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What Parents Know About How Well Their Children Are Doing in School

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ABSTRACT. The authors used data from the Early Childhood Longitudinal Study–Kindergarten cohort to examine whether parents' knowledge of their children's reading and mathematics skills varies by academic domain and parents' income group or ethnicity. Of particular interest was how parents' knowledge is moderated by school- or home-based involvement. Parents' knowledge was moderately related to their children's reading and mathematics scores. However, there were systematic income- and ethnicity-related differences in the correlations. Poor parents were reportedly less involved at home and school than nonpoor parents. White, non-Hispanic parents were more involved at school than other parents. School-based rather than home-based involvement was related to the strength of the correlations between parents' knowledge and children's reading and mathematics scores.

Keywords: children's mathematics, children's reading, parents' knowledge of children's academic skills

Current federal educational policy emphasizes parents' involvement in their children's education (Pomerantz, Moorman, & Litwack, 2007). Such involvement is manifested through parents emphasizing the importance of school, having expectations for their children's progress, assisting with and monitoring homework completion, providing supplies and helping children structure their time, assisting in school, and communicating with teachers and school staff. Researchers have speculated that parent involvement can show children that parents think school is important, provide instruction and guidance at home, help inform parents of their children's academic strengths and needs, and establish closer relationships with teachers (for reviews, see Mashburn & Pianta, 2006; Sonnenschein & Schmidt, 2000). Parent involvement is related to children's academic achievement (e.g., Davis-Kean, 2005; Izzo, Weissberg, Kasprow, & Fendrich, 1999; Jeynes, 2005; Rimm-Kauffman & Pianta, 1999). However, there are ethnicity- and income-related differences in the amount and nature of involvement (e.g., Sy & Schulenberg, 2005) and the relation between parents' involvement and children's achievement (Desimone, 1999).

Theories of parental involvement have focused on why parents choose to become involved (Hoover-Dempsey & Sandler, 1997) and ways that teachers and schools can engage parents (Epstein, 2001). Researchers have documented the nature of parents' involvement, differences across ethnic and income groups, and how to increase involvement (e.g., Epstein, 2001; Green, Walker, Hoover-Dempsey, & Sandler, 2007; Izzo et al., 1999; Wong & Hughes, 2006). Researchers also have documented parents' cognitions about children's development and their role in such development (Simpkins, Fredericks, & Eccles, 2012). Parents' cognitions are an important area of inquiry because these cognitions predict parents' behaviors (Goodnow, 1992; McGillicuddy-DeLisi & Sigel, 2002; Sigel, 1992), which should include parents' involvement in their children's education.

One component of parents' cognitions about children's development is parents' knowledge of their children's capabilities and skills (Simpkins et al., 2012). Relative to research in other aspects of parental involvement, there has been less inquiry into parents' knowledge of their children's capabilities, particularly, their academic strengths and weaknesses. Ensuring that parents are knowledgeable about their children's academic skills is important, if parents are to effectively assist their children at home with schoolwork. That is, parents should tailor their interactions to their children's competencies, if such interactions are to be maximally effective (e.g., Alexander, Entwisle, & Bedinger, 1994, Bornstein, Cote, Haynes, Hahn, & Park, 2010).

This study uses data from the Early Childhood Longitudinal Study–Kindergarten cohort (ECLS-K; Tourangeau, Nord, Pollack, & Atkins-Burnett, 2006) to examine the relation of parents' relative ratings of their Grade 3 children's reading and mathematics skills with children's actual performance on standardized measures, and whether the relation varies by academic domain or parents' ethnic or income group. Parents' ratings of their children's reading and

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mathematics skills are considered an indicant of their knowledge of their children's academic skills. Of particular interest are two sources of information that may inform parents' ratings: information provided by the school and information gleaned from interacting at home with their children.

Parents' Knowledge

Parents' knowledge is an important component of parents' cognitions (Bornstein et al., 2010; Huang, Caughy, Genevro, & Miller, 2005). Parents' knowledge about children's development is thought to influence how parents interact with children and the experiences they make available to them (Cote & Bornstein, 2001; Miller, 1988). Parents who are more knowledgeable about their children's abilities interact more sensitively with their children and provide more appropriate learning environments (Miller, 1988). On the other hand, parents often overestimate their children's skills (Miller, Manhal, & Mee, 1991; Pezdek, Berry, & Renno, 2002).

