Social Science Research xxx (2011) xxx–xxx

Contents lists available at SciVerse ScienceDirect

Social Science Research

journal homepage: www.elsevier.com/locate/ssresearch

Social and behavioral skills and the gender gap in early educational achievement

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ARTICLE INFO

Article history:
Received 11 February 2011
Revised 30 August 2011
Accepted 2 September 2011
Available online xxxx

Keywords:
Gender
Educational achievement
Social and behavior skills
Gender stratification

ABSTRACT

Though many studies have suggested that social and behavioral skills play a central role in gender stratification processes, we know little about the extent to which these skills affect gender gaps in academic achievement. Analyzing data from the Early Child Longitudinal Study–Kindergarten Cohort, we demonstrate that social and behavioral skills have substantively important effects on academic outcomes from kindergarten through fifth grade. Gender differences in the acquisition of these skills, moreover, explain a considerable fraction of the gender gap in academic outcomes during early elementary school. Boys get roughly the same academic return to social and behavioral skills as their female peers, but girls begin school with more advanced social and behavioral skills and their skill advantage grows over time. While part of the effect may reflect an evaluation process that rewards students who better conform to school norms, our results imply that the acquisition of social and behavioral skills enhances learning as well. Our results call for a reconsideration of the family and school-level processes that produce gender gaps in social and behavioral skills and the advantages they confer for academic and later success.

1. Introduction

A large and growing literature in psychology, economics, and sociology has documented the impact of social and behavioral skills on cognitive outcomes, educational attainment, and labor market success (Coie and Krehbiel, 1984; Alexander et al., 2003; Ladd et al., 1999; Normandeau and Guay, 1998; Raver, 2005). The lack of standard terminology across these studies reflects the multidimensional character of these skills as well as the multidisciplinary collection of scholars who study their consequences. Psychologists classify many of these skills under the categories of cognitive self-regulation, self-discipline, effortful control, or executive function (Blair and Diamond, 2008; Blair and Razza, 2007; Bull and Scerif, 2001; Bull et al., 2008; Duckworth and Seligman, 2005; Duncan et al., 2007; Clair-Thompson et al., 2006). These skills include planning, sustaining attention, effortful control of attention or action, task persistence, and inhibition of impulsive responses. A second set of skills, often referred to by psychologists as "emotional self-regulation," includes the ability to control anger, sadness, joy, and other emotional reactions, which predict both externalizing and internalizing problem behaviors (Campos et al., 2004; Cole et al., 2004; Raver, 2004). Economists, led by Heckman and colleagues, have referred broadly to these skills as "non-cognitive," (Heckman and Rubenstein, 2001; Cawley et al., 2001; Carneiro and Heckman, 2003; Cunha et al., 2006; Heckman and Masterov, 2007; Heckman et al., 2006; Urzua, 2006), while still others contest the use of this term and prefer instead to discuss these skills as personality traits (Borghans et al., 2008). Sociologists have studied these skills using a variety of terms, including non-cognitive skills, behavior, social-psychological factors, cultural capital, and engagement in schooling (Arum et al., 2003; Farkas, 2003; Jencks et al., 1972; Kirkpatrick-Johnson et al., 2001; Lareau, 2003). Though

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doi:10.1016/j.ssresearch.2011.09.001

scholars continue to debate the specific skills that matter and the size of their effects, there is a consensus across disciplines that what we will refer to below as "social and behavioral skills" influences children's educational outcomes.

Left largely unaddressed in this literature is the role of social and behavioral skills in producing gender differences in educational outcomes. Abundant literature reports that boys have higher rates of developmental problems, disruptive behavior, attention disorders, reading disabilities, mental retardation, stuttering, delayed speech, and other related phenomena (Buchmann et al., 2008; Halpern, 1997; Muter, 2003; Rutter et al., 2004). Several studies have demonstrated stronger tendencies towards externalizing behavior by boys (Entwisle et al., 2005; Raffaelli et al., 2005). Gilliam (2005) reports that boys are five times as likely as girls to be expelled from pre-kindergarten. In early elementary school boys continue to be more disruptive than girls, and they also are less engaged in classroom learning (Ready et al., 2005; Zill and West, 2000). These gender differences persist through high school (Downey and Vogt Yuan, 2005; Dumais, 2005).

These findings have largely remained separate from a growing literature documenting academic performance differences between girls and boys, starting from elementary school. Entwisle et al. (2007) find that the gender gap emerges relatively late in the elementary school experience in their data collected in Baltimore in the 1980s. Other studies analyzing more recent data, however, show that girls have better reading skills than boys in kindergarten (Chatterji, 2006; Tach and Farkas, 2006; West et al., 2000), and that this pattern persists into middle school and beyond (Trzesniewski et al., 2006; US Department of Education, 2006).[1] Some scholars have found generally similar performance of girls and boys in mathematics and reading tests in the early grades, though their trajectories are different: boys gain in mathematics achievement relative to girls during elementary school (Penner and Paret, 2008), while girls gain in reading achievement relative to boys (Maccoby and Jacklin, 1974; Willingham and Cole, 1997). Still other studies drawing on test scores from state standardized tests find convergence in mean math performance in recent data (Hyde et al., 2008).

Also unsettled in this literature is the extent to which the gender gap in behavior and achievement arises from family or school processes linked to social class. Using data from the Baltimore Beginning School Study (BSS), Alexander et al. (2003) determined that the gender gap in retention rates was larger for poor children (i.e. those eligible for free or reduced price lunch) than for non-poor children. Other scholars have also found a social class component to the gender gap in reading (Bianchi, 1984; Burbridge, 1991; Mickelson, 2003). Entwisle et al. (2007) report that significant gender gap in conduct marks, in retention, and in reading scores and reading score growth from first to fifth grade for poor children, though all these gaps are negligible for non-poor children. In their data, 44% of the female advantage in reading gain for poor children by fifth grade was explained by teacher conduct marks in years 2 and 4, even as conduct has no relationship with reading gain for non-poor children.

Some scholars have attributed the female advantage in social and behavioral skills, by which we mean a difference in mean female and male performance that favors girls, to elementary school teachers' middle class and female demographic profile. This hypothesis implicitly draws on a large body of literature on in-group bias in psychology finding strong evidence that individuals assign higher ratings and more favorable characteristics to members of their own group (Bettencourt et al., 2001; Brewer, 1979; Hewstone et al., 2002; Mullen et al., 1992; Pettigrew, 1998). For example, Entwisle et al. (2007) argue that girls have better social and behavioral ratings not so much because of differences in maturation rates but rather because "they find the student role more compatible than boys do" (p. 134).[2] As further evidence of this bias, they find that social and behavioral skills affect academic achievement differently for boys and girls; in particular, they report that boys with poor conduct grades were more likely to be retained in first grade than were girls. This finding parallels Farkas et al. (1990), who reported from their Southwestern City School District data that boys apparently suffered lower course grades for being disruptive, while girls did not.

