01 | -.02 | .00 |
| .04 | .01 | .01 | .07 | | | | .50 | .03 | .40 | .02 | .01 | .00 | .02 | .05 | .04 | -.02 | .03 |
| -.04 | .01 | .08 | .05 | | | | | .05 | .52 | .05 | .04 | .00 | .03 | .06 | .05 | .01 | .05 |
| .04 | .17 | .19 | .67 | | | | | | -.04 | .55 | .08 | .00 | .01 | .01 | .01 | .00 | -.02 |
| -.03 | .01 | .00 | -.03 | | | | | | | -.04 | .01 | .00 | .03 | .05 | .03 | .02 | .04 |
| .05 | .29 | .25 | .61 | | | | | | | | .07 | .00 | .03 | .04 | .02 | .02 | .01 |
| .00 | .01 | .03 | -.02 | | | | | | | | | .01 | .01 | .03 | .01 | .01 | .03 |
| -.01 | .01 | .02 | .02 | | | | | | | | | | .07 | -.07 | -.02 | -.04 | -.05 |
| -.04 | .02 | -.01 | .04 | | | | | | | | | | | .27 | .19 | .05 | .16 |
| -.04 | .01 | -.01 | .03 | | | | | | | | | | | | .61 | .08 | .30 |
| -.08 | -.01 | -.02 | .06 | | | | | | | | | | | | | .06 | .22 |
| .00 | .01 | .01 | -.02 | | | | | | | | | | | | | | .09 |
| -.04 | .00 | .00 | .01 | | | | | | | | | | | | | | — |

whereas the children who would benefit most from these practices are least likely to receive them.

Kindergarten transition practices were found to have a positive effect on parent-initiated school involvement, and this involvement was found to partially mediate the effect of transition practices on academic achievement. The link between parent involvement and improved school outcomes is well established (Hill et al., 2004; Izzo, Weissberg, Kasprow, & Fendrich, 1999; Kohl et al., 2000; Marcon, 1999), but the current findings represent the strongest evidence to date that schools' effort to increase parent-initiated

school involvement will have a positive impact on student academic outcomes. It is possible that transition practices help parents feel more comfortable at school, better informed of school activities, and aware of the importance of their involvement, which leads to increased parent-initiated school involvement and in turn to improved student achievement. In contrast, teacher-initiated parent involvement, as reported by teachers, was negatively associated with child outcomes. This finding is consistent with other research that identified a link between teacher-initiated parent involvement and negative child outcomes (Kohl et al., 2000). It is possible that teachers attempt to involve parents at school and

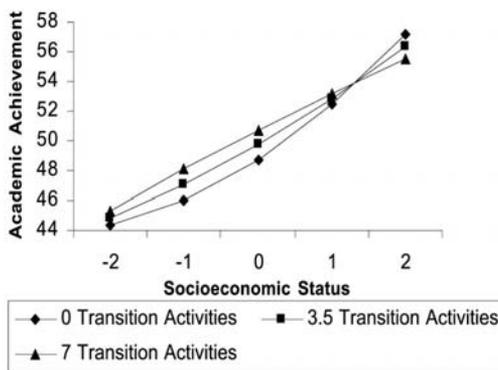


Figure 1. Predicted kindergarten achievement by socioeconomic status and transition practices.

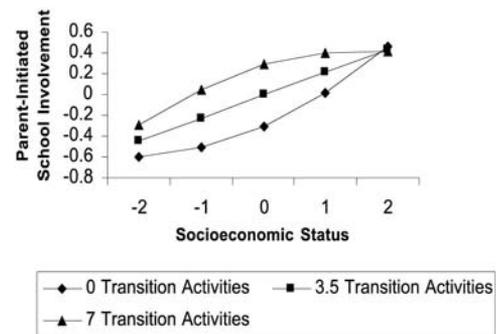


Figure 2. Predicted parent-initiated school involvement by socioeconomic status and transition practices.

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encourage them to attend meetings and conferences about their child's progress primarily after the child has displayed problems in school.

SES was also found to moderate the relation between transition practices and parent-initiated school involvement. Transition practices had a limited effect on the parent-initiated school involvement of both very rich and very poor parents, presumably for different reasons. Affluent parents had high levels of school involvement overall. It is unlikely that transition practices would significantly increase school involvement among this population, as affluent parents are already very involved at school. In contrast, impoverished parents demonstrated very low levels of school involvement overall. Transition practices were related to a slight increase in their involvement at school, perhaps by increasing parents' comfort at school or their knowledge of opportunities to become involved. However, it is likely that current transition practices do not adequately address the needs of this high-risk population or reduce the substantial barriers to their involvement, thus limiting the impact of transition practices on low-income parents' involvement. The strongest relation between transition practices and parent-initiated school involvement was found among parents with moderately low to moderately high incomes, indicating that current transition practices are most effective at encouraging involvement among the middle-class population.

Limitations and Future Directions

It is important to note the limitations to this study. This study used correlational data, not a randomized design; therefore, it is unclear whether transition practices played a causal role in improving the kindergarten outcomes identified in this study. It remains possible that an unmeasured third variable would have accounted for the effect of transition practices on both achievement and parent involvement. It is also possible that a school's use of transition practices is a proxy for other school factors such as good leadership, high-quality teachers, better home-school relations, or other practices that support student achievement and parent involvement. Future studies can address this limitation by measuring and accounting for relevant school-level factors that may contribute to student achievement and parent involvement or through a randomized intervention trial.

Although we were able to determine which transition practices were offered to students and families, it is not known whether families actually participated in the activities offered to them. It will be important for future studies to determine which transition practices were used by parents and children to measure the impact of individual practices on kindergarten outcomes.

The strongest test of the effect of kindergarten transition policies and practices would come from a randomized intervention design in which students are assigned to various combinations of transition interventions or a control group. Such a design would allow researchers to determine whether transition practices exert a causal impact, which transition practices have the greatest impact on kindergarten outcomes, and whether the same practices are equally efficacious for families from diverse socioeconomic or cultural backgrounds. It is possible that transition practices designed to meet the needs of low-income students, in particular practices that serve to improve the home-school relationship, will lead to even

better outcomes for this high-risk population (Pianta & Walsh, 1996).

Conclusions

The findings of the current study have important implications for education policy and efforts to improve the transition to kindergarten. The findings are that school transition practices are related to improved academic achievement and increased parent-initiated school involvement during kindergarten and that the impact of these practices is greatest for the low-income children who are least likely to receive them. Low-income children are at the greatest risk of school failure at kindergarten entry. In addition, low-income children are more likely to have parents who are not involved at school (Zill, 1999), and unfortunately, as demonstrated in this study, they are also more likely to attend a school that offers fewer transition practices. The findings of this study indicate that offering transition practices to high-risk children and families can have a substantial positive impact on academic achievement and parent-initiated school involvement during kindergarten. Furthermore, transition practices designed specifically to meet the needs of high-risk families might have an even greater positive effect on kindergarten outcomes, as current transition practices appear to be most effective with middle-class parents. This study supports the continued use of kindergarten transition practices to ease children's and families' transition to kindergarten and suggests that school transition policies should be expanded to focus on targeting low-income students and families.

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