Parents' knowledge is related to their age and sociodemographic background (Bornstein et al., 2010; Huang et al., 2005). For example, Bornstein et al. (2010) demonstrated, using MacPhee's (1981) Knowledge of Infant Development Inventory (KIDI), that more educated mothers exhibited greater knowledge of infant and toddlers' development norms than less educated mothers.

Research on parents' knowledge has often focused on parents of infants through preschoolers rather than on parents of older children (cf. Simpkins et al., 2012). Much of the research has focused on parents' knowledge of developmental milestones (Bornstein et al., 2010). Far less research has addressed parents' knowledge of children's specific academic skills (reading and mathematics), the focus of this study. Moreover, there has been limited research into experiences that inform parents' knowledge, another focus of this study.

Reading versus mathematics domains. There has been little, if any, research comparing parents' knowledge of their children's reading and mathematics skills. However, research into others aspects of reading and mathematics suggest that parents' knowledge of their children's skills in these two academic domains might differ. Although both reading and mathematics are considered foundational areas for children to master, children spend more time during the first years of school engaged in reading than mathematics (e.g., Downer & Pianta, 2006; Guarino, Hamilton, Lockwood, & Rathbun, 2006). There is extensive research investigating the role that parents play in their children's literacy acquisition; however, there is less research on their role in mathematics acquisition (Huntsinger, Jose, Larson, Krieg, & Shaligram, 2000). The available research suggests that children spend less time at home engaged in mathematics than literacy activities (Huntsinger et al., 2000; Tudge & Doucet, 2004), which suggests that parents may be less knowledgeable about how well their children are doing in mathematics than reading. This study investigates whether parents are less knowledgeable about their children's mathematics than their reading skills.

Ethnicity- and income-related differences in parents' knowledge. Although there has not been much research exploring demographic differences in parents' knowledge about their children's development, the few studies that have explored demographic differences support the need for further inquiry. For example, Bornstein et al. (2010) found that older and more educated mothers display greater knowledge of their young children's development. Inquiries into other aspects of parenting, such as parents' involvement, also show demographic differences (Davis-Kean, 2005).

Low-income, Hispanic, and Black parents are generally less involved than middle-income White families (e.g., Garcia Coll et al., 2002; Keels, 2009; Nzinga-Johnson, Baker, & Aupperlee, 2009). It is important, however, to distinguish parental involvement at home and at school because there are differences in the patterns of involvement and in the effectiveness of involvement in the two locales (Galindo & Sheldon, 2012; Izzo et al., 1999). Given differences across demographic groups in reported parent involvement, this study investigates whether there are ethnicity- or income-related differences in parents' knowledge about their children's reading and mathematics skills.

Sources of parents' knowledge. Parents form impressions of how well their children are faring academically from a number of sources (Bornstein et al., 2010). Considering the school as a source of information, parents review their children's report cards and meet with their children's teachers to discuss progress. Parents also can volunteer in class and see how their children and others perform. At home, they can work with their children.

Research has not investigated whether school or home is a more effective source of information for parents. However, findings by Dearing, Kreider, Simpkins, and Weiss (2006) suggest that school-based information may be more effective, at least for low-income families. They found that for low-income parents with limited education, higher involvement in activities at their children's school predicted children's literacy development.

This study extends prior research by investigating whether there are ethnicity- or income-related differences in the sources of parents' knowledge about their children's academic skills. To address this issue, we compare the frequency of parents' school- and home-based involvement and whether it varies with ethnicity or income. We then explore whether either school- or home-based sources of information moderate the relation between parents' ratings of children's reading/mathematics scores and children's actual scores.

The Present Study

Parents' knowledge about their children's development is considered an important component of parenting (Bornstein et al., 2010). Much of the research on this topic has focused on knowledge of developmental milestones or focused on parents of infants through preschool-age children. Understanding what parents know about their elementary school-age children's academic skills is relevant for developing ways to improve parental involvement in children's education. To effectively assist a child with school, a parent should have a realistic understanding of the child's skills and needs (Alexander et al., 1994). Relatedly, it is important to understand whether parents' knowledge of children's academic skills varies by domain (reading vs. mathematics) and parents' demographic background (ethnicity and income). Research on other aspects of parenting finds differences related to academic domain and parents' demographic background. Learning more about the experiences that inform parents about their children's reading and mathematics skills will allow the development of ways to improve parents' knowledge. This is particularly important for groups most at risk for academic difficulties (e.g., low-income, Black, and Hispanic children).