Given the types of data that are currently available, measurement problems with the teacher bias perspective make it difficult to fully evaluate its validity. For example, the findings from Entwisle et al.'s Beginning School Study are consistent with the conclusion that teachers evaluate girls more favorably than boys because of gender bias, but they are equally consistent with the contrary hypothesis that parents and teachers accurately observe gender differences in behavior, which affect both learning itself and the production of materials (like homework, reports, and presentations) that factor into the academic evaluation process. While data containing external evaluation measures could adjudicate between these possibilities, no such data are currently available for large samples of students. Similarly, class-based gender disparities in educational outcomes could imply that the family and neighborhood environment of poor children differentially encourages boys to behave in ways that inhibit academic achievement. It could also imply that parents of lower-class children do not work as effectively to compensate for biologically-based gender differences in behavioral propensities that would otherwise

[1] Trzesniewski et al. (2006) found that the correlation between anti-social behavior and reading was significantly stronger for boys than for girls in the E-Risk Longitudinal Twin Study. Environmental rather than genetic factors explain most of the correlation between these variables. They further found that antisocial behavior may have a causal impact on reading for both genders, but that the reciprocal effect (poor reading leading to antisocial behavior) appears to apply only to boys.

[2] Some scholars go so far as to characterize school-based standards for behavior as "feminine" and irrelevant to the masculine sense of self of black youth (Holland, 1992; Noguera, 2003; Watson and Hodges, 1991). One reviewer suggested that we explicitly test for the bias concerns raised in this section by comparing the ratings of male and female teachers. Indeed, a number of studies have found that students make more progress on standardized tests when they have a teacher of their own gender. Results such as these suggest that something different is happening in classrooms when there are student–teacher gender matches, and it is plausible that boys actually behave better when faced with a male teacher. As a result, we cannot distinguish truly better behavior from better rated behavior using these data, and thus did not pursue this strategy. We also note that unlike Alexander et al.'s (1987) study, our data do not allow us to test for the impact of teachers' social class background on the academic ratings they assign to poor and non-poor students.

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disadvantage the performance of their boys (Else-Quest et al., 2006; Schmitt et al., 2008). Entwisle et al. (2007) provide evidence that parents of poor children are more likely to have gender-traditional orientations toward gender roles than do non-poor children, which accords with a broader literature that shows lower-status adults to be more traditional in their gender role orientations (Buchmann and DiPrete, 2006; Lackey, 1989; White and Brinkerhoff, 1981). However, other evidence suggests that the relationship between class and orientations towards gender roles may have changed during the latter decades of the 20th century (Brewster and Padavic, 2000).

Research by Rosenbaum (2001), by Farkas et al. (1990), by Downey and Vogt Yuan (2005), and by Buchmann and DiPrete (2006) provide evidence that female adolescent students have better social and behavioral skills at older ages than boys, and that gender differences in social and behavior skills may be an important component of gender differences in academic performance. However, we know little about the evolution of these skills in elementary school or how the connection between the trajectory of development of social and behavioral skills and academic skill development may influence gender gaps in both test scores and teacher evaluations. We fill this gap in this paper by assessing the role of behavior in producing an academic performance gap between boys and girls in elementary school with data from the Early Child Longitudinal Study–Kindergarten Cohort (ECLS–K). We also reconsider the claim that gender differences in early academic outcomes stem from gender bias in the evaluation process that results from the better conformity of girls than boys to the student role. In doing so, we contribute to the growing body of literature on the effects of social and behavioral skills on social stratification processes.

To preview our results, we find that girls in contemporary America possess advantages in social and behavioral skills over boys and perform better on standardized tests from the start of kindergarten. We further find that social and behavioral skills are generally predictive of academic achievement in early elementary school even within groups defined by race, class, and gender, and that these variables explain relatively little of the variation in rated social and behavioral skills in the elementary school population. These facts render untenable the simple identification of social and behavioral skills with class-based socialization practices: differences in mean levels of social and behavioral skills by gender are actually larger than are differences by poverty status. At the same time, social and behavioral skills can clearly be taught; children from higher socioeconomic backgrounds have more of these skills, and early elementary teachers measurably differ in their ability to transmit these skills to their students (Jennings and DiPrete, 2010). The contribution of social and behavioral skills to academic achievement runs partly through their continuing effects on cognitive test scores. They provide an even greater advantage in teacher-based academic evaluation, which, we argue, arises not so much because teachers are biased in favor of middle-class and feminine behavior patterns as because teachers generally use well-rounded performance evaluations that take account of the production of assignments and the full participation in the school process that is enhanced by social and behavioral skills. Our results call for a reconsideration of the family and school-level processes that produce these skills and the advantages they confer for academic and later success.

2. Data and methods

The ECLS–K is a study of a nationally representative sample of 21,260 kindergartners that attended kindergarten in the 1998–1999 school year; 11,820 have now been followed through fifth grade.[3] These data provide parent reports on the socioeconomic and demographic characteristics of the children, teacher and parent reports of their social and behavioral skills, cognitive assessments, and measures of teacher and school characteristics. The first data collection was at the start of kindergarten. Major follow-ups took place at the end of kindergarten, the end of first grade, the end of third grade, and the end of fifth grade. Teachers were surveyed about classroom activities and the focal child's performance in academic subjects and on a variety of social and behavioral dimensions. In addition, the sample children were given cognitive tests on reading, mathematics and general knowledge in each of these data collection waves.

Our analyses make use of students' test scores in reading and math at the beginning and end of kindergarten, the end of first grade, the end of third grade, and the end of fifth grade, plus teacher assessments of academic achievement and retention in grade after kindergarten, first grade, and third grade. The ECLS math and reading tests use item response theory (IRT) to place students on a common scale for mathematics and reading. We measure reading and math achievement using within-panel standard deviation scores, where the standardization is done relative to the estimated population distribution. The use of standardized measures facilitates the interpretation of the effects of social and behavioral skills, which we also measure as within-panel standardized scores. It should be noted, however, that our use of standardized scores implies that "growth" in reading and math refers to changes in the distribution of scores at each grade, relative to the other students in the population corresponding to the ECLS–K sample. To test the robustness of our results, we also estimated models using the IRT scores as dependent variables and obtained similar results (which are available upon request).

Teachers in the ECLS–K study also rated student progress in language and literacy, general knowledge in science and social studies, and mathematical thinking in each year. According to the NCES (Westat and Educational Testing Service, 1998), these academic rating scales (ARS) are indirect cognitive assessments that differ in two principal respects from the direct cognitive assessments provided by the cognitive tests. First, the ARS measured both the "process" and the "products" of children's learning in school, where "process" included "the strategies they [the students] used to read, solve math

[3] In keeping with NCES requirements when analyzing restricted data, all sample size numbers reported in this paper have been rounded to the nearest 10.

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problems, or investigate a scientific phenomenon." In contrast, the tests only measure the "products" of learning. Second, while the tests were constrained by a standardized testing format, the ARS was intended to "reflect a broader sampling of the most recent curriculum standards and guidelines" and a "broader curriculum content." They differed in a third obvious respect as well in that they are teacher ratings of academic progress as opposed to measures from standardized tests.

Teachers were asked to rate five dimensions of student social and behavioral skills at the beginning and end of kindergarten, the end of first grade, the end of third grade, and the end of fifth grade. The Approaches to Learning Scale rates the child's attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization. The Self-Control Scale indicates the child's ability to control behavior by respecting the property rights of others, controlling temper, accepting peer ideas for group activities, and responding appropriately to pressure from peers. The Interpersonal Skills scale rates the child's skill in forming and maintaining friendships, getting along with people who are different, comforting or helping other children, expressing feelings, ideas and opinions in positive ways, and showing sensitivity to the feelings of others (National Center for Education Statistics, 2007). The Externalizing Problem Behaviors scale includes acting out behaviors such as the frequency with which a child argues, fights, gets angry, acts impulsively, and disturbs ongoing activities. The Internalizing Problem Behaviors Scale rates the student on the apparent presence of anxiety, low self-esteem, loneliness, and sadness.

