BEYOND THE ABC’S AND 123’s:
THE EFFECT OF SOCIAL COMPETENCE ON
EARLY ACADEMIC ACHIEVEMENT

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Master of Arts
in Public Policy

By

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Washington, DC
April 6, 2010
The current educational culture in the U.S. of high-stakes testing and accountability standards has led to a focus on developing children’s academic skills as the primary determinants of school readiness and achievement. However emergent research linking social competence to school adjustment and positive academic outcomes demonstrates that a broader range of skills and behaviors supports optimal school success. The present study adds to this research by examining the effect of social competence at school entry on academic achievement at the end of first grade, while controlling for initial levels of academic achievement and individual, family background and school characteristics. The study utilizes data drawn from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, a nationally representative study sponsored by the National Center for Education Statistics (NCES). The construct of social competence is divided into two sets of skills—learning-related social skills and interpersonal social skills—and the differential effect of each set of skills on academic achievement is assessed.

The study found that students rated highly by their parents and teachers in learning-related social skills show significantly greater growth in reading and math achievement from the fall of kindergarten to the spring of first grade. These findings
suggest that policymakers should consider supporting educational policies and programs that seek to develop these learning-related social skills in children prior to school entry and in the early years of formal schooling in order to set children on favorable academic and social courses and promote the attainment of optimal academic success.
ACKNOWLEDGEMENTS

I would like to thank the Georgetown Public Policy Institute for providing me with the opportunity to pursue my Master’s degree in Public Policy. I would like to thank my thesis advisor, Priscilla Carver, for her dedicated guidance in this endeavor. And I would like to thank Jeffrey, Cynthia and Meredith Forster and Nathaniel Jutras for their encouragement and loving support during this challenging but rewarding process.

Many thanks,

Hilary C. Forster
Table of Contents

Abstract ........................................................................................................................................... ii
Acknowledgements .......................................................................................................................... iv
List of Tables and Figures ................................................................................................................. vi
I. Introduction ...................................................................................................................................... 1
II. Literature Review .......................................................................................................................... 4
   A. Social Competence and Academic Achievement ................................................................. 4
      a. Learning-Related Skills and Academic Achievement ...................................................... 6
      b. Interpersonal Skills and Academic Achievement .......................................................... 8
   B. Other Factors Influencing Academic Achievement ............................................................. 9
      a. Individual Characteristics ................................................................................................. 10
      b. Family Background Characteristics .............................................................................. 11
      c. School Characteristics ...................................................................................................... 12
   C. Current Study ......................................................................................................................... 13
III. Conceptual Framework and Hypothesis ...................................................................................... 14
IV. Data and Methods ........................................................................................................................ 15
   A. Data and Participants ............................................................................................................. 15
   B. Data Collection Procedures ................................................................................................. 18
   C. Measures ............................................................................................................................... 19
   D. Missing Data ........................................................................................................................ 23
   E. Analysis Plan ........................................................................................................................ 25
   F. Study Limitations ................................................................................................................... 27
V. Results ............................................................................................................................................ 29
   A. Descriptive Results ............................................................................................................... 29
   B. Regression Results ............................................................................................................... 32
      a. Results Pertaining to Reading Academic Achievement ................................................ 33
      b. Results Pertaining to Mathematics Academic Achievement ....................................... 36
VI. Discussion .................................................................................................................................... 40
Appendix A. Survey Items Composing Study Scales ...................................................................... 49
Bibliography ..................................................................................................................................... 51
List of Tables and Figures

Exhibit 1. Study Conceptual Model ................................................................. 14

Table 1. Characteristics of Study Sample: Categorical Variables...................... 17
Table 2. Characteristics of Study Sample: Continuous Variables......................... 18
Table 3. Cronbach’s Alphas for Scales ................................................................. 23
Table 4. Logit Regression Model Relating Sample Characteristics to Missing Data in the
Dependent Variable .......................................................................................... 25
Table 5. Mean, Standard Error, Range, and Number for Control and Independent Variables 29
Table 6. Mean, Standard Error, Range, and Number for Dependent Variables .............. 30
Table 7. Correlations Among the Independent Variables ........................................ 31
Table 8. Correlations Among the Dependent Variables ........................................ 31
Table 9. Correlations Among the Dependent and Independent Variables .................... 32
Table 10. OLS Regression Model Relating Social Skills and Control Variables to Reading
Academic Achievement ...................................................................................... 35
Table 11. OLS Regression Model Relating Social Skills and Control Variables to Math Academic
Achievement ........................................................................................................ 38
I. Introduction

The current No Child Left Behind era of high-stakes testing and accountability standards has led to an emphasis on academic skills for determining school readiness and the primary focus of school curricula. Those that support this emphasis assert that the acquisition of knowledge in mathematics, reading, and writing, and the mastery of basic skills are the primary determinants of positive academic outcomes (Vecchiotti, 2003).

Others, however, maintain that a broader range of skills and behaviors enables children to achieve optimal success in school. Specifically, growing research linking social competence to school adjustment and subsequent academic achievement makes a compelling case for greater attention to the social and emotional development of children (McClelland, Morrison, & Holmes, 2000). In a National Center for Early Development and Learning survey, 46% of kindergarten teachers reported that more than half of the children in their classes lacked the self-regulatory skills and emotional and social competence to function productively and learn (Webster-Stratton, Reid, & Stoolmiller, 2008). An extensive review on the long-term trajectories of children with low social acceptance found that peer rejection stemming from poor social and self-regulatory skills is significantly related to low academic achievement and a strong predictor of students dropping out of school (Patrick, 1997). These findings, along with recent increases in emotion-related illnesses, behavior problems, bullying, and school violence, further bolster the case for devoting increased attention to and resources for developing children’s social and emotional competencies.
Early schooling is of particular interest in this debate. Kindergarten is traditionally children’s first organized educational experience in a formal school context. Therefore kindergarten has been identified as offering a “window of opportunity” before achievement trajectories are fully established when good classroom adjustment can help place children on favorable academic and social courses that tend to persist (Alexander, Entwisle, & Dauber, 1993). Social competence, which encompasses traits such as good attention, self-regulatory, communication and interpersonal skills (Meisels, Atkins-Burnett, & Nicholson, 1996), has been found to facilitate such early school adaptation. This, in turn, sets the stage for increased participation in and attention to school tasks, and, consequently, higher academic achievement (Ladd, Birch, & Buhs, 1999). Thus it appears that a socially competent child is poised to benefit from the opportunities for learning and growth offered in the early school years.

This study examines the effect of social competence at school entry on academic achievement at the end of first grade after controlling for initial levels of academic achievement and individual, family background and school characteristics. The study uses data drawn from an existing data set, the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K), a nationally representative study sponsored by the National Center for Education Statistics (NCES). The ECLS-K measures of social competence are divided into two distinct sets for analyses—those that represent learning-related social skills and those that represent interpersonal social skills. Learning-related social skills include the child’s attentiveness, task persistence, eagerness to learn, learning independence, organization, and self-regulation. Interpersonal social skills include the
child’s skill in forming and maintaining friendships, comforting or helping other children, and expressing feelings, ideas and opinions in positive ways. This study assesses the differential effect of each set of skills on academic achievement.

While prior research has consistently demonstrated a significant association between learning-related social skills and higher academic achievement, the research regarding the association between interpersonal skills and academic achievement is more variable. Some studies identify a significant association (Ladd et al., 1999) and others find no significant effect of interpersonal skills on academic outcomes (Claessens, Duncan, & Engel, 2009; Duncan, Claessens, Huston, Pagani, Engel, Sexton, Dowsett, Magnuson, Klebanov, Feinstein, Brooks-Gunn, & Duckworth, 2007). The current study contributes to this body of research. The expectation is that both the learning-related and interpersonal social skills comprising social competence at school entry will be significantly associated with the attainment of higher academic achievement in first grade, with the learning-related skills exhibiting a stronger effect.

Understanding which skills are linked to children’s academic achievement has important implications for both early childhood programs intended to support school readiness and the structure and content of school curricula. By exploring the effect of social competence on early academic achievement, the current study seeks to contribute to the literature concerning how to most effectively support children in attaining optimal academic success, and to ascertain whether supporting the development of social competence in children merits espousal as a strategy to promote academic achievement.
II. Literature Review

Social competence has been conceptualized in a wide variety of ways in social development research. Some researchers conceptualize social competence as a specific set of desirable social skills and employ behavior checklists to identify competent children. Others assess competence by a child’s peer status, or popularity, and the quality of relationships he or she forms. Still other researchers adopt a functional approach and define social competence as the ability to set and fulfill social goals and tasks. Despite the range of operational definitions, a recurring theme that emerges across the definitions as a central aspect of social competence is effectiveness in interaction (Rose-Krasnor, 1997).