This study addresses parents' knowledge of their children's reading and mathematics skills and how home and school interactions inform such knowledge. We investigated how ratings given by parents of their third-grade students' relative reading and mathematics skills correlate with children's scores on standardized achievement tests. Correlations between parents' ratings and children's scores were predicted to be moderated by parents' income and ethnicity because of income- and ethnicity-related differences in parent involvement (Davis-Kean, 2005). Poor and minority parents are reportedly less involved than nonpoor or White parents (e.g., Izzo et al., 1999). Therefore, we expected to find lower correlations between ratings from poor and Black, non-Hispanic or Hispanic parents. We also expected that correlations between parents' ratings and children's reading scores would be higher than correlations between parents' ratings and children's mathematics scores, based on differences in children's home engagement in reading and mathematics activities (Huntsinger et al., 2000).

We focused on third-grade students in this study because Grade 3 is traditionally viewed as an important turning point in school: The instructional emphasis changes from helping children acquire foundational skills to using those skills for learning higher level content and skills (e.g., Balsiger, n.d.; National Association of School Psychologists, 2006).

A second purpose of this study was to compare whether parents' home- and school-based involvement would vary with ethnicity and income. Consistent with prior research (Keels, 2009; Nzinga-Johnson et al., 2009), we expected that nonpoor and White, non-Hispanic parents would report greater involvement than poor and Black, non-Hispanic or Hispanic parents.

The third purpose of this study was to investigate whether parents' home interactions with their children or their observations or interactions at school moderated the correlations between their ratings and their children's reading and mathematics scores. There has not been much research on this topic so it was not possible to formulate hypotheses.

Method

Participants

Participants were selected from the ECLS-K (publicly available data set), which followed a nationally representative group of 17,565 children from kindergarten through Grade 5 (Tourangeau et al., 2006). We examined the panel of 10,135 children who were assessed as third-grade students and who had valid reading and mathematics assessment scores and available parent and teacher ratings. The sample was approximately evenly divided between boys and girls (49.1%). Information about children's ethnicity and parents' education level and income came from telephone interviews with the parents, typically the mothers, during the fall of kindergarten. The majority of children in our sample were White, non-Hispanic (64%). Ten percent were Black, non-Hispanic; 14% were Hispanic[1]; 5% were Asian; and 6% were other. For analyses, race/ethnicity categories were dummy coded with White, non-Hispanic serving as the referent category.

Information about families' income came from responses to the question "What was the total income of all persons in your household over the past year, including salaries or other earnings, interest, retirement, and so on for all household members?" Consistent with how ECLS-K coded such information, we divided the sample into poor (making $25,000 or less per year) and nonpoor (making more than $25,000 per year). We categorized families into poor and nonpoor based on research showing that the impact of poverty is felt most by people in the lowest stratum (Dearing, McCartney, & Taylor, 2001; Dotterer, Iruka, & Pungello, 2012). There were 1,828 poor families and 7,913 nonpoor families. About 400 families did not provide income information. For analyses, a dichotomous income variable was created where poor families were coded as 0 and nonpoor families were coded as 1.

Parents' education level was based on the highest amount of education reported for either parent. Values ranged from 1 to 9. At the low end, 1 represented Grade 8 or below and 2 was Grades 9–12 (without high school diploma). At the higher end, a value of 8 reflected master's degree and 9 represented doctorate or professional degree. Weighted mean education for the entire sample was 4.82 ($SD = 1.90$) and can be interpreted as some college (4 = vocational/technical program, 5 = some college, and 6 = bachelor's degree). The weighted mean education for poor parents was 3.46 ($SD = 1.71$); for nonpoor parents the weighted mean was 5.31 ($SD = 1.72$).

For the focal children in the study, 3,213 Grade 3 teachers in 1,485 schools provided ratings of the parents' interactions with the school. Analyses were statistically adjusted for clustering of students in schools, as described in the analysis section.