We conducted a series of factor analyses of these five sets of skills and consistently found that the externalizing and internalizing scales formed separate dimensions, while approaches to learning, interpersonal skills, and self-control were best represented by one factor. We then analyzed externalizing and internalizing problem behaviors separately. We found that measures of Externalizing Problem Behaviors (acting out behaviors such as the frequency with which a child argues, fights, gets angry, acts impulsively, and disturbs ongoing activities) and internalizing problem behaviors (the apparent presence of anxiety, low self-esteem, loneliness, and sadness) are empirically less stable from year to year, which may suggest that they are more sensitive to the temporary effects of shocks in the student's life. For these reasons, we focus our attention in the body of the paper on the approaches to learning, interpersonal skills, and self-control measures.[4]

Parents also rate their children's behavior in the ECLS–K, but we chose not to include parents' ratings of social and behavioral skills for a number of conceptual reasons. First, the set of social and behavioral skills that are assessed by teachers and valued in educational settings do not necessarily map onto the meaning of these skills in the home, and we worried that there is more variation in how parents rate their children's behavior than teachers. Second, children may behave quite differently at school and at home, and divergences between their home and school behaviors may change over time. The weak correlations between teacher and parent ratings (.2–.3) is suggestive evidence of the above points, as is the weaker correlation between parents ratings of social skills across waves of the ECLS–K relative to the correlation between teacher ratings over time.

Of the 11,820 students still in the study in 5th grade, 90 students were added to the study in 1st grade to freshen the sample, and thus lacked any kindergarten measures; 430 students were not first-time kindergartners in 1998–1999; 5390 students were missing at least one test score or social rating between *K* and 5; and 1010 were missing covariates.[5] Our complete data sample of 4910 students includes all students with non-missing data for the variables listed in Table 1 and our control variables. Because a considerable number of cases were dropped by these criteria, we used multiple imputation to fill in missing data for cases who have at least one kindergarten observation and who are still part of the study in 5th grade. The imputed sample size is 11,300. 1690 (of the 11,300 students total) lived in households whose home language was not English and were given a special "Oral Language Development Screener" (OLDS). For these students, we included the OLDS in the imputation model and performed analyses that alternately dropped and included them as described further below. We estimated models both using the complete data sample, and also using Rubin and Little's method for estimating confidence intervals with multiple imputed data (Little and Rubin, 2002; Carlin et al., 2008). Our analyses also took the complex sample design of the ECLS–K (including the fact that students were nested within classrooms) into account in the computation of standard errors.[6]

In order to establish the best way to measure social and behavioral skills with the three ECLS–K factors, we specified a covariance structure model that treats the three social and behavioral scales (approaches to learning, self-control, and interpersonal skills) as indicators of a single latent factor, and specified reading at the end of first grade to be a function of the latent social factor, the reading score at the end of first grade, and a number of covariates.[7] We estimated the covariance structure model on reading because of the patterns of gender disparities in reading and math that we observed in the data. At the beginning of kindergarten and through first grade, there is no or only a small disparity in math performance between

[4] In supplemental analyses, we found that the estimates for the coefficients of the focal social and behavioral variables were similar when the externalizing and internalizing variables were included, while the coefficients of these variables were generally not statistically significant.

[5] We note again that all sample size numbers are rounded to the nearest 10 to conform to NCES requirements. As a result the subtotals may not sum to the grand total.

[6] Population sampling units (PSUs) were drawn within geographic clusters, and schools were drawn from these PSUs stratified on the basis of private and public status. Within sampled schools, up to twenty-four students were sampled with unequal probabilities based on race. We used information about the geographic strata, PSU, and probability sampling weights to estimate standard errors, facilitated by advice from NCES. In some cases, the ECLS-K sample had only one PSU within a given stratum for cases that fell within our sample. In these cases, we combined this stratum with an adjacent stratum in order to include these cases in our estimation.

[7] Because the underlying items used by NCES to construct its five scales of social development are proprietary, we were not able to perform our factor analysis on the underlying items themselves, which certainly would have been preferable from a scientific perspective.

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Table 1
Means of dependent variables, kindergarten through fifth grade.

	Boys	Girls	Poor[a]	Not poor	Black	White	Hispanic	Asian
Reading								
Beginning of *K*	−0.078	0.080	−0.491	0.129	−0.208	0.193	−0.417	0.236
End of *K*	−0.082	0.085	−0.472	0.124	−0.251	0.160	−0.294	0.258
1st	−0.075	0.077	−0.520	0.141	−0.284	0.179	−0.307	0.209
3rd	−0.073	0.075	−0.680	0.197	−0.430	0.237	−0.327	0.091
5th	−0.061	0.063	−0.668	0.183	−0.480	0.244	−0.318	0.098
Math								
Beginning of *K*	0.005	−0.005	−0.537	0.141	−0.373	0.249	−0.421	0.131
End of *K*	0.033	−0.034	−0.512	0.135	−0.436	0.245	−0.367	0.133
1st	0.065	−0.067	−0.547	0.148	−0.486	0.241	−0.299	0.045
3rd	0.112	−0.116	−0.629	0.182	−0.555	0.252	−0.278	0.135
5th	0.114	−0.118	−0.609	0.167	−0.625	0.243	−0.208	0.265
Social/behavioral factor								
Beginning of *K*	−0.203	0.210	−0.241	0.063	−0.249	0.083	−0.039	0.026
End of *K*	−0.199	0.205	−0.247	0.065	−0.291	0.091	−0.042	0.116
1st	−0.193	0.199	−0.203	0.055	−0.266	0.075	−0.004	0.107
3rd	−0.203	0.209	−0.281	0.082	−0.334	0.077	0.016	0.313
5th	−0.247	0.255	−0.276	0.076	−0.323	0.058	0.056	0.402
Approaches to learning								
Beginning of *K*	−0.209	0.215	−0.270	0.071	−0.247	0.075	−0.032	0.161
End of *K*	−0.219	0.226	−0.270	0.071	−0.252	0.073	−0.037	0.223
1st	−0.193	0.198	−0.250	0.068	−0.292	0.080	−0.024	0.197
3rd	−0.241	0.248	−0.314	0.091	−0.280	0.070	−0.035	0.387
5th	−0.279	0.287	−0.330	0.090	−0.331	0.074	0.001	0.451
N	5430	5440	1970[b]	8880	1210	6270	2000	900

[a] Measured against the US Census poverty thresholds.
[b] Sample size as of the beginning of kindergarten.

girls and boys, but a large disparity in reading favoring girls that persists throughout elementary school. Based on these patterns, we hypothesized that social and behavioral skills would explain more of the gender gap in reading than math.