Social competence in young children is typically defined as the ability to pay attention, inhibit impulsive behaviors, develop and maintain interpersonal relationships, and make appropriate social judgments and act accordingly (Duncan et al., 2007; Meisels et al., 1996). The definition of social competence in this study is based on the one delineated by Meisels and colleagues in a paper prepared for the National Center of Education Statistics (NCES) to inform the design of the Early Childhood Longitudinal Study (ECLS), from which the data employed in this study is drawn. Meisels and colleagues define social competency as “those skills and behaviors of a child that lead to positive social outcomes with the individuals residing in a given setting and that avoid socially unacceptable responses” (Meisels et al., 1996, p. 4).

A. Social Competence and Academic Achievement

A robust body of research over the past two decades has demonstrated the link between children’s social competencies and early academic achievement (Raver, 2003).
Generally this research has found that the constellation of skills present in socially competent children—including attentiveness, development of positive relationships with peers and teachers, regulation of emotions, and appropriate classroom participation—is associated with higher academic achievement (Ladd, Kochenderfer, & Coleman, 1997; O’Neil, Welsh, Parke, Wang, & Strand, 1997; Ladd et al., 1999). This evidence indicates that social competencies are integral to children’s success in early academic contexts.

Recent research has divided the construct of social competence into two sets of skills—learning-related social skills and interpersonal social skills—and assessed the differential effect of each set of skills on children’s academic outcomes. Learning-related social skills are identified in the research as those that tap the domains of independence, responsibility, organization, attention and self-regulation (McClelland & Morrison, 2003). Studies have demonstrated a consistent significant association between learning-related social skills and higher academic achievement (Alexander et al., 1993; Duncan et al., 2007). Interpersonal social skills encompass actions that contribute to the development and maintenance of friendships, such as interacting positively with peers, sharing, and respecting other children. Interpersonal skills also include the ability to express feelings, ideas and opinions in positive ways. The research regarding the association between interpersonal skills and academic achievement is more variable, with some studies identifying a significant association (Ladd et al., 1999; Miles & Stipek, 2006) and others finding no significant effect of interpersonal skills on academic outcomes (Duncan et al., 2007; Claessens et al., 2009). I examine the literature on the two sets of social-emotional skills in more detail below.
a. **Learning-Related Skills and Academic Achievement**

Studies have demonstrated a consistent significant association between learning-related social skills and higher academic achievement. These same studies tend to find no association between interpersonal skills and academic achievement; thus they underscore learning-related social skills as the strongest predictors of positive academic outcomes.

One such study was conducted by Duncan and his colleagues (2007). The researchers conducted a meta-analysis with six longitudinal data sets, including the ECLS-K, to estimate the link between key elements of school readiness—identified as school-entry academic, attention-related skills, and socioemotional skills—and later reading and math achievement. Across all six data sets, the strongest predictors of later achievement were children’s school-entry math, reading, and attention-related skills. The researchers found that socioemotional behaviors, which included interpersonal skills, were not predictive of later academic performance. The authors suggested that these results may have been due to lower validity of socioemotional measures (e.g., socioemotional skills are more difficult to measure than achievement skills).

Alternatively they proposed that socioemotional skills may matter more for other school-related outcomes, such as special education classification, than for test scores.

A study by Claessens, Duncan, and Engel (2009) also demonstrated a significant association between learning-related skills and academic achievement while refuting the presence of a link between achievement and interpersonal social skills. The researchers conducted regression analyses using data from the ECLS-K to estimate the power of academic, attention-related and socioemotional skills to predict fifth-grade school
achievement. They found significant predictive power for school-entry academic skills and kindergarteners’ capacity to pay attention. Their analyses yielded virtually no evidence that socioemotional skills in kindergarten predict fifth grade achievement. This finding held for kindergarteners as a whole, among disadvantaged population subgroups, and among children scoring the lowest on the socioemotional indicators.

A third study reached similar conclusions when examining the effects of learning-related social skills on school performance over a four-year period for a panel of first graders randomly selected from public elementary schools in Baltimore City (Alexander et al., 1993). Teachers used a measure adapted from the National Survey of Children to rate children’s socioemotional skills along three domains: Interest-Participation (I-P), Cooperation-Compliance (C-C), and Attention Span-Restlessness (A-R). Academic performance was measured using children’s report cards and scores on the reading and mathematics subtests of the California Achievement Test (CAT). Outcomes were evaluated at the end of the first, second, and fourth years in elementary school.

Using regression analyses the authors found that learning-related skills, as captured in the Interest-Participation (I-P) and Attention Span-Restlessness (A-R) scales, had significant effects on academic performance in the first year, with the I-P domain continuing to play a role in performance outcomes in subsequent years. Interpersonal skills, as measured by the Cooperation-Compliance (C-C) scale, had no effect on academic performance in any of the three years.
b. Interpersonal Skills and Academic Achievement

Despite the findings of the above studies, several studies have identified a significant association between interpersonal social skills and higher academic achievement. This association appears to stem from the facilitative and protective roles interpersonal social skills play in children’s early academic experiences. Findings from studies that demonstrate these two roles are described below.

A study by Ladd, Birch and Buhs (1999) found that interpersonal skills facilitated classroom adaptation and participation, which in turn promoted higher academic achievement. A sample of 200 full-day kindergarteners from urban and rural communities in the mid-western United States were rated on peer acceptance, number of mutual friendships, quality of relationship with their teacher, and classroom participation by trained observers. The participants were also administered the Visual and Quantitative composites of the Metropolitan Readiness Tests (MRT) at the end of kindergarten to assess academic achievement.

The authors found that children with prosocial behavioral styles tended to develop a larger number of mutual friends, higher levels of peer acceptance and stronger relationships with their teachers, as well as more adaptive classroom participation styles. Direct links were identified between children’s classroom relationships and participation and higher academic achievement. Thus interpersonal factors in the kindergarten setting, namely behavioral styles and peer and teacher-child relationships, emerged as important antecedents of achievement.
A longitudinal study conducted by O’Neil and colleagues (O’Neil et al., 1997) demonstrated that interpersonal skills, and the social acceptance they yielded, serve as protective factors buffering children from early academic difficulty. The researchers followed a sample of 548 children from eight public elementary schools in a southern California district from kindergarten through second grade. The children’s sociometric status was assessed once each year in kindergarten, first, and second grade using peer-based assessments of social acceptance. Indicators of academic performance and school adjustment were derived from report cards in first and second grades, and from achievement test scores from the California Test of Basic Skills (CTBS) in language/writing and mathematics in second grade. Analysis of variance (ANOVA) was used to examine differences in the academic performance of children by sociometric status.

The study found that lower levels of social acceptance in kindergarten were predictive of deficits in classroom social skills and work habits and lower academic performance in the first and second grade. In comparison, stable social acceptance appeared to buffer children from early academic difficulty. Children classified as popular displayed the highest academic performance on average. These findings remained significant after controlling for initial kindergarten academic competence.

B. Other Factors Influencing Academic Achievement

Factors other than social competence have been shown to influence academic achievement. Specifically, previous research studies have identified individual, family
background and school characteristics that are associated with higher or lower academic outcomes.

\textit{a. Individual Characteristics}

Individual characteristics that have been identified by previous research studies as influencing academic outcomes include: gender, age at school entry, cognitive skills at school entry, presence of a learning disability, and participation in Head Start prior to kindergarten. Research has shown that boys do not fare as well as girls in school performance during the first few years of school due to adjustment and behavioral differences (Patterson, Kupersmidt, & Vaden, 1990; Gibb, Fergusson, & Horwood, 2008). Younger age at school entry has been linked to poorer academic and social outcomes due to differences in maturation or cognitive development. Research also indicates that the presence of a learning disability is associated with lower academic achievement (Lackaye & Margalit, 2006).