Measures

Parents' ratings of children's reading and mathematics skills

Parents were asked to rate their children's reading and mathematics skills.

Ratings of reading. Parents responded on a 5-point Likert-type scale to the question, "Compared to other children in {CHILD's} class, how well do you think {he/she} is doing in school this spring in reading/language arts?" Response options ranged from 1 (*much worse*) to 5 (*much better*). Responses from the less than 1% of parents who refused to answer or responded "don't know" were not included in the analyses.

Ratings of mathematics. Parents responded on a 5-point Likert-type scale to the question, "Compared to other children in {CHILD's} class, how well do you think {he/she} is doing in school this spring in mathematics?" Response options ranged from 1 (*much worse*) to 5 (*much better*). Responses from the relatively few parents (less than 1%) who refused to answer or responded "don't know" were not included in the analyses.

Parents' home-based involvement

We created an index of items to tap parents' home-based involvement with their children's schooling using a subset of items included in the home environment section of the ECLS-K. Items in the ECLS-K home environment section were adapted from the commonly used Home Observation for Measurement of the Environment (HOME) Inventory developed by Caldwell and Bradley (1984). The HOME Inventory includes questions about a broad array of parenting activities and provision of artifacts relevant for children's development. Areas of inquiry include parent engagement in activities with children at home, child's engagement in organized classes and lessons outside of school, child's attendance at cultural events (e.g., concert, play), and presence of books and newspapers at home. We included in our indices only those items that we believed might directly foster parents' knowledge of their children's reading and mathematics skills.

Involvement with reading. An index reflecting each parent's responses to four questions was created.

Question 1: "In a typical week, how often do you or any other family member read books to {CHILD}?" Response options on a 4-point scale of 1–4 were not at all, once or twice, 3–6 times, and every day, respectively.

Question 2: "During this school year, how often have you (or other family member) helped {CHILD} with {his/her} language arts or spelling homework?" Response options on a 5-point scale from 0 to 4 were never, less than once a week, 1–2 times a week, 3–4 times a week, and 5 or more times a week, respectively.

Question 3: "In a typical week, how often do you or any other family member practice reading, writing, or working with numbers with {CHILD}?" Response options on a scale of 1–4 were not at all, once or twice, 3–6 times, and every day, respectively.

Question 4: "In the past month has anyone in your family visited a library with {CHILD}?" Parents received a 3 if they responded affirmatively. Parents scored a 2 if they responded "no" to the question, but yes to the question, "How about in the past year? Has anyone in your family visited a library with {CHILD}?" Parents scored a 1 on this variable if they responded with a "no" to both questions.

Because the number of response options differed across questions, parents' responses to each question were standardized to Z scores based on the overall sample weighted mean and standard deviation. These Z scores were then summed to create a reading involvement index for each parent.

Involvement with mathematics. An index score reflecting each parent's responses to two questions was created.

Question 1: "During this school year, how often have you or another adult helped {CHILD} with {his/her} mathematics homework?" Response options scored on a 5-point scale ranging from 0 to 4 were never, less than once a week, 1–2 times a week, 3–4 times a week, 5 or more times a week, respectively.

Question 2: "In a typical week, how often do you or any other family member practice reading, writing, or working with numbers with {CHILD}?" Response options on a 4-point scale ranging from 1 to 4 were not at all, once or twice, 3–6 times, and every day, respectively.

Similar to the involvement with reading activities index, parents' responses to each question were standardized to Z scores prior to summing because the number of response options differed across the questions comprising the mathematics involvement index.

School-based involvement

Parents and teachers independently completed ratings of parents' involvement in school-based activities.

Parents-reported involvement. Questions in this index came from the parent involvement question in the ECLS-K data set. Parents were asked five questions about their involvement at their child's school. Each question began

with, "Since the beginning of the school year have you or the other adults in your household attended . . . ?" If they responded affirmatively, they were asked to specify who attended. We included parents' responses to probes about attending "an open house or back-to-school night, a PTA, PTO or Parent-Teacher Organization, a regularly scheduled parent–teacher conference with {CHILD's} teacher or meeting with {CHILD's} teacher, school or class event, such as a play, sports fair or science fair, volunteered at the school or served on a committee." Each response indicating parent attendance at an event was scored as 1. Responses were summed to create an index of parent-reported involvement at school. Index scores could range from 0 to 5. Parents also were asked a sixth question about their involvement in fundraising activities at school. However, that information did not seem pertinent for our interests and therefore was not included in the index.