A satisfactory fit for this model required the inclusion of a direct effect of the residual on the orientation to learning scale on the end of first grade reading score. With this specification, both the social and behavioral skills factor and the residual effect of orientation to learning had significant effects on end of first grade reading. In an alternative specification, we allowed orientation to learning to be a separate factor, and specified self-control and interpersonal skills to be indicators of a second latent social development factor. This alternative specification required the inclusion of a covariance between orientation to learning and the latent social development factor, and the overall fit of the model was not as good as in the first case. Students' orientation to learning is clearly related to the other two social and behavioral scales even as it has an independent effect that cannot be fully captured by a single latent factor. Consequently, in the work that follows, we used two orthogonal social factors as our measures of social development in this paper: the "social and behavioral factor," which is indicated by all three scales,[8] and the orthogonal "approaches to learning residual" that was not accounted for by the common factor. We will refer to the two variables together as "social and behavioral skills" in the text below.[9] As with the math and reading scores, the social and behavioral scores are relative measures; they compare students to the entire sample of students in the same grade.

We first determined the extent to which social background factors can account for gender differences in social and behavioral skills, and then used three estimation strategies to estimate the impact of social and behavioral skills on the growth of academic skills. First, we estimated OLS regressions of reading and math test scores on lagged reading and math test scores and lagged social and behavioral skills for each wave of the ECLS–K. These models (displayed in Table 2) describe the association between social and behavioral skills and achievement at different ECLS–K waves. Second, to address potential endogeneity issues (including measurement error in the academic and social skills measures), we used instrumental variables (IV) regressions with lagged test scores and social and behavioral skills ratings as the instruments. Third, as a further control for unmeasured stable student-specific attributes, we estimated student fixed effects models to determine whether within-student changes in social and behavioral skills affect academic achievement. Because much of the prior literature has suggested that there is a different return to social and behavioral skills for boys and girls, we also estimated these models separately for males and females, and estimated a joint model that included interaction effects between gender and social and behavioral skills. In each case, we control for variables that have been associated in previous research with students' academic and social and behavioral skills. These variables include race, gender, socioeconomic status, family structure

[8] The factor weights were 0.759 for approaches to learning, 0.832 for self-control, and 0.861 for interpersonal skills.
[9] Supplementary analyses that include the internalizing and externalizing problem behavior scales are available from the authors upon request.

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Table 2
OLS estimates of the relationship between demographic factors and social/behavioral skills: *K*–5th grade.

	Social/behavioral factor		Approaches to learning	
	Beginning of *K*	5th	Beginning of *K*	5th
Female	0.398*** (.038)	0.240*** (.039)	0.235*** (.035)	0.384*** (.042)
Black	−0.097 (.058)	−0.011 (.06)	−0.019 (.063)	−0.070 (.067)
Hispanic	0.109* (.054)	0.050 (.065)	0.048 (.066)	0.055 (.053)
Asian	−0.052 (.063)	−0.036 (.076)	0.002 (.076)	0.184** (.057)
Home language is not English	−0.000 (.07)	0.133* (.058)	0.129* (.059)	0.120* (.054)
SES	0.036 (.021)	0.046* (.021)	0.017 (.019)	0.075** (.023)
No biological father present	−0.191* (.078)	−0.120 (.073)	−0.127* (.058)	−0.138 (.068)
No father present	0.063 (.085)	0.001 (.078)	−0.026 (.06)	0.072 (.066)
Age	0.042* (.019)	0.017 (.017)	0.012 (.017)	−0.010 (.015)
Social/behavior factor (lagged)		0.393*** (.025)		
Approaches to learning residual (lagged)				0.414*** (.025)
Reading[a]	0.112*** (.026)	0.027 (.028)	0.044 (.026)	0.043 (.03)
Math[a]	0.179*** (.031)	0.129*** (.029)	0.213*** (.028)	0.111*** (.026)
Constant	−0.150*** (.037)	−0.099* (.036)	−0.087* (.034)	−0.173*** (.036)

[a] Reading and math are measured contemporaneously for beginning of *K* and lagged one period for other panels.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

and changes in family structure, the presence of a biological or non-biological father, and whether a student has been retained. Because "academic red-shirting" (the practice of delaying the start of school) is more common for boys than for girls (Graue and DiPerna, 2000; Malone et al., 2006), we also control for the child's age at the wave when the outcome variable was measured.[10]

3. Results

3.1. Gender differences in social and behavioral skills

In Table 1, we present the means of our social and behavioral measures by gender, race, and socioeconomic status. Girls lead boys by nearly 0.4 standard deviations at the start of kindergarten on the social and behavioral factor and by a similar amount on the approaches to learning scale.[11] From kindergarten to the end of fifth grade, boys fall further behind girls, lagging by 0.53 standard deviations on social and behavioral skills and 0.58 on approaches to learning by the end of fifth grade. In every year, the rated gap in social and behavioral skills between girls and boys was considerably larger than was the gap between children below the poverty threshold vs. non-poverty families, where poverty is measured based on the preliminary Census poverty thresholds for 1998 (Westat and Educational Testing Service, 1998). The black–white gap in social and behavioral skills was about the same size as the poverty gap and is smaller than the gender gap. Asian students received higher average ratings than did the other racial/ethnic groups; in particular, the Asian-black gap in rated social and behavioral skills is larger than the gender gap.

To what extent is the large difference in social and behavioral skills explained by family background variables? Controlling for ethnicity, family background, age, and reading and math skills reduces the baseline gender gap by only a small amount. Table 2 shows that girls have an advantage on the social/behavioral factor in kindergarten, net of controls, and they gain an additional relative advantage of 0.24 standard deviations in 5th grade over boys even after controlling for social/behavioral factor scores in kindergarten. A similar pattern applies to approaches for learning; on both dimensions, girls begin kindergarten with an advantage, and this advantage continues to grow net of earlier advantage between kindergarten and fifth grade. Social and behavioral skills have a significant relationship with reading and math skills, and relative performance increases further as of fifth grade (net of prior levels) for students who have stronger cognitive skills. Socioeconomic status, and the presence of a biological father in the household are also associated with stronger social and behavioral skills. Net of other factors, Asian students and students from homes where English is not the primary language is rated as having relatively high social and behavioral skills.

In contrast to previous work (Entwisle et al., 2007), we find no significant gender-socioeconomic status interaction effects on social and behavioral skills in the much larger and nationally representative sample available from the ECLS–K study. The estimated interactions remain insignificant regardless of whether socioeconomic status is modeled as a continuous variable, as SES quartiles, or as a dichotomous poverty variable (see Appendix Table A1).

[10] In supplementary analyses, we also added mother and father's education, family income, mother and father's occupation, number of siblings, preschool child care, mother ever worked, maternal depression, parent expectations, public assistance and the racial and socioeconomic composition of the school. The inclusion of this larger set of controls did not alter our results.

[11] Descriptive information about the approaches to learning scale refer to the scale itself, not the orthogonal residual to the social and behavioral factor that is used as a covariate in our statistical models.

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Table 3
Estimated effects of the social/behavioral factor and the approaches to learning residual on reading and math test scores, using four different estimation methods.

	OLS		IV contemporaneous		Fixed effects contemporaneous		Fixed effects lagged	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
End of kindergarten					(Same for all panels)			
Social/behavioral	0.029*	0.072***	0.044*	0.106***	.039***	.032***	.016	.021*
Learning residual	0.019	0.051***	0.038	0.099***	.045***	.022*	.009	.009
End of first grade								
Social/behavioral	0.047**	0.067***	0.057	0.106**				
Learning residual	0.082***	0.094***	0.174**	0.228***				
End of third grade								
Social/behavioral	0.073***	0.066***	0.119***	0.047				
Learning residual	0.054***	0.080***	0.107*	0.135*				
End of fifth grade								
Social/behavioral	0.034***	0.032**	0.026*	0.032**				
Learning residual	0.026*	0.032**	0.043	0.094*				

* $p < .05$.
** $p < .01$.
*** $p < .001$.