Children’s cognitive skills before they enter kindergarten have been identified as significantly associated with higher achievement in elementary and high school. Genetic influences and cognitive stimulation prior to school entry appear to make important contributions to individual differences in verbal, spatial, perceptual speed, and memory abilities (Shonkoff & Phillips, 2000; Thompson, Detterman, & Plomin, 1991). Participation in center-based preschool programs, such as Head Start, is also associated with increases in school achievement, particularly for children from low-income families (Barnett, 1995; Fantuzzo, Rouse, McDermott, Sekino, Childs & Weiss, 2005; Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan, & Yazejian, 2001).
b. Family Background Characteristics

Research has demonstrated that certain family background characteristics exert a significant influence on academic achievement; these characteristics include: socioeconomic status, parent education levels, race/ethnicity, family structure, and parenting factors (parental warmth, parental cognitive stimulation, and maternal depression). Research indicates that children living in low-income households are more likely to demonstrate early and persistent school difficulties, including poor academic performance, grade retention, and emotional/behavioral problems (Fantuzzo et al., 2005). In contrast, research has found a significant association between high socioeconomic status and high intellectual, academic, and personal-social development (Guidubaldi & Perry, 1984). Being of minority ethnic status has been identified as heightening the risk of disturbances in peer relations, and as associated with higher incidences of behavior problems and lower academic achievement in school (Stevenson, Chen, & Uttal, 1990; Weiher & Tedin, 2006; Patterson et al., 1990).

Evidence suggests that children from intact families, or two-parent households, obtain higher academic outcomes than those from single-parent households; parental divorce and subsequent parental absence appear to hamper children’s academic progress (Jeynes, 2005; Boyd & Parish, 2001). Lower levels of parental education have similarly been identified as predicting poorer math and reading achievement in the early grades (Flower & Cross, 1986).

Research has demonstrated that several aspects of parenting significantly impact early developmental outcomes for children, including academic outcomes. Parental
warmth and involvement are important correlates of early cognitive outcomes (Shonkoff & Phillips, 2000; Pettit, Bates, & Dodge, 1997). Parental behaviors that explicitly encourage learning (also referred to as cognitive stimulation), such as reading to or playing number games with their child, show strong associations with early literacy and numeracy skills and later academic achievement (Shonkoff & Phillips, 2000). Research has also found that a mother’s psychological well-being influences the academic outcomes of her children. Maternal depression has been linked to child adjustment problems for children of all ages, with children of depressed mothers tending to have more behavior problems, develop more problematic peer relations at school, and have significantly more academic difficulty (Wright, George, Burke, Gelfand, & Teti, 2000).

c. School Characteristics

Participation in full-day versus half-day kindergarten programs has been identified as having a significant effect on achievement trajectories. Specifically, research studies have shown that full-day kindergarten confers initial benefits on academic achievement. A meta-analysis of studies that examined academic outcomes for students who attended every-day full-day kindergarten versus those who attended half-day kindergarten found that the former achieved at a higher level (Fusaro, 1997).

Thus it is clear factors other than social competence—namely individual, family background, and school characteristics—significantly influence academic achievement. The present study, however, is specifically interested in social competence, and the learning-related and interpersonal social skills that comprise the construct, in relation to
academic achievement. Therefore individual, family background, and school factors are controlled for in this study.

C. Current Study

The current study extends the body of research that differentiates between learning-related and interpersonal social skills when examining the effect of early social competence on academic achievement. In this way the study moves beyond research that concentrates on the effect of social behavior in general to examine specific aspects of social behavior that are chiefly relevant to school performance. Also, by focusing on the effect of social competence, a positive trait, this study contributes to the literature that examines the influence of child strengths on academic achievement. Such literature has historically been overshadowed by the research examining the effect of negative criteria or developmental problems on academic outcomes (Masten, Herbers, Cutuli, & Lafavor, 2008).
III. Conceptual Framework and Hypothesis

It is expected that the presence of social competence at school entry will lead to higher academic achievement in first grade. Specifically, it is hypothesized that both the learning-related and interpersonal social skills comprising social competence at school entry will be significantly associated with the attainment of higher academic achievement in first grade, with the learning-related skills exhibiting a stronger effect. The theoretical model underpinning this hypothesis is presented below (see Exhibit 1); it illustrates the expected relationship among the control, independent and dependent variables.

Exhibit 1. Study Conceptual Model
IV. Data and Methods

A. Data and Participants

Data for this study is drawn from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K). The ECLS-K was sponsored by the National Center for Education Statistics (NCES) of the U.S. Department of Education. The ECLS-K study followed a nationally representative sample of children from kindergarten through eighth grade in order to study children’s cognitive and social development. Participants came from public and private schools, full-day and part-day kindergarten programs, and diverse socioeconomic and racial/ethnic backgrounds. The children's parents, teachers, and schools also participated in the study.

A multistage probability sample design was utilized to construct the ECLS-K sample. The primary sampling units (PSU) were geographic areas consisting of counties or groups of counties, from which 1,280 public and private schools offering kindergarten programs were selected (Judge, 2005). A stratified sample data structure was followed, with schools first sampled and then a fixed number of students sampled within each school. Asian/Pacific Islanders, private kindergarten programs, and Head Start children were oversampled.

Data collection began in the 1998-99 school year, when the sampled children were in kindergarten. Data was collected in the fall and spring from approximately 21,000 kindergartners from about 1,000 kindergarten programs. Information was then collected in the fall and spring of first grade (1999-2000), the spring of third grade (2002), the spring of fifth grade (2004), and the spring of eighth grade (2007).
The current study only uses child, parent and teacher data from the kindergarten fall and spring rounds of data collection, and the first grade spring round of data collection. Only participants for whom there is social competence data at school entry (fall kindergarten), and academic achievement data at the end of first grade (spring first grade) are included in this study.

Restricting the sample in this way yields a sample size of 10,919 children for this study (as compared to the full ECLS-K sample of 21,409 children); when weighted, the sample represents 2,958,424 children nationally. The sample is about evenly split between males (50.99%) and females (49.01%). A majority of the children are White (63.23%), with the next largest racial/ethnic groups Black or African American (16.55%) and Hispanic (13.17%). The average SES for the sample is 0.001 (as measured by a composite variable that ranges from -3 to 3), so just about equivalent to the national average in 2000, the time of data collection. The majority of the children come from two-parent households (69.65%).

The average age at school entry was 65.66 months, or just over 5 years old, with more children in the sample attending full-day kindergarten programs (55.81%) than half-day programs (44.19%, morning or afternoon programs). Also, most children in this study’s sample do not have an identified learning disability (84.69%) and did not attend Head Start (83.41%). Tables 1 and 2 present the descriptive statistics for the variables that represent individual, family background, and school characteristics of the study sample.
Table 1. Characteristics of Study Sample: Categorical Variables

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>National Estimates</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage Distribution</td>
<td>Standard Error</td>
</tr>
<tr>
<td><strong>Total Number of Cases in Subset Sample</strong></td>
<td>2,958,424</td>
<td>100%</td>
<td>--</td>
</tr>
<tr>
<td><strong>Student’s sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1,508,576</td>
<td>50.99%</td>
<td>0.006</td>
</tr>
<tr>
<td>Female</td>
<td>1,449,848</td>
<td>49.01%</td>
<td>0.006</td>
</tr>
<tr>
<td><strong>Student’s race/ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1,870,840</td>
<td>63.23%</td>
<td>0.02</td>
</tr>
<tr>
<td>Black or African American</td>
<td>489,476</td>
<td>16.55%</td>
<td>0.01</td>
</tr>
<tr>
<td>Hispanic</td>
<td>389,545</td>
<td>13.17%</td>
<td>0.01</td>
</tr>
<tr>
<td>Asian</td>
<td>62,361</td>
<td>2.11%</td>
<td>0.002</td>
</tr>
<tr>
<td>Other</td>
<td>146,202</td>
<td>4.94%</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Presence of a learning disability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>452,978</td>
<td>15.31%</td>
<td>0.005</td>
</tr>
<tr>
<td>No</td>
<td>2,505,446</td>
<td>84.69%</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>Participation in Head Start</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>490,856</td>
<td>16.59%</td>
<td>0.01</td>
</tr>
<tr>
<td>No</td>
<td>2,467,568</td>
<td>83.41%</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Participated in half-day or full-day kindergarten program</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half-day</td>
<td>1,307,464</td>
<td>44.19%</td>
<td>0.03</td>
</tr>
<tr>
<td>Full-day</td>
<td>1,650,960</td>
<td>55.81%</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Family structure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>2,060,667</td>
<td>69.65%</td>
<td>0.01</td>
</tr>
<tr>
<td>Separated</td>
<td>147,934</td>
<td>5.00%</td>
<td>0.003</td>
</tr>
<tr>
<td>Divorced</td>
<td>283,466</td>
<td>9.58%</td>
<td>0.003</td>
</tr>
<tr>
<td>Widowed</td>
<td>28,312</td>
<td>0.96%</td>
<td>0.001</td>
</tr>
<tr>
<td>Never married</td>
<td>438,045</td>
<td>14.81%</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Note: All weighted percents are based on an estimated 2,958,424 children who were in the first grade in the spring of 2000.
Table 2. Characteristics of Study Sample: Continuous Variables

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>Standard Error</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic status</td>
<td>0.001</td>
<td>0.02</td>
<td>-2.96 – 2.88</td>
</tr>
<tr>
<td>Age at school entry</td>
<td>65.66</td>
<td>0.08</td>
<td>54 – 79 months</td>
</tr>
</tbody>
</table>

Note: All weighted means are based on an estimated 2,958,424 children who were in the first grade in the spring of 2000. * Higher scores indicate higher levels of the characteristic being measured.