Teacher reports of parents' involvement at school. Teachers were asked to indicate whether the children's parents participated in four activities tapping their involvement in the classroom. "During this school year, have {CHILD's} parents/guardians participated in the following activities: attended regularly scheduled conferences in your school, attended parent–teacher informal meetings that you initiated to talk about {CHILD's} progress, initiated contact with you, volunteered to help in your classroom or school?" Affirmative responses were scored 1. Scores were summed to create an index of teacher reports of parents' involvement at school. Index scores could range from 0 to 4. Teachers reported on parents' involvement in the class or meetings with the teacher. Questions to teachers also probed parents' involvement in other school activities but these were not included in this index because these were thought not to be relevant to fostering parents' knowledge of their children's reading and mathematics skills.

Children's reading and mathematics scores

The reading and mathematics assessments used in the ECLS-K are based on the Grade 4 assessments from the National Assessment of Educational Progress (1992, 1994 reading; 1996 mathematics; Pollack, Atkins-Burnett, Rock, & Weiss, 2005), adapted to be age appropriate for each age group assessed in the ECLS-K. These assessments generally tap aspects of reading and mathematics content, except for reading and mathematics fluency, and writing skills, consistent with theory and recommendations from the National Reading Panel, National Council of Teachers of Mathematics, National Mathematics Advisory Panel and related groups (for additional description of the measures and their development, see Pollack et al., 2005).

The reading and mathematics assessments are based on a conceptualization of a single continuum of reading (or mathematics) skills that develop from kindergarten through Grade 5. Child scores on content domains from the ECLS-K are available in different formats including item response theory (IRT) latent ability estimates, proficiency scores, and *t* scores (Pollack et al., 2005). Analyses included in this paper are based on reported *t* scores, after standardizing them to *Z* scores based on the sample mean and standard deviation.

Reading scores. Items in the entire reading battery come from nine content areas. In order of increasing difficulty these content areas are: identifying upper- and lowercase letters, associating letters with sounds at the beginning of words, associating letters with sounds at the ends of words, recognizing common sight words, reading words in context, making literal inferences, identifying clues to make inferences, evaluating narrative text, and evaluating nonfiction text. The Grade 3 assessment included items that emphasized phonemic awareness, single-word decoding, reading vocabulary, and comprehension. Fifteen percent of the Grade 3 items focused on basic decoding skills (phonemic awareness and single word decoding), 10% focused on vocabulary, and 75% focused on reading comprehension (Pollack et al., 2005). The IRT estimated reliability for the assessment in the spring of Grade 3 was .94 (Tourangeau et al., 2004; for complete description of psychometrics, see Pollack et al., 2005). The reliability (alpha coefficient) for the 15-item reading routing test was .75 (Tourangeau et al., 2004).

Mathematics scores. The mathematics battery assesses skills in conceptual and procedural knowledge and problem solving. Similar to the reading assessment, it includes items from nine content areas. In order of increasing difficulty, these content areas are number and shape, relative size, ordinality and sequence, addition and subtraction, multiplication and division, place value, rate and measurement, fractions, and area and volume. The Grade 3 assessment included items that emphasized number sense, properties, and operations (40% of items focused on number sense and properties and operations; Pollack et al., 2005); measurement (20% of items); geometry and spatial sense (15% of items); data analysis, statistics, and probability; and pattern (10% of items), algebra, and functions (15%). The IRT estimated reliability for the assessment in the spring of Grade 3 was .95 (Tourangeau et al., 2004; for additional psychometric information, see Pollack et al., 2005). The reliability (alpha coefficient) for the 17-item mathematics routing test was .86 (Tourangeau et al. 2004).

Procedure

Demographic information about the parents was collected when children were in kindergarten or first grade. Parents' ratings of their children's mathematics and reading skills and their involvement at home and school were collected in individual interviews conducted in the spring of Grade 3. Parents were interviewed by phone, or if there was no phone in the home, in person (Tourangeau et al., 2006).