3.2. Academic achievement

Mean reading and math achievement are presented in Table 1 for each panel of the ECLS–K. Overall, the female advantage on the reading test remains roughly constant at about .14 standard deviations from the beginning of kindergarten to the end of fifth grade.[12] Kindergarten boys have a slight lead on girls on the math test (.04 standard deviations) at the start of kindergarten, and this gap grows to about 1/4 of a standard deviation by the end of fifth grade. Except at the start of kindergarten (where the gender gap is *smaller* for children from poverty families), there are no significant differences in the gender gap for either reading or math scores in the ECLS–K (see Appendix Table A2).

Table 3 reports the estimated effects of social and behavioral skills on reading and math growth based on four different modeling strategies: OLS models with lagged social and behavioral skills effects and IV regression with (instrumented) contemporaneous social and behavioral effects, and fixed effects regression with alternatively contemporaneous and lagged social and behavioral effects. For clarity, Table 3 only presents the coefficients for social and behavioral skills; the full set of OLS estimated model coefficients are presented in Appendix Table A3 (the same set of covariates is used in the IV regression and fixed effects models as well and the full set of estimates are available upon request). Net of background factors, the contemporaneously measured social and behavioral factor and the approaches to learning residual have a strong relationship to reading and math performance at the beginning of kindergarten. The size of the effect is smaller in subsequent waves, which use one-panel lagged measures for social and behavioral skills and controls for lagged reading and math scores. However, even in these models, both the social and behavioral factor and the approaches to learning residual have a significant positive effect on both reading and math test performance. We find that the point estimates on both social and behavioral skills coefficients are larger for math than for reading in both kindergarten and first grade, but the effects across subjects are more similar in 3rd and 5th grades. The general pattern of the coefficients is similar for the IV and OLS estimates. Unlike Entwisle et al. (2007), we find no significant difference between the academic returns to social and behavioral skills for girls and for boys. Appendix Table A4 shows statistical tests for gender differences in the effects of social and behavioral skills on reading and math test scores, academic rating scales, and retention. In every case, we cannot reject the hypothesis of no difference using the full set of dependent variables as in our other analyses. Because the effects do not vary significantly by gender, we restrict attention to main-effects models for the rest of this paper.

A more stringent test of the effects of social and behavioral skills on academic outcomes is afforded by the use of student-level fixed effects models. These models remove all stable individual characteristics including any stable relationship between social and behavioral skills and academic outcomes from the calculation under the (strong) assumption that the effect of growth in social and behavioral skills does not vary by grade. There is a highly significant contemporaneous relationship between (relative) growth in social and behavioral skills and growth in cognitive skills. This is doubtless an overestimate of the causal effect of social and behavioral skills on academic growth; the contemporaneous relationship might be due to effects of academic skill growth on improved social and behavioral skills, or something else about the student (biological events, the death of a loved one, etc.) which causes both social and behavioral and cognitive measures to change in the same direction. On the other hand, the one-period lagged fixed effects models probably underestimate the effects of social and behavioral skills on academic outcomes (see footnote 11). The fixed effects lagged estimates are between 40% and 2/3 the

[12] The gender gap in reading is stable at .14 standard deviations regardless of whether we compare respondents who have non-missing reading scores at the start of kindergarten and the end of fifth grade (using panel weights) or if we compare the full samples who have reading scores at the beginning of kindergarten with the full sample who have reading scores at the end of fifth grade (in each case using cross-sectional weights).

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Table 4
Estimated contribution of the gender gap in social and behavioral skills to the gender gap in reading and math test scores.

	OLS				IV			
	Start *K*–5th grade		1st–5th grade		End *K*–5th grade		1st–5th grade	
	Reading	Math	Reading	Math	Reading	Math	Reading	Math
Total mean difference (male–female)	−0.12	0.23	−0.12	0.23	−0.12	0.23	−0.12	0.23
Proportion of difference explained by social/behavioral skills	0.46	−0.28	0.36	−0.21	0.34	−0.21	.28	−0.20

Note: A positive sign in "proportion of difference explained" means that the female lead would be reduced by the indicated amount if social and behavioral skills were equalized across genders. A negative sign means that the male lead would be larger by the indicated amount if social and behavioral skills were equalized across genders.

Table 5
Probit regression of the probability of retention at the end of kindergarten, first grade, and third grade, conditional on not having been previously retained.

	Kindergarten	First grade	Third grade
Social and behavioral skills	0.917 (.047)	0.736*** (.058)	0.790* (.082)
Approaches to learning residual	0.711*** (.046)	0.475*** (.052)	0.586*** (.078)
Math test score	0.736* (.096)	0.799 (.12)	0.767 (.13)
Reading test score	0.844 (.11)	0.509*** (.07)	0.880 (.17)
Female	0.750*** (.052)	1.027 (.073)	0.993 (.1)
Black	0.684** (.067)	1.240* (.11)	1.265* (.14)
Hispanic	0.613*** (.059)	0.901 (.08)	0.884 (.1)
Asian	0.850 (.1)	0.783 (.11)	0.671 (.14)
Home language not English	0.898 (.1)	0.866 (.087)	0.975 (.13)
SES	0.999 (.033)	0.954 (.037)	0.833*** (.044)
No biological father present	1.033 (.11)	1.052 (.096)	0.923 (.12)
No father present	1.024	0.906	1.158
Age	0.789*** (.025)	0.879*** (.024)	0.914* (.033)
N	11,300	10,920	10,330

Social and behavioral skills and academic test scores are measured as of the spring of the indicated year and are instrumented with lagged social and behavioral skills and lagged academic test scores. Exponentiated coefficients; standard errors in parentheses.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

magnitude of the contemporaneous estimates for social and behavioral skills, with the effect remaining significant for math outcomes but not for reading.

Next, we address the total contribution of social and behavioral skills to the gender gaps in math and reading between fifth grade and the beginning of kindergarten, the end of first grade, and the end of third grade, respectively.[13] The results that we obtain are very similar regardless of whether we use OLS or IV regression (see Table 4). Based on the OLS results, we obtained as a point estimate that the female advantage in social development at the start of kindergarten accounts for 46% of the female advantage in reading at the end of fifth grade, and that the math gap would be 28% larger but for the female advantage in social and behavioral skills. If we instead base the calculations on IV regression estimates from the end of kindergarten, we obtain similar but slightly smaller contributions of social and behavioral skills to cognitive achievement (34% for reading, 21% for math). The closer in time we move to fifth grade, the smaller is the contribution of social and behavioral skills as more of this effect becomes indirect through its impact on intermediate academic outcomes. These decomposition results, to repeat, are based on OLS and IV estimates. The fixed effects models concern the evolution of within-student trajectories, but there is no clear upward trend in reading test scores for girls relative to boys between kindergarten and fifth grade. The math test score gender gap, in contrast, develops between the start of kindergarten and the end of fifth grade. The lagged and contemporaneous fixed effects results imply the math gap would be 21% and 38% larger respectively but for the female advantage in social and behavioral skills between the start of kindergarten and the end of fifth; these results bracket the OLS estimates for the same period of time.