B. Data Collection Procedures

The ECLS-K assessed children’s cognitive and social/emotional development through direct and indirect methods. In kindergarten and first grade, the direct child assessment was un-timed and conducted one-on-one, and collected information about children's reading, mathematics, and general (i.e., science and social studies) knowledge. Parent and teacher ratings of children’s cognitive and social/emotional development comprise the indirect child assessments. To collect information from parents, a trained interviewer conducted computer-assisted telephone interviews (CATI) or, if the child's family did not have a telephone, in-person interviews. Teachers completed paper and pencil surveys to provide information for each sampled child on cognitive and social/emotional dimensions.

In the kindergarten year, child assessments, parent interviews, and teacher questionnaires were conducted in the fall and spring. In the first-grade year, the ECLS-K conducted child assessments and parent interviews for a 30 percent sub-sample in the fall. In the spring, the full sample of children, parents, and teachers participated. Also, the spring child sample was freshened to include current first-graders who had not been
enrolled in kindergarten in 1998–99 and who, therefore, had no chance of being included in the ECLS-K base-year kindergarten sample.

The weighted child-level completion rates for the spring-first grade data collection across all school types are as follows: the child assessments were completed at an overall rate of 88%; the parent interviews were completed at an overall rate of 84.5%; and all three of the teacher questionnaires were completed at an overall rate of approximately 78%. These rates pertain to children who were sampled as part of the kindergarten cohort in the base year. Some degree of attrition is expected in longitudinal studies due to participant nonresponse, inability to track participants that move, or changes in participant eligibility status. The attrition in the spring first grade sample was primarily due to children moving, particularly if they moved outside of the sampled PSU.

C. Measures

*Social Competence*: The study’s independent variable, children’s social competence at school entry, is measured through parent and teacher ratings of children on the Social Skills Rating System (SSRS), which was adapted for use in the ECLS-K. Parents and teachers completed survey items that compose the Approaches to Learning scale, which measures both attention skills and achievement motivation. Teachers also completed the Interpersonal Skills scale and parents completed the Social Interaction scale, both of which measure a child’s skill in forming and maintaining friendships, including the ability to get along with people who are different, comfort other children, and express emotions and opinions in positive ways. Each item in each scale is scored from 1-4, with 1 indicating the child never exhibits the behavior in question and 4
indicating the child exhibits the behavior very often. When NCES adapted the scales for use in the ECLS-K, factor analyses (both exploratory analyses and confirmatory factor analyses using LISREL) were conducted to confirm the scales. The reliabilities for the scales in the fall kindergarten data collection round are as follows: 0.89 for the teacher-rated Approaches to Learning scale; 0.89 for the teacher-rated Interpersonal Skills scale; 0.68 for the parent-rated Approaches to Learning scale; and 0.70 for the parent-rated Social Interaction scale.

Academic Achievement: The study’s dependent variable, children’s academic achievement in the spring of first grade, is captured through direct cognitive assessments of children’s mathematics and reading skills at the end of first grade. The mathematics assessment evaluated skills such as concepts of numbers and use of math strategies; the reading assessment measured language and literacy skills, including proficiency in reading and writing.

This study uses the child assessment scores based on Item Response Theory (IRT). The range of values for the math IRT scores is 0-174, and the range of values for the reading IRT scores is 0-212. The IRT scale scores represent estimates of the number of items children would have answered correctly at each point in time if they had taken all of the 212 questions in all of the first- and second-stage reading forms administered in all data collection rounds, and the 174 questions in all of the mathematics forms. The reliability of the IRT-based scores for the math and reading assessments conducted in the spring of first grade are 0.96 and 0.94, respectively.
Control Measures: In order to isolate the effect of social competence on academic achievement, this study controls for a number of individual, family background, and school-level factors. The factors that are controlled for are as follows:

- **Gender**
- **Age at school entry**: Age of participant when he/she entered kindergarten; values range from 54 to 79 months.
- **Participation in half-day or full-day kindergarten**: Participant attends or attended a half-day (morning or afternoon) or full-day kindergarten program.
- **Cognitive skills at school entry**: Participant’s IRT scores from direct cognitive assessments of mathematics and reading skills at school entry (fall kindergarten). The range of values for the math IRT scores is 0-174; the range of values for the reading IRT scores is 0-212.
- **Presence of a learning disability**: Participant has a disability diagnosed by a professional.
- **Participation in Head Start**: Participant ever attended Head Start.
- **Socioeconomic status**: Socioeconomic status of participant’s family as measured by a continuous variable for the SES composite that ranges from -3 to 3; the SES composite is the average of up to five measures (mother’s education, father’s education, mother’s occupation, father’s occupation, and household income), each of which was standardized to have a mean of 0 and a standard deviation of 1. The SES variable reflects the socioeconomic status of the household at the time of data collection for spring-first grade (spring 2000).
• **Race/ethnicity**: Participant’s race/ethnicity; categories are White, Black or African American, Hispanic\(^1\), Asian, or other (which includes Native Hawaiian, other Pacific Islander, American Indian, Alaska Native, and participants who identified as more than one race).

• **Family structure**: Whether participant comes from a one-parent or two-parent household; the categories include married, separated, divorced, widowed, and never married.

• **Parental warmth**: Parental expression of physical affection, and positive discussion and interaction with his/her child, as measured by survey items that compose a scale (Cronbach’s \(\alpha = 0.95\)).\(^2\) Respondents are asked to indicate how true each item is with regards to their relationship with their child. Each item is scored on a scale of 1-4 (1 = *completely true*, 4 = *not at all true*). The composite variable, composed of 13 items, ranges from 1-52.

• **Parental cognitive stimulation**: Parental behaviors that promote children’s learning and understanding of the world around them, as measured by survey items that compose a scale (Cronbach’s \(\alpha = 0.80\)).\(^2\) Respondents are asked to indicate how often they do the following activities with their child in a typical week. Each item is scored on a scale of 1-4 (1 = *not at all*, 4 = *every day*). The composite variable, composed of seven items, ranges from 1-28.

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\(^1\) Note that the Hispanic category includes both participants coded as “Hispanic, race specified” and participants coded as “Hispanic, race not specified” in the ECLS-k data set.

\(^2\) See Appendix A for a list of the survey items that comprise the parental warmth, parental cognitive stimulation, and maternal depression scales.
• **Maternal depression**: Presence of maternal depression, as measured by survey items that compose a scale (Cronbach’s α = 0.97). \(^2\) Respondents are asked to indicate how often in the past week they have felt or behaved in the way described by the survey item. Each item is scored on a scale of 1-4 (1 = never, 4 = most of the time). The composite variable, composed of 12 items, ranges from 1-48.

As indicated above, the variables for parental warmth, parental cognitive stimulation and maternal depression are composite variables; each represents several survey items that compose a scale to measure that particular latent construct. \(^3\) Cronbach’s alpha, a coefficient of consistency, was run for each scale to confirm that the set of items that compose the scale do indeed “hang together”. As Table 3 presents, the Cronbach’s alpha for each scale is above 0.80, indicating each scale is a valid measure of the latent construct it is intended to measure.

<table>
<thead>
<tr>
<th>Scale and Items</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental Warmth</td>
<td>0.95</td>
</tr>
<tr>
<td>Parental Cognitive Stimulation</td>
<td>0.80</td>
</tr>
<tr>
<td>Maternal Depression</td>
<td>0.97</td>
</tr>
</tbody>
</table>

### D. Missing Data

The sub-sample from the full ECLS-K data set analyzed for this study is composed of those participants for whom there is social competence data at school entry.