TABLE 1. Means and Standard Deviations of Measures

Measure	*n*	M	*SD*	Minimum score	Maximum score
Children's *t* score					
Reading	10,135	50.59	9.87	14.56	84.40
Mathematics	10,135	50.69	9.81	15.88	84.40
Parent's ratings of child's skills					
Reading	10,135	3.89	1.05	1	5
Mathematics	10,135	3.86	1.02	1	5
Parent home-based involvement					
Reading	10,074	−0.02	2.48	−8.45	4.27
Mathematics	10,075	0.01	1.57	−4.80	2.19
Parent school-based involvement					
Parent reported	10,135	3.45	1.25	0	5
Teacher reported	10,135	2.15	1.54	0	4

Note. All scores are weighted. Parent home-based involvement is based on Z scores.

Teachers' ratings of parents' involvement also were collected in the spring of Grade 3 through completion of self-administered questionnaires.

Children were individually tested at their school in the spring of Grade 3 by trained personnel (Tourangeau et al., 2006). They first completed the reading assessment followed by the mathematics assessment. For reading, each child was given a 15-item routing test that was used to determine the appropriate difficulty level of the remainder of the test consistent with adaptive testing in IRT (Pollack et al., 2005; Tourangeau et al., 2004). Depending on how the child scored on the routing test, he or she completed an additional subset of reading items from a set of 186 possible items. For mathematics, each child was given a 17-item routing test followed by a subset of mathematics items from a set of 153 possible items.

Analyses

In order to obtain unbiased parameter estimates and appropriate standard error estimates, all analyses used the Grade 3 panel weight and Taylor Series linearized estimates of standard errors to adjust for clustering in the sampling design. Descriptive statistics were calculated using PROC SURVEYMEANS and PROC SURVEYFREQ in SAS 9.1 (SAS Institute, Cary, NC) and mean differences across groups were tested with PROC SURVEYREG. In estimating correlations between parent ratings and relative child ability, regression analyses were conducted using standardized variables. To test for differences in correlations across parents, interaction terms were added to the model. To test for differences in correlations of mathematics and reading, the procedure of testing dependent nonoverlapping correlations outlined by Raghunathan, Rosenthal, and Rubin (1996) was undertaken.

Results

We organize the presentation of findings along the three foci of this study: parents' knowledge of their children's reading and mathematics skills, parents' involvement at home and at school, and the role that home and school play to inform parents about their children's reading and mathematics skills. Table 1 presents descriptive statistics for the children's reading and mathematics scores, parents' home involvement with reading and mathematics, and school involvement as reported by parents and teachers.

Parents' Knowledge of Their Children's Reading and Mathematics Skills

Parents' ratings of relative child ability were moderately correlated with children's reading and scores (see Table 2). Contrary to our predictions, the correlations between parents' reading ratings and children's reading scores ($r = .34$) and between parents' mathematics ratings and children's mathematics scores ($r = .33$) were not significantly different from each other ($Z = 0.35$, $p = .364$). However, consistent with our predictions, there were differences in the strengths of the correlations across parents' demographic background.

Poor parents had significantly lower correlations among their ratings and their children's reading ($r = .29$) and mathematics scores ($r = .25$) than nonpoor parents: reading, $t(431) = 2.09$, $r = .37$, $p = .037$; mathematics, $t(431) = 3.68$, $r = .36$, $p < .001$. White, non-Hispanic parents had significantly higher correlations between their ratings

TABLE 2. Correlations Between Parents' Ratings and Children's Reading and Mathematics Scores

	Parent's rating and child's reading score	*p*	Parent's rating and child's mathematics score	*p*
Overall	.34		.33	.364
Income				
Poor	.29		.25	
Nonpoor	.37	.037	.36	<.001
Race/Ethnicity				
White, non-Hispanic	.46		.41	
Black, non-Hispanic	.29	<.001	.27	.033
Hispanic	.24	<.001	.25	<.001
Asian	.33	.021	.41	.440

Note. All statistical comparisons of race/ethnicity were conducted using White, non-Hispanic parents as the referent group. All *p* values represent the significance level for the comparison between the correlations of parent ratings and student scores for income or ethnic groups.