3.3. Social and behavioral skills, retention, and teacher academic ratings

Measures of social and behavioral skills are strongly related to other outcomes besides test scores, and they statistically account for a considerable portion of gender differences on these outcomes. One such important outcome is retention in

[13] In light of the general lack of significant interactions between gender and the other variables in our models, we computed the decomposition based on a pooled regression over both genders (Neumark, 1988; Jann, 2008).

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Table 6
Mean differences between girls and boys on fifth grade academic and third grade social outcomes.

Variable		Females	Males	Male–female
5th Grade math test scores		−.118 (.041)	.114 (.036)	.232
5th Grade reading test scores		.063 (.039)	−.061 (.038)	−.124
5th Grade teacher math evaluations		.002 (.035)	−.002 (.032)	−.004
5th Grade teacher reading evaluations		.160 (.036)	−.115 (.033)	−.275
3rd Grade social scale		.209 (.034)	−.203 (.030)	−.412
3rd Grade learning residual		.133 (.031)	−.129 (.033)	−.262
5th Grade predicted math evaluation with sample means on covariates	(Males with own means on social/behavioral variables)	.104	.106	.002
	(Males with female means on social and behavioral variables)		.243	.139
5th Grade predicted reading evaluation with sample means on covariates	(Males with own means on social and behavioral variables)	.242	−.052	−.294
	(Males with female means on social and behavioral variables)		.129	−0.113

Note: Covariates in the predicted evaluation models are spring reading and test scores, gender, race, age, whether ever retained by a grade, SES, whether biological father lives in the household, whether any father lives in the household, third grade social scale and third grade learning-residual scale. The math and reading scores and the social and learning residual scores are treated as endogenous and all further lagged math and reading test scores and social and learning residual scores are used as instrumental variables. Standard errors are in parentheses.

grade. In the ECLS–K, 16.4% of boys vs. 12.2% of girls have been retained by the start of 5th grade, with particularly large gender differences in retention for kindergarten and first grade. We estimated instrumental variables probit regressions where we instrumented the spring social and behavioral measures and test scores based on measures from earlier points in time.[14] These results (see Table 5) show that low social and behavioral scores strongly predict retention. Net of social and behavioral and academic scores, girls are significantly less likely to be retained in kindergarten than are boys. However, at the end of first grade, the gender difference in retention rates is entirely explained by gender differences in social and behavioral scores and in reading. By the end of third grade, the male disadvantage in retention has disappeared, but social and behavioral skills continue to strongly predict the probability of retention.

A second teacher-rated set of academic outcome measures are the academic rating scales (ARS). Unlike with reading scores, the gender gap in reading ARS scores continues to grow between kindergarten and fifth grade (from .22 to .32 standard deviations), and as with math test scores, the math ARS trend is favorable to boys, though it only brings them from a deficit of .15 standard deviations in kindergarten to parity in fifth grade (results not shown). Table 6 shows the average outcomes of girls and boys in the ECLS on standardized math and reading tests, on standardized teacher evaluations of math and reading competencies, and on their standardized social and behavioral skills as reported 2 years earlier by their third grade teachers. While fifth grade teacher evaluations are not the same as formal grades, the results in Table 6 mirror other results (Entwisle et al., 1997; Entwisle et al., 2007) in showing that the gender gaps in teacher evaluations of reading and math achievement are notably larger (in favor of girls) than are the gender gaps in reading and math test scores. Table 6 also shows predicted teacher fifth grade evaluations based on a set of background variables, fifth grade reading and math test scores, and the evaluations 2 years earlier of the student's social and behavioral skills.[15] Finally, Table 6 reports the predicted evaluations that boys would have if they had received the same average social and behavioral ratings as girls 2 years later. The gender gap in social and behavioral skills is large enough to explain almost the entire additional gender gap in teacher reading evaluations over reading test scores, and it also explains most of the difference between the considerable male advantage in math test scores and the virtual gender tie on teacher evaluations of mathematics performance.

4. Discussion

Our results demonstrate that social and behavioral skills are an important resource for school success in elementary school, both as measured on cognitive tests and even more so by teacher evaluations. Girls have a considerable lead over boys in these skills, and they extend this lead further over the first 6 years of schooling. This female advantage in social and behavioral skills accounts for an important component of the female academic advantage in elementary school. Other research shows that the female advantage in academic achievement persists into middle school, high school, and college, and may be the single most important factor underlying the significant lead that women have over men in rates of college completion (Buchmann and DiPrete, 2006). The reason for the growing female advantage in college attainment may lie in

[14] For statistical reasons, we estimated these models using multiple imputation on unweighted samples. The results are very similar to what we obtain when we estimated these models with instrumental variables regression using weights, stratification, and clustering information.

[15] These predictions were made using instrumental variables regression with lagged instruments for both test scores and social and behavioral skills.

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changes over the past 40 years in labor market opportunities for women, in changing life course risks for marriage and divorce, and in the changing connection between these risks and education. But given the current environment, the production of female educational advantage appears to begin at the very start of the school career, when girls and boys enter the school systems with average differences in social and behavioral skills that are larger than the differences we find between children who live in poverty and those who do not. Thus, while social and behavioral skills used to function like other skills in creating a life course advantage for children born to upper middle class households, they may now have a double effect, of preserving advantage for one population even as they allow another historically disadvantaged group—women—to overtake men in the acquisition of the single most important resource in the stratification system of a modern industrial country, namely education.

Duncan et al. (2007) recently argued that early test scores have much bigger effects on subsequent test scores than do social and behavioral skills. We agree with this conclusion, but this does not undermine the importance of these skills for the size of the gender gap. The apparent tension between our conclusions and those of Duncan et al. partly stems from our focus on gender instead of individual-level differences and partly (we believe) from the way they interpret coefficients. As noted earlier, Duncan et al. make a strong distinction between what they call "attention" skills and what they call "socioemotional" skills. They find that "ability to pay attention" effects are moderate in size but that the effects of "socioemotional skills" are rarely significant. However, the ECLS–K does not have a pure measure of "attention" skills as opposed to "socioemotional" skills. Instead, the "approaches to learning" scale consists of a series of questions about "the child's attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization" and two other scales (self-control and interpersonal skills) jointly concern "respecting the property rights of others, controlling temper, accepting peer ideas for group activities, responding appropriately to pressure from peers, skill in forming and maintaining friendships, getting along with people who are different, comforting or helping other children, expressing feelings, ideas and opinions in positive ways, and showing sensitivity to the feelings of others." Several of the items in "approaches to learning" do not involve "ability to pay attention," and some items within the "approaches to learning" scale do involve "socioemotional skills," as do items on the self-control and interpersonal skills scales. Even "ability to pay attention" is partly determined by one's level of emotional self-regulation. As a statistical matter, we find that approaches to learning is correlated with the other two scales and so we prefer the two-dimensional solution that we used in our models. As a theoretical matter, it is important to disentangle the skills that allow some children to bring a mental organization, an eagerness to learn (including to please the teacher through the quality of one's work), a drive to follow instructions, an ability to participate effectively in class and (in the process) to "get along" with the teacher as well as with the other students in the classroom. This broad set of skills certainly involves more than "cognitive attention," but establishing the full set of dimensions that underlie this complex of skills will require more research with better data.[16]