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\(^2\) See Appendix A for a list of the survey items that comprise the parental warmth, parental cognitive stimulation, and maternal depression scales.
(fall kindergarten), and academic achievement data at the end of first grade (spring first grade). Therefore the sample excludes participants added to the spring first grade child sample for freshening due to the lack of school entry data for these participants. Also, approximately 22% of the participants in the sample of interest are missing data for the study’s dependent variable (the spring first-grade academic achievement measures). These cases are excluded from the study’s sample.

The significant amount of missing data in the dependent variable is a limitation of this study. An analysis was conducted to determine whether the presence of data for the dependent variable differs based on selected characteristics of the sample (i.e., by gender, race/ethnicity, child age or socioeconomic status). Results from the logistic regression relating sample characteristics to missing data in the dependent variable are presented in Table 4. The only sample characteristics with a statistically significant negative effect are the presence of a learning disability the attendance of Head Start. These findings are reasonable given that some children in the ECLS-K sample could not be administered the ECLS-K direct cognitive battery due to a disability or because they were not proficient in English. During the 2002-2003 program year, 30.6% of the Head Start enrollment consisted of Hispanic/Latino children, and 12.5% consisted of children with disabilities; these enrollment characteristics help to explain why attendance of Head Start is significantly associated with missing data in the dependent variable (Head Start Program Fact Sheet Fiscal Year 2004).
Table 4. Logit Regression Model Relating Sample Characteristics to Missing Data in the Dependent Variable

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Unstandardized Regression Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>-0.11</td>
<td>0.12</td>
<td>0.34</td>
</tr>
<tr>
<td>Black</td>
<td>-0.005</td>
<td>0.23</td>
<td>0.98</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.01</td>
<td>0.16</td>
<td>0.94</td>
</tr>
<tr>
<td>Asian</td>
<td>-0.28</td>
<td>0.28</td>
<td>0.33</td>
</tr>
<tr>
<td>Separated</td>
<td>-0.04</td>
<td>0.27</td>
<td>0.87</td>
</tr>
<tr>
<td>Other Race</td>
<td>-0.20</td>
<td>0.32</td>
<td>0.54</td>
</tr>
<tr>
<td>Divorced</td>
<td>-0.32</td>
<td>0.20</td>
<td>0.11</td>
</tr>
<tr>
<td>Widowed</td>
<td>1.00</td>
<td>0.66</td>
<td>0.13</td>
</tr>
<tr>
<td>Never married</td>
<td>0.13</td>
<td>0.22</td>
<td>0.56</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>-0.01</td>
<td>0.09</td>
<td>0.90</td>
</tr>
<tr>
<td>Attended Head Start</td>
<td>-0.31</td>
<td>0.14</td>
<td>0.02*</td>
</tr>
<tr>
<td>Attended full-day kindergarten program</td>
<td>-0.02</td>
<td>0.16</td>
<td>0.92</td>
</tr>
<tr>
<td>Presence of a learning disability</td>
<td>-0.36</td>
<td>0.14</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

* Statistically significant (p<0.05)

The control and independent variables for the study have very minor amounts of missing data in the restricted sample, ranging from no missing data to just over 2% missing data. This is a very small amount of sample loss that will not affect the study’s estimates or standard errors.

E. Analysis Plan

Multiple regression analyses were conducted to examine the effect of social competence at school entry on academic achievement at the end of first grade. Multiple regression analyses indicate the strength of the independent variables (social competence learning-related skills and interpersonal skills) in predicting the dependent variable.
(academic achievement in the spring of first grade), while holding a number of factors constant. From these findings, the presence or lack of a causal relationship between the independent and dependent variables can be inferred. The expectation was that both the learning-related and interpersonal social skills comprising social competence at school entry would be significantly associated with the attainment of higher academic achievement in first grade, with the learning-related skills exhibiting a stronger effect.

The method of ordinary least squares (OLS) was applied to estimate the regression models using the statistical analysis software STATA. Under the Gauss-Markov assumptions, OLS produces the best linear unbiased estimates of the effect of the independent variable on the dependent variable (Wooldridge, 2006). To adjust for attrition and for the oversampling of certain types of schools and students, longitudinal weights calculated by NCES were applied when conducting analyses; this renders the results of this study generalizable to the nation’s kindergarteners. In addition, special procedures for estimating the statistical significance were employed because the data were collected using a complex sampling design. Complex sampling designs result in data that violate some of the assumptions that are normally made when assessing the statistical significance of results from a simple random sample. The OLS regressions that were run appear below. (Note that each control variable was entered as a separate term in the regression equations; the controls are listed below as one term in the equations for simplicity.)
Math academic achievement = $\beta_0 + \beta_1$ teacher-rated learning skills + $\beta_2$ teacher-rated interpersonal skills + $\beta_3$ parent-rated learning skills + $\beta_4$ parent-rated interpersonal skills + $\beta_5$ controls

Reading academic achievement = $\beta_0 + \beta_1$ teacher-rated learning skills + $\beta_2$ teacher-rated interpersonal skills + $\beta_3$ parent-rated learning skills + $\beta_4$ parent-rated interpersonal skills + $\beta_5$ controls

**F. Study Limitations**

The ECLS-K data set was chosen for this study because of its recognition of the importance of factors that represent children’s socioemotional and intellectual development, and the public availability of the data files. However there are limitations to utilizing this data set. Individual items from several assessments used in the ECLS-K are not available for review due to copyright protections. This includes the Social Skills Rating Scale (SRS), which was adapted from the Social Skills Rating Scale (Gresham and Elliott, 1990), and the ECLS-K direct child assessment, which was adapted from several copyrighted assessment batteries. This limits researcher knowledge of the operational definitions and measurement of certain constructs in the study. However, detailed descriptions of the copyrighted measures are included in the study’s User Manuals and Psychometric Reports.

Another limitation is the study’s reliance on teacher and parent ratings for data on children’s social skills and behaviors; ratings from trained observers were not utilized. Teacher stereotypes of children’s interpersonal skills and behavior (based on gender or age) may influence their perceptions of social skills and behaviors and thus bias the data.
(Judge, 2005). Studies of teacher opinion about social behavior have shown that teachers respond differentially toward children who display different behaviors; therefore teachers may rate children higher if they display behaviors they tend to favor (Cartledge & Milburn, 151). Parents may also falsely report a more positive view of their children’s behaviors and skills in an attempt to please or impress the interviewer.

Lastly, the ECLS-K User’s Manual indicates that care should be taken when entering the social skills scales into the same analysis due to problems of multicollinearity; the factor intercorrelations among the scales for social skills are high. Analyses confirmed that the correlation between the teacher-rated Approaches to Learning scale and Interpersonal Skills scale is high (0.69). Therefore multicollinearity may increase the standard errors of the coefficients on these terms in the regression equation and make it more difficult to detect a significant effect on academic achievement. Ordinarily multicollinearity might be handled by conducting factor analyses; in this case, however, ECLS-K does not provide access to the individual items that comprise the social skills scales so factor analyses could not be conducted. Fortunately, as long as the multicollinearity is not perfect, it does not violate OLS assumptions; the OLS estimates are still the best linear unbiased estimators.
V. Results

A. Descriptive Results

Table 5 presents the descriptive statistics for cognitive ability at school entry, parent and teacher ratings of social competence, and parenting factors (i.e., parental warmth, parental cognitive stimulation and maternal depression). The average parent ratings of children’s interpersonal and learning-related social skills are higher than the average teacher ratings; this is to be expected assuming that parents are likely to be less critical of their own children and therefore likely to rate them higher than the children’s teachers might. Parents rated themselves on the higher end of the parental warmth and cognitive stimulation scales, and mothers rated themselves on the lower end of the depression scale. This is also expected given that the items that measure each construct were asked of parents during phone interviews; parents may report a more positive view of their own behaviors when having to respond aloud to an interviewer.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>Standard Error</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math IRT scale score, fall kindergarten</td>
<td>26.62</td>
<td>0.21</td>
<td>10.51 – 115.65*</td>
</tr>
<tr>
<td>Reading IRT scale score, fall kindergarten</td>
<td>35.33</td>
<td>0.22</td>
<td>21.07 – 138.51*</td>
</tr>
<tr>
<td>Parent-rated social competence at school entry,</td>
<td>3.13</td>
<td>0.008</td>
<td>1.33 – 4*</td>
</tr>
<tr>
<td>Learning-related skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent-rated social competence at school entry,</td>
<td>3.37</td>
<td>0.009</td>
<td>1 – 4*</td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher-rated social</td>
<td>3.01</td>
<td>0.01</td>
<td>1 – 4*</td>
</tr>
</tbody>
</table>
competence at school entry, Learning-related skills .......... 
Teacher-rated social competence at school entry, Interpersonal skills ................
Parental warmth scale ............ 45.84 0.07 22 – 52
Parental cognitive stimulation scale ................. 
Maternal depression scale ...... 17.67 0.12 12 – 48

Note: All weighted means are based on an estimated 2,958,424 children who were in the first grade in the spring of 2000. * Higher scores indicate higher levels of the characteristic being measured.

Table 6 presents the descriptive statistics for the study’s dependent variables—academic achievement at the end of first grade as measured by math and reading IRT scale scores. The average math and reading IRT scale scores at the end of first grade are significantly higher than the scores reported at the beginning of kindergarten; this is expected given that the children are older and have had two additional years of instruction by the end of first grade.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>Standard Error</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math IRT scale score, spring first grade</td>
<td>62.33</td>
<td>0.46</td>
<td>13.53 – 132.49</td>
</tr>
<tr>
<td>Reading IRT scale score, spring first grade</td>
<td>78.20</td>
<td>0.52</td>
<td>25.11 – 184.05</td>
</tr>
</tbody>
</table>

Note: All weighted means are based on an estimated 2,958,424 children who were in the first grade in the spring of 2000. * Higher scores indicate higher levels of the characteristic being measured.

Bivariate correlations among the independent variables range from 0.09 to 0.69 and are all significant (p=0.0); the latter correlation, which applies to the two teacher-
rated social skills scales, is high and indicates that multicollinearity may influence regression results by increasing the standard errors of the coefficients on these terms, making it more difficult to detect a significant effect on academic achievement (Table 6). The correlation between the two dependent variable measures is 0.65 and is significant (p=0.00); this indicates a strong positive relationship between the two academic achievement measures. Bivariate correlations also indicate that there is a significant, positive relationship between the independent and dependent variables, with the strongest relationships being between the teacher-rated learning-related social skills and the dependent variables. This is expected given that teachers govern the learning environment and monitor students’ learning-related behaviors, skills and outcomes in this environment.

Table 7. Correlations Among the Independent Variables

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Learning-related skills, Parent-rated</th>
<th>Interpersonal skills, Teacher-rated</th>
<th>Learning-related skills, Teacher-rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal skills,</td>
<td>0.42</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>Parent-rated</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Learning-related skills,</td>
<td>---</td>
<td>0.14</td>
<td>0.21</td>
</tr>
<tr>
<td>Parent-rated</td>
<td>---</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Interpersonal skills,</td>
<td>---</td>
<td>---</td>
<td>0.69</td>
</tr>
<tr>
<td>Teacher-rated</td>
<td>---</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

Table 8. Correlations Among the Dependent Variables

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Reading achievement, Spring first grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math achievement, Spring</td>
<td>0.65</td>
</tr>
<tr>
<td>first grade</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>
Table 9. Correlations Among the Dependent and Independent Variables

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Math achievement, Spring first grade</th>
<th>Reading achievement, Spring first grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal skills,</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Parent-rated</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Learning-related skills,</td>
<td>0.19</td>
<td>0.19</td>
</tr>
<tr>
<td>Parent-rated</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Interpersonal skills,</td>
<td>0.21</td>
<td>0.22</td>
</tr>
<tr>
<td>Teacher-rated</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Learning-related skills,</td>
<td>0.37</td>
<td>0.36</td>
</tr>
<tr>
<td>Teacher-rated</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
</tbody>
</table>

B. Regression Results

Results from the OLS regression analyses are presented in Tables 10 and 11.

Table 10 presents the results from the OLS regression model relating the control variables and the two independent variables—learning-related social skills and interpersonal social skills—to the dependent variable reading academic achievement. Table 11 presents the results from the OLS regression model relating the control variables and the two independent variables to the dependent variable mathematics academic achievement.

The findings from the two regression models partially confirm the study’s hypothesis. The learning-related social skills have a significant positive effect on both reading and mathematics academic achievement; this effect is present after controlling for individual, family background and school characteristics, and reading and mathematics achievement in kindergarten. Thus, taking into account where children start academically in kindergarten, learning related skills predict significant, positive growth in
academic achievement from the beginning of kindergarten to the end of first grade. Interpersonal social skills, however, were found to have a statistically insignificant effect.

\textbf{a. Results Pertaining to Reading Academic Achievement}

The R-squared of this regression indicates that the control and independent variables in the model account for 53.45% of the variation in the dependent variable, reading academic achievement at the end of first grade. The p-value for the overall model indicates it is statistically significant (p=0.00).

Several background characteristics have notable, significantly positive effects on reading academic achievement. Hispanic students achieve reading assessment scores in first grade that are 1.76 points higher than their White counterparts (p<0.10), ceteris paribus. Because the study controls for initial levels of reading achievement, these findings indicate slightly greater gains in reading skills for Hispanic students than for White students between the fall of kindergarten and the spring of first grade. This is reasonable given that Hispanic students are starting at lower levels of reading skills in kindergarten (the average reading assessment IRT scale score for Hispanic students is 32.59 in kindergarten, whereas the average for White students is 36.63), and assuming that in kindergarten and first grade the Hispanic students, particularly those who are bilingual, are getting more exposure to the English language than they have in the past.

Socioeconomic status has a significant positive effect on the reading assessment score, with each successively higher SES rating associated with a gain of 1.56 points (p<0.01) from a student’s initial reading assessment score in kindergarten, ceteris paribus. Also, math and reading academic achievement at kindergarten entry significantly predict
reading achievement at the end of first grade; each higher kindergarten reading assessment score is associated with a 0.98 point gain in the first grade reading assessment score (p<0.01), and each higher kindergarten math assessment score is associated with a 0.74 point gain in the first grade reading assessment score (p<0.01), both while controlling for other individual, family background and school characteristics.

Alternatively, being male, coming from a single-parent household (with a parent who is separated, widowed, or never married), and the presence of a learning disability are all significantly negatively associated with reading academic achievement. The negative effect of coming from a household with a parent who is widowed is of the greatest magnitude, resulting in lower gains in the reading assessment score from kindergarten to first grade by 4.14 points relative to students who come from a household with married parents, ceteris paribus (p<0.01). The effect of the presence of a learning disability is also of a significant magnitude, resulting in lower gains in assessment scores by 3.04 points relative to students who do not have a learning disability (p<0.01), while controlling for other individual, family background and school characteristics, and for initial levels of reading achievement in the fall of kindergarten.

In terms of the effect of the primary independent variables, parent-rated learning-related social skills have a significant positive effect on reading assessment scores, with each successively higher rating resulting in an increase of 2.39 points (p<0.01), ceteris paribus. Teacher-rated learning-related social skills have a significant positive effect as well, and of a slightly greater magnitude—each successively higher teacher rating results in an increase of 2.82 points on the reading assessment (p<0.01), ceteris paribus. Thus
students who are rated highly in terms of learning-related social skills show greater
growth in reading achievement from the fall of kindergarten to the spring of first grade.
The effects of both parent-rated and teacher-rated interpersonal social skills were not
statistically significant.

Table 10. OLS Regression Model Relating Social Skills and Control Variables to Reading Academic
Achievement

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Unstandardized Regression Coefficient</th>
<th>Standard Error</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>-1.65</td>
<td>0.39</td>
<td>0.00***</td>
</tr>
<tr>
<td>Black</td>
<td>-0.84</td>
<td>0.74</td>
<td>0.26</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.76</td>
<td>0.91</td>
<td>0.05*</td>
</tr>
<tr>
<td>Asian</td>
<td>1.71</td>
<td>1.22</td>
<td>0.16</td>
</tr>
<tr>
<td>Other Race</td>
<td>-0.76</td>
<td>0.87</td>
<td>0.38</td>
</tr>
<tr>
<td>Separated</td>
<td>-1.59</td>
<td>0.80</td>
<td>0.05*</td>
</tr>
<tr>
<td>Divorced</td>
<td>-0.56</td>
<td>0.69</td>
<td>0.42</td>
</tr>
<tr>
<td>Widowed</td>
<td>-4.14</td>
<td>1.30</td>
<td>0.00***</td>
</tr>
<tr>
<td>Never married</td>
<td>-1.94</td>
<td>0.65</td>
<td>0.00***</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td>1.56</td>
<td>0.32</td>
<td>0.00***</td>
</tr>
<tr>
<td>Attended Head Start</td>
<td>-0.07</td>
<td>0.58</td>
<td>0.90</td>
</tr>
<tr>
<td>Attended full-day kindergarten program</td>
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### Teacher-rated social competence at school entry, Interpersonal skills

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<tr>
<th></th>
<th>R²</th>
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<th>p-value</th>
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<td>Parental cognitive stimulation scale</td>
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<td>Maternal depression scale</td>
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</tbody>
</table>

* Statistically significant (p<0.10)
** Statistically significant (p<0.05)
*** Statistically significant (p<0.01)

---

### Results Pertaining to Mathematics Academic Achievement

The R-squared of the regression indicates that the control and independent variables in the model account for 54.85% of the variation in the dependent variable, mathematics academic achievement at the end of first grade. The p-value for the overall model indicates it is significant (p=0.00).