Teacher academic ratings are even more strongly affected by social and behavioral skills than are test scores. Because social and behavioral skills are also "evaluated" by the teachers (quite literally so in the ECLS–K), it is possible that the teacher's evaluations of academic achievement are biased upward for students that they evaluate as being well adjusted to the school environment. However, it is equally possible that educationally committed and well-behaved students gain an advantage from the use of "well-rounded" evaluation criteria as well as from the better fit of their skills with the learning environment of the classroom. This advantage can readily be seen in the criteria that teachers are asked to use when constructing their academic rating in the ECLS–K. Fifth grade teachers were specifically asked to rate reading achievement on criteria that include the presentation of oral reports using logically organized outlines, the ability to use vocal inflection, facial expression and appropriate pacing to increase listener interest, the use of multiple sources to gain information, the taking of good notes when collecting information for reports, the writing of well-organized reports, and the revising of writing to improve organization, increase clarity, and correct errors. These behaviors would readily seem to be more consistently produced by students who have higher levels of commitment to learning, better organization, stronger interpersonal skills, and better ability to accept feedback without getting angry. More direct evidence is supplied from the literature on elementary school grading, which makes clear that elementary teachers typically take into account student effort, the production of homework, and broader types of performance assessment than multiple choice tests when assigning grades (McMillan et al., 2002; Brookhart, 1993).

In our opinion, the "pure bias" explanation was more plausible when the conduct penalty centered on boys of lower socioeconomic status. But in the ECLS–K data, class plays a comparatively minor role in the link between social and behavioral skills and academic outcomes, and the gender gap in performance is readily apparent for middle class children as well as disadvantaged children. The ECLS–K data also reveal a social and behavioral skill gap between Asian and other students, and even (net of other factors) between students whose language at home was not English and other factors. The parsimonious story that middle-class female teachers tend to favor students like themselves (i.e., middle class girls) does not carry over well to the pattern of differences in rated social and behavioral skills found in the ECLS–K. We do not deny the existence of teacher bias, but read the results to suggest that the link between social and behavioral skills and academic outcomes (particularly teacher academic evaluations) is flowing largely through a direct connection between social and behavioral

[16] In this context, it is unfortunate that the NCES is not able to release the items underlying the five social and behavioral scales to allow a more thorough study of this issue.

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Table A1
Estimates of social and behavioral skills measures as of the start of kindergarten on gender and poverty status.

	Social and behavioral factor	Approaches to learning
Black	−0.098 (.058)	−0.015 (.057)
Hispanic	0.107* (.054)	0.175*** (.053)
Asian	−0.045 (.062)	0.085 (.059)
Home language not English	0.003 (.07)	0.075 (.07)
Female	0.398*** (.041)	0.404*** (.039)
Poverty	−0.098 (.072)	−0.109 (.079)
Female * Poverty	0.011 (.1)	0.034 (.11)
No biological father present	−0.192* (.079)	−0.147* (.068)
No father present	0.074 (.085)	0.049 (.079)
Age	0.041* (.019)	0.064** (.02)
Reading test score	0.116*** (.027)	0.115*** (.028)
Math test score	0.183*** (.03)	0.311*** (.031)
Constant	−0.134*** (.038)	−0.185*** (.036)
N	10,870	10,870

Standard errors are in parentheses.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

skills and learning, and through the link between social and behavioral skills and more diligent production of homework and other classroom exercises and projects that factor into the teacher's evaluation. The superior social and behavioral skills of girls would therefore produce a stronger female advantage in course grades determined through the use of well-rounded academic evaluative criteria. Indeed, Hoxby (2000) used exogenous variation in classroom composition to show that boys as well as girls gain on both math and reading achievement from having more girls in the classroom, while Whitmore (2005) obtains similar findings for first and second grades using data from the Tennessee Project STAR experiment. If the greater social and behavioral skills of girls produce spillover effects on standardized tests for both girls and boys, it would seem that the gains that students (whether boy or girl) with high social and behavioral skills produce for themselves are something more than pure bias in teacher evaluation.

Table A2
Gender gap in reading and math test scores and social behavioral skills, by poverty status.

	Not poor			Poor			Difference
Reading	Boys	Girls	Gap	Boys	Girls	Gap	
Start *K*	0.027	0.239	−0.213	−0.514	−0.471	−0.043	*
End *K*	0.022	0.234	−0.212	−0.519	−0.430	−0.088	No
End 1st	0.065	0.222	−0.157	−0.632	−0.418	−0.214	No
End 3rd	0.107	0.293	−0.187	−0.738	−0.626	−0.111	No
End 5th	0.124	0.246	−0.122	−0.769	−0.573	−0.196	No
Math							
Start *K*	0.127	0.156	−0.029	−0.506	−0.565	0.059	No
End *K*	0.146	0.123	0.023	−0.442	−0.575	0.133	No
End 1st	0.215	0.077	0.138	−0.532	−0.560	0.029	No
End 3rd	0.287	0.071	0.216	−0.536	−0.714	0.178	No
End 5th	0.274	0.054	0.220	−0.498	−0.715	0.217	No
Social and behavioral factor							
Start *K*	−0.146	0.288	−0.434	−0.445	−0.061	−0.384	No
End *K*	−0.137	0.282	−0.420	−0.456	−0.062	−0.394	No
End 1st	−0.131	0.254	−0.386	−0.438	0.011	−0.450	No
End 3rd	−0.138	0.315	−0.452	−0.445	−0.130	−0.315	No
End 5th	−0.177	0.341	−0.518	−0.514	−0.047	−0.467	No
Approaches to learning							
Start *K*	−0.142	0.300	−0.442	−0.488	−0.077	−0.410	No
End *K*	−0.148	0.306	−0.454	−0.516	−0.052	−0.464	No
End 1st	−0.125	0.273	−0.399	−0.460	−0.057	−0.403	No
End 3rd	−0.167	0.366	−0.533	−0.513	−0.132	−0.382	No
End 5th	−0.192	0.387	−0.580	−0.610	−0.061	−0.549	No

* $p < .05$.
** $p < .01$.
*** $p < .001$.

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Table A3
OLS estimates of the effects of social and behavioral skills on academic achievement: *K*–5th grade.