Several individual and background characteristics have significant, positive effects on math IRT assessment scale scores. Being male is associated with a gain of 2.62 points in the math assessment score from fall kindergarten to spring first grade in relation to females (p<0.01) while holding other individual, family background and school characteristics and initial levels of math achievement in kindergarten constant. Each successively higher socioeconomic status rating is associated with an increase in assessment score of 1.85 points (p<0.01), ceteris paribus. Also, math academic achievement at kindergarten entry significantly predicts math achievement at the end of first grade; each higher kindergarten math assessment score is associated with a 1.11 point increase in the first grade math assessment score (p<0.01), ceteris paribus.
Several individual characteristics have a significant, negative effect on math assessment scores in first grade. Black or African American students achieve gains in math assessment scores that are 4.18 points lower than their White counterparts (p<0.01), ceteris paribus. Also, Asian students and students identified as in the “other race” category (which includes those who identify as Native Hawaiian, other Pacific Islander, American Indian, Alaska Native, or more than one race) achieve gains that are over two points lower than White students, ceteris paribus. Therefore White students show greater growth than Black/African American and Asian students and students in the “other race” category in math from fall kindergarten to spring first grade. Lastly, the presence of a learning disability is associated with gains in math assessment scores that are 2.27 points lower than the gains of students who do not have a learning disability (p<0.01), while controlling for individual, family background and school characteristics, and initial levels of math achievement in kindergarten.

In terms of the effect of the primary independent variables, parent-rated learning-related social skills have a significant positive effect on math assessment scores, with each successively higher rating resulting in an increase of 2.35 points (p<0.01), ceteris paribus. Teacher-rated learning-related social skills have a significant positive effect as well, and of a greater magnitude—each successively higher teacher rating results in an increase of 3.16 points on the math assessment (p<0.01), ceteris paribus. Thus students who are rated highly in terms of learning-related social skills show greater growth in math achievement from the fall of kindergarten to the spring of first grade, particularly
those rated highly in learning-related skills by their teachers. The effects of both parent-rated and teacher-rated interpersonal social skills were not statistically significant.

Table 11. OLS Regression Model Relating Social Skills and Control Variables to Math Academic Achievement

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<thead>
<tr>
<th>Characteristic</th>
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<td>0.01**</td>
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</tr>
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<td>Attended full-day kindergarten program</td>
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<td>Age at school entry</td>
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<td>Math IRT scale score, fall kindergarten</td>
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</tr>
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<td>Reading IRT scale score, fall kindergarten</td>
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<td>0.03</td>
<td>0.00***</td>
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<td>Parent-rated social competence at school entry, Learning-related skills</td>
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<td>Parent-rated social competence at school entry, Interpersonal skills</td>
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<td>0.35</td>
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<td>Scale</td>
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<td>Value 2</td>
<td>Value 3</td>
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<tr>
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<td>---------</td>
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<td>Parental warmth scale</td>
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<td>Maternal depression scale</td>
<td>-0.04</td>
<td>0.02</td>
<td>0.11</td>
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</tbody>
</table>

* Statistically significant (p<0.10)
** Statistically significant (p<0.05)
*** Statistically significant (p<0.01)
VI. Discussion

The current educational culture in the U.S. of high-stakes testing and accountability standards has led to a focus on developing children’s academic skills as the primary determinants of school readiness and achievement. However emergent research linking social competence to school adjustment and positive academic outcomes demonstrates that a broader range of skills and behaviors supports optimal school success. The present study’s examination of the effect of social competence at school entry on academic achievement in first grade adds to this research. Results of the study indicate that learning-related social skills predict significant positive growth in reading and math achievement, even after the effects of achievement in kindergarten and individual, family background, and school characteristics have been netted out. The effect of interpersonal social skills was not statistically significant.

These findings are in line with other studies in the field that demonstrate a consistent significant association between learning-related social skills and higher academic achievement but fail to identify a significant link between interpersonal social skills and academic achievement. However, this study goes a step further by showing that learning-related social skills predict growth in academic achievement outcomes from kindergarten to first grade; thus learning-related social skills such as attentiveness, task persistence, organization, and self-regulation play an important facilitative role in the learning process. By identifying specific aspects of social behavior that are chiefly relevant to school performance, the study provides guidance for policy in terms of targeting interventions to promote academic achievement.
It is important to note that, in this study, children’s learning-related and interpersonal social skills were measured through teacher and parent ratings. While both the parent- and teacher-rated learning-related social skills were found to have a significant positive effect on academic achievement, the teacher ratings were associated with growth of a greater magnitude, particularly in math. This suggests that teachers may be more attuned to and better able to accurately identify strong learning-related social skills in children, and therefore in a prime position to nurture children’s social development and guide parents in doing so as well. However further analyses are necessary to determine whether the teacher ratings are statistically significantly different from the parent ratings to verify this hypothesis.

There are several possible reasons why interpersonal social skills were not associated with academic gains for children in the study. The measure of learning-related social skills in this study—the Approaches to Learning scale—captures skills that tap several domains, including self-regulation. Research has demonstrated that a general self-regulatory process underlies both the self-regulation of academic work and self-regulation of social relationships; the ability to monitor and regulate one’s academic work, which involves motivational, affective, and cognitive processes, shares similarities with the ability to monitor one’s social interactions (Patrick, 1997). Furthermore, researchers have demonstrated that children’s self-regulatory skills impact the types of relationships they form; those exhibiting poor self-regulation tend to experience lower levels of peer acceptance and, in turn, lower levels of academic achievement (Pelco & Reed-Victor, 2007). This illustrates the highly permeable boundaries between cognitive
processes and social competence (Shonkoff & Phillips, 2000). Therefore it may be that
the learning-related social skills in this study are driving the interpersonal social skills
and thus, when both are included in a regression, there is no unique variance associated
with interpersonal skills. Future research could attempt to tease out the unique effects of
the highly interrelated dimensions of self-regulation—including emotion, behavior, and
attention regulation—on both social and academic adjustment.

Alternatively it may be that in the early grades of kindergarten and first grade,
young children have not yet learned to integrate and coordinate their interpersonal social
skills with their learning-related ones; research has concluded that such synchronization
has a powerful impact on academic achievement (Wentzel & Wigfield, 1998). If children
have not yet coordinated the two sets of skills, exhibiting high interpersonal social skills
could be interfering with skills and behaviors that promote learning (e.g., being overly
social detracts from attention paid to studies). Future research could explore how children
navigate the integration of the two sets of social skills, the interplay among the range of
social skills at different ages, and the influence that developmental and environmental
factors exert on this process.

Another possibility is that interpersonal skills have a greater impact on academic
outcomes as children get older and interact more meaningfully with peers and teachers in
the classroom. Research has demonstrated that socially responsible behavior is a critical
aspect of classroom social competence and a significant predictor of academic
performance in early adolescence (Wentzel, 1991). In the early grades, interpersonal
social skills may better predict other important outcomes, such as overall self-concept
and peer relationships, while having an as of yet insignificant effect on academic achievement. Or perhaps exhibiting antisocial behaviors has a significant impact on academic outcomes at this age whereas prosocial behaviors again have an as of yet insignificant effect. The present study did not include measures of problem behaviors to assess their effect on academic achievement. Future research could include such measures and address when and how specific social strengths and problems interface with learning tasks and significantly influence outcomes.

Lastly, it may be that the parent and teacher ratings of children’s interpersonal social skills used in this study are biased by preferences for or stereotypes of certain types of social behaviors and are therefore not accurately capturing children’s levels of interpersonal skills. In subsequent research it would be informative to include ratings from trained observers of children’s social skills to achieve more precise results.