	Reading					Math				
	Beg. of *K*	End *K*	1st	3rd	5th	Beg. of *K*	End *K*	1st	3rd	5th
Female	0.050 (.033)	0.041 (.023)	0.021 (.028)	0.059* (.026)	0.026 (.021)	−0.130*** (.032)	−0.116*** (.034)	−0.154*** (.026)	−0.220*** (.023)	−0.108*** (.02)
African–American	0.019 (.047)	0.011 (.043)	−0.018 (.044)	−0.123* (.047)	−0.104* (.041)	−0.167*** (.048)	−0.142*** (.04)	−0.165*** (.038)	−0.187*** (.049)	−0.153** (.044)
Hispanic	−0.127* (.057)	0.085 (.046)	−0.021 (.044)	−0.047 (.035)	−0.038 (.029)	−0.183*** (.048)	−−0.029 (.04)	−0.039 (.041)	−0.049 (.049)	0.039 (.034)
Asian	0.212* (.079)	0.068 (.046)	0.031 (.045)	−0.072 (.044)	−0.030 (.038)	0.057 (.058)	−0.007 (.057)	−0.122* (.047)	−0.009 (.047)	0.104** (.033)
Home language not English	−0.260*** (.065)	0.018 (.047)	−0.109* (.048)	−0.095* (.041)	−0.034 (.034)	−0.230*** (.048)	−0.036 (.035)	−0.017 (.038)	0.001 (.037)	0.008 (.036)
SES	0.329*** (.022)	0.009 (.014)	0.062*** (.015)	0.140*** (.013)	0.058*** (.011)	0.319*** (.019)	0.019 (.013)	0.092*** (.014)	0.118*** (.015)	0.050*** (.01)
No biological Father present	−0.150*** (.04)	0.016 (.04)	−0.027 (.049)	−0.033 (.039)	0.024 (.036)	−0.134** (.048)	−0.022 (.037)	−0.002 (.041)	−0.047 (.042)	−0.032 (.034)
No father present	0.003 (.047)	−0.083 (.042)	−0.027 (.056)	0.004 (.05)	0.043 (.041)	−0.041 (.054)	−0.039 (.043)	−0.005 (.044)	0.028 (.052)	0.039 (.044)
Age	0.154*** (.021)	−0.003 (.012)	−0.010 (.012)	−0.014 (.013)	−0.024* (.0094)	0.204*** (.019)	0.047** (.014)	0.002 (.011)	−0.025* (.012)	−0.043*** (.009)
Social/behavior factor	0.193*** (.017)	0.029* (.011)	0.047** (.015)	0.073*** (.015)	0.034*** (.0099)	0.209*** (.017)	0.072*** (.012)	0.067*** (.013)	0.066*** (.013)	0.032** (.011)
Learning residual	0.178*** (.016)	0.019 (.011)	0.082*** (.017)	0.054*** (.013)	0.026* (.011)	0.243*** (.015)	0.051*** (.011)	0.094*** (.013)	0.080*** (.016)	0.032** (.011)
Reading ($t-1$)		0.711*** (.022)	0.545*** (.025)	0.477*** (.018)	0.698*** (.016)		0.149* (.061)	0.041* (.016)	0.151*** (.019)	0.118*** (.016)
Math ($t-1$)		0.148*** (.019)	0.184*** (.02)	0.194*** (.018)	0.138*** (.016)		0.642*** (.047)	0.636*** (.018)	0.543*** (.015)	0.727*** (.015)
Retained			−0.616*** (.046)	−0.243*** (.057)	−0.132** (.039)			−0.459*** (.069)	−0.163** (.055)	−0.031 (.036)
Constant	0.071*	−0.028	0.049	0.052	0.015	0.206***	0.106**	0.135***	0.175***	.072***

Standard errors are in parentheses.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

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Our results also highlight the subtle interconnections between inequalities based on social class, race, and gender. The linkage between class and gender differences found in the Baltimore Beginning School Study are largely absent in the ECLS–K. This would seem to be a puzzle in light of the apparent connection between class and the gender gap in educational attainment (King, 2000). However, Buchmann and DiPrete (2006) found that a large social class component to the gender-specific *trend* in attainment did not imply that the gender gap was equally strongly structured by class at every cohort. The ECLS–K results could imply that when cohorts born in the middle 1990s finish their schooling, we may see (if current trends continue) even a larger gender gap in educational attainment than we see at present, but relatively modest differences in this gender gap across the socioeconomic spectrum. Alternatively, it could be that a relatively small gender gap at the top of the socioeconomic spectrum will be maintained through other mechanisms than class-specific gender differences in the production of social and behavioral skills. Additional data from cohort studies at older ages are needed to answer this question.

The large and growing gender gap favoring women in educational attainment is almost certainly lowering the level of gender inequality in American society, but stagnant levels of educational attainment by successive cohorts of American males are a source of concern regardless of whether one's focus is on national income or on the well-being of children and young adults. Given the growing evidence that social and behavioral as well as cognitive skills play a role in the educational process underlying these trends, the identification of strategies by which schools and families can increase the prevalence of these skills should be an important goal for future research and public policy development.

While our study was not designed to shed light on the effect of policy interventions on the development of social and behavioral skills, it is worth noting that the centerpiece of American education policy at present is standardized test-based accountability, whereby schools are held accountable for improving standardized test scores annually and teachers are increasingly evaluated based on these scores. Supporters of educational accountability largely assume that the activities schools pursue to increase test scores will also improve other unmeasured goals of education such as social and behavioral skills. Yet other studies suggest this may not be the case. For example, Jennings and DiPrete (2010) find that the kindergarten teachers who are effective at increasing academic skills are not necessarily effective at increasing social and behavioral skills, and Deming (2011) found that students winning a school choice lottery were less likely to be arrested than lottery losers, even though they did not experience gains in test scores. The evidence presented in this study, considered alongside the existing literature, suggest that we need to know more about the practices pursued by schools that improve non-test score outcomes, as well as the impact of current policy approaches on students' development of social and behavioral skills.

Social and behavioral skills have potential value for other life outcomes such as job market success, marriage and marital satisfaction, obesity, depression, and general health. On some of these outcomes, women do better than men on average, while on others, they do worse. Whether gender differences in social and behavioral skills play a role in explaining gender gaps on other life outcomes constitute a set of empirical questions that are not answered by the present analysis. These are important issues for future research.

Table A4
OLS estimates of gender differences in the effects of social and behavioral skills on academic outcomes.

	Social and behavioral factor				Approaches to learning residual			
	Test score		Teacher rating		Test score		Teacher rating	
	Main effect	Male–female	Main effect	Male–female	Main effect	Male–female	Main effect	Male–female
Reading								
Beginning of *K*	0.175***	−0.042	0.271***	−0.000	0.153***	−0.053	0.217***	−0.009
End of *K*	0.027	−0.006	0.220***	0.017	0.021	0.002	0.174***	0.024
End of 1st grade	0.037*	−0.024	0.101**	−0.032	0.047*	−0.076**	0.139***	−0.016
End of 3rd grade	0.058**	−0.033	0.123***	−0.018	0.052*	−0.005	0.138***	0.005
End of 5th grade	0.045**	0.023	0.174***	0.012	0.028*	0.004	0.106***	−0.033
Math								
Beginning of *K*	0.189***	−0.045	0.289***	−0.014	0.231***	−0.026	0.204***	0.012
End of *K*	0.084***	0.028	0.270***	0.052	0.060**	0.019	0.163***	−0.007
End of 1st grade	0.060**	−0.016	0.080*	−0.068	0.081***	−0.029	0.134**	0.011
End of 3rd grade	0.061**	−0.011	0.082*	−0.033	0.068**	−0.027	0.089**	−0.004
End of 5th grade	0.018	−0.031	0.152***	0.079	0.019	−0.030	0.134**	0.033
Retention								
End of *K*	−0.076	0.207			−0.165*	0.103		
End of 1st grade	−0.169*	0.067			−0.154	0.111		
End of 3rd grade	−0.108	0.099			−0.225*	−0.009		

Note: Control variables are identical with models presented in Table A3.
The main effect is specified with female as the reference group.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

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Acknowledgments

This research was supported by grants from the Spencer Foundation and from the American Educational Research Association. The authors analyzed restricted data from the ECLS–K under terms of a license between DiPrete and the National Center for Education Statistics.

Appendix A

See Tables A1–A4.

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