**Implications for Early Educational Policies and Programs**

The findings of this study confirm that learning-related social skills, which include attentiveness, task persistence, organization and self-regulation, are important precursors to successful academic performance in the early grades. This suggests that research-based strategies and programs that seek to develop and promote these types of skills and behaviors in children prior to school entry and in the early years of formal schooling should inform educational policies in order to significantly and positively influence early academic outcomes. Specifically, policymakers should consider encouraging the implementation of such methods and programs in the domains of early
childhood programs, school curricula, and teacher professional development in order to support optimal academic success.

*Strategies and programs designed to develop learning-related social skills:*

Preschool and kindergarten classroom prevention programs that target the development of children’s social and self-regulatory skills have been found to result in significant improvements in children’s school readiness and less aggressive behavior (Webster-Stratton, Reid & Stoolmiller, 2008). The Preschool Head Start Research-based Developmentally Informed (*REDI*) program is an example of such a program. The program uses the Preschool PATHS (Promoting Alternative THinking Strategies) curriculum, which integrates research-based strategies that foster the development of social competency and vocabulary and literacy skills. A recent study found that *REDI* program students did better on literacy measures and exhibited stronger skills in emotional understanding, social problem solving, social behavior, and learning engagement than students in regular Head Start classrooms (Bierman, Domitrovich, Nix, Gest, Welsh, & Greenberg, et al., 2008).

Researchers have recommended that all elementary schools provide students with direct instruction in learning-related social skills. The lead classroom teacher can employ strategies such as modeling, role playing and reinforcing positive student behavior to provide students with ongoing practice of these skills. Learning-related social skills curricula can both guide and supplement the teachers’ strategies. Commercially available intervention programs akin to the PATHS curriculum, such as Dina Dinosaur Social
Skills and Problem Solving Curriculum, include lessons to develop children’s attention, concentration, and cooperation skills (Pelco & Reed-Victor, 2007).

Classroom management training for teachers has been found to result in enhanced teacher classroom management skills and improvements in children’s emotion knowledge skills, problem-solving abilities, and overall school readiness. Such training equips teachers with specific strategies and tools for promoting children’s social competence and self-regulation, reducing conduct problems, and involving parents in their children’s learning. For example, the aforementioned Head Start REDI program provides teacher training and mentoring in the use of techniques such as sensitive-responsive language use, emotion coaching, and social problem-solving dialogue; this was found to strengthen the teachers’ quality and fidelity of curriculum implementation and relationships with students, which in turn supported increased learning engagement among and positive academic outcomes for students (Bierman et al., 2008). The Incredible Years Training Series is another example of a training curriculum designed to develop teachers’ skills in proactively supporting children’s social and self-regulatory development (Pelco & Reed-Victor, 2007).

Research has also demonstrated the efficacy of therapeutic playgroups that teach children techniques for self-regulation and social skills, provide them with opportunities to practice these skills across activities, and explicitly and frequently reinforce their self-regulation strategies (Pears, Fisher & Bronz, 2007). Recent research has also highlighted playtime during the school day as an important arena for children to use language or symbols to practice social and self-regulatory skills as they dramatize scenarios.
(Bowman, Donovan, & Burns, 2001). Teachers can apply group or individual interventions to support rule-governed play and to help children plan for play. A Harvard Family Research Project case study of a Boston elementary school found that a well functioning recess can create opportunities for practicing social and self-regulatory skills, interacting meaningfully with peers, and learning conflict resolution skills (Robert Wood Johnson Foundation, 2010).

For children who are already experiencing chronic or intense difficulties in learning-related skills, researchers recommend a more sustained, comprehensive and integrated intervention plan that is individualized to the child’s temperament and behaviors (Pelco & Reed-Victor, 2007). A functional behavior assessment (FBA) can provide an effective framework for guiding and tailoring such an intervention plan.

The strategies and programs outlined above and similar interventions that have been identified by research as having a significant impact on the development of self-regulatory and social skills in children should inform educational policies in order to significantly and positively influence early academic outcomes. Below I delineate specific policy recommendations that apply these research-based methods to the domains of early childhood programs, school curricula, and teacher professional development.

*Increased federal funding for early childhood and care programs:* Policymakers should consider increasing federal funding for early childhood programs that employ strategies and/or curricula for developing children’s social competencies, such as the Head Start *REDI* program. Such investment is a productive policy to pursue for boosting the learning and social behaviors of children prior to school entry for several reasons.
Developing social competencies early strengthens children’s school readiness and helps place them on favorable academic and social courses that tend to persist (Alexander, Entwisle, & Dauber, 1993). Further, such a policy would likely have a broad impact given that over 60% of children ages 3-5 spend a significant portion of their day in early childhood and care program settings (Raver, 2002).

However, it is important to note that many pre-school programs, like the traditional Head Start program, are under-resourced and often lack high levels of teacher training and organizational support. Policies seeking to support the growth of programs like the REDI program must, therefore, ensure the programs are adequately funded and well supported in order to maximize quality and effectiveness.

*Regulations for school curricula:* Policymakers should consider setting standards for school curricula that are informed by developmental research and that seek to enhance children’s academic, thinking and social skills. They should consider promoting a dual-focus approach for structuring curricula that integrates “child-centered” strategies (which target the development of children’s general thinking, problem solving, and social skills) and traditional “didactic” ones (which support the acquisition of basic knowledge and skills). Such an integrated curricular model is a strategic way to support gains in both domains of cognitive and social-emotional skills. Policymakers could weave the promotion of this model into the common core of state standards for grades K-12 currently being developed by the National Governors Association and the Council of Chief State School Officers; the dual-focus curricular approach could be prescribed as a best practice for adoption by districts and schools.
Increased federal funding for teacher training: Another policy proposal that merits consideration is increased funding for comprehensive teacher training and professional development in classroom practices and behaviors designed to support the development of socioemotional skills. Such training should be made available and accessible to current teachers and should also be incorporated into teacher graduate and certification programs so that future teachers start their careers equipped with such knowledge and skills. Given the important role teachers appear to play in identifying social skills that influence academic achievement, as suggested by this study, rigorously preparing them to effectively support and monitor the development of these skills in their students is a smart policy to pursue.

Conclusion

The present study demonstrates the power of the learning-related social skills associated with social competence to advance children’s learning and boost academic outcomes. This suggests that establishing positive and sustainable academic trajectories is about more than just the acquisition of basic skills—it includes the development of social competencies that will position children to benefit from the opportunities for learning and growth offered in the early school years. The current spirit of education reform marking the U. S. Department of Education under the Obama administration provides a policy window to pursue policy and programmatic changes grounded in the research regarding the significant effect of social development in order to support optimal educational success for all children.
Appendix A. Survey Items Composing Study Scales

**Parental Warmth Scale:**

(CHILD) and I often have warm, close times together.
Most of the times I feel that (CHILD) likes me and wants to be near me.
I am usually too busy to joke and play around with (CHILD).
Even when I’m in a bad mood, I show (CHILD) a lot of love.
By the end of a long day, I find it hard to be warm and loving toward (CHILD).
I express affection by hugging, kissing, and holding (CHILD).
Being a parent is harder than I thought it would be.
(CHILD) does things that really bother me.
I find myself giving up more of my life to meet (CHILD)’s needs than I ever expected.
I feel trapped by my responsibilities as a parent.
I often feel angry with (CHILD).
(CHILD) seems harder to care for than most.
I find taking care of a young child more work than pleasure.

**Parental Cognitive Stimulation Scale:**

In a typical week, how often do you or any other family member do the following things with (CHILD)?

a. Read books to (CHILD)?
b. Tell stories to (CHILD)?
c. Sing songs with (CHILD)?
d. Help (CHILD) to do arts and crafts?
f. Play games or do puzzles with (CHILD)?
g. Talk about nature or do science projects with (CHILD)?
h. Build something or play with construction toys with (CHILD)?

**Maternal Depression Scale:**

How often during the past week have you felt that you were bothered by things that don't usually bother you?
How often during the past week have you felt that you did not feel like eating, that your appetite was poor?
How often during the past week have you felt that you could not shake off the blues even with help from your family or friends?

How often during the past week have you felt that you had trouble keeping your mind on what you were doing?

How often during the past week have you felt depressed?

How often during the past week have you felt that everything you did was an effort?

How often during the past week have you felt fearful?

How often during the past week have you felt that your sleep was restless?

How often during the past week have you felt that you talked less than usual?

How often during the past week have you felt lonely?

How often during the past week have you felt sad?

How often during the past week have you felt that you could not get going?
Bibliography