and their children's reading scores than corresponding correlations between the three other groups of parents and their children's reading scores: Black, non-Hispanic, $t(383) = 3.87$, $p < .001$; or Hispanic parents, $t(399) = 5.51$, $p < .001$; or Asian parents, $t(355) = 2.32$, $p < .021$ (see Table 2). White, non-Hispanic parents also had significantly higher correlations between their mathematics ratings and their children mathematics scores than corresponding correlations between Black, non-Hispanic, $t(383) = 2.14$, $p < .033$, or Hispanic parents and their children's mathematics scores, $t(399) = 6.23$, $p < .001$. In contrast, White, non-Hispanic parents had statistically equivalent correlations of their ratings of their children's mathematics skills and their children's mathematics score to Asian parents and their children's mathematics scores, $t(355) = 0.77$, $p = .440$.

Parents' Involvement at Home and School

Findings of parents' involvement at home and school were consistent with our predictions. Table 3 displays the weighted means for poor and nonpoor parents' involvement at home and school. Poor parents had significantly lower means than non-poor parents for parent-reported school involvement, $t(431) = 15.07$, $p < .001$, Cohen's $d = .61$, and teacher-reported parent school involvement, $t(431) = 11.02$, $p < .001$, Cohen's $d = .40$. Similarly, poor parents had significantly lower means than nonpoor parents on parent-reported home involvement with reading, $t(431) = 3.62$, $p = .001$, Cohen's $d = .40$, and mathematics, $t(431) = 2.40$, $p = .017$, Cohen's $d = .16$.

As shown in Table 4, White, non-Hispanic parents were rated by both parents and teachers as more involved at

TABLE 3. Parents' Involvement at School and Home in Children's Education, Organized by Income Groups

	Poor ($n = 1{,}807$)		Nonpoor ($n = 7{,}745$)		
	M	*SE*	M	*SE*	*p*
Parent-reported school involvement	2.92	0.04	3.65	0.03	<.001
Teacher-reported parent school involvement	1.71	0.06	2.32	0.04	<.001
Parent-reported home involvement with reading	−0.29	0.10	0.11	0.04	.001
Parent-reported home involvement with mathematics	−0.10	0.07	0.06	0.03	.017

Note. *Z* scores are used in the two indices of parent-reported home involvement. Scores on the parent-reported school involvement scale could range from 0 to 5; scores on the teacher-reported school involvement scale could range from 0 to 4.

TABLE 4. Parents' Involvement at School and Home in Children's Education, Organized by Race/Ethnicity

	White, non-Hispanic (n = 6,363)		Black, non-Hispanic (n = 1,033)		Hispanic (n = 1,414)		Asian (n = 479)	
	M	*SE*	M	*SE*	M	*SE*	M	*SE*
Parent-reported school involvement	3.65	0.03	3.19	0.07	3.19	0.06	3.25	0.08
Teacher-reported parent school involvement	2.45	0.05	1.71	0.09	1.73	0.06	1.64	0.12
Parent-reported home involvement with reading	0.03	0.02	0.07	0.03	−0.06	0.04	0.05	0.06
Parent-reported home involvement with mathematics	0.01	0.03	0.19	0.05	−0.04	0.04	−0.08	0.07

Note. Z scores are used in the two parent-reported home involvement indices. Scores on the parent-reported school involvement scale could range from 0 to 5; scores on the teacher-reported school involvement scale could range from 0 to 4.

school than (a) Black, non-Hispanic parents: parent ratings, $t(383) = -6.22$, $p < .001$, Cohen's $d = .20$; teacher ratings, $t(383) = -7.68$, $p < .001$, Cohen's $d = .21$; (b) Hispanic parents: parent ratings, $t(399) = -6.83$, $p < .001$, Cohen's $d = .20$; teacher ratings, $t(399) = -10.18$, $p < .001$, Cohen's $d = .22$; or (c) Asian parents: parent ratings, $t(355) = -4.49$, $p < .001$, Cohen's $d = .19$; teacher ratings, $t(355) = -7.65$, $p < .001$, Cohen's $d = .24$. There were no significant differences among the other groups.

Significant differences in parents' reported involvement in reading and mathematics activities at home also were found. Black, non-Hispanic parents reported significantly more involvement, on average, in reading activities at home than Hispanic parents, $t(327) = -2.61$, $p = .010$, Cohen's $d = .10$. There were no other significant differences among comparisons of the groups. Black, non-Hispanic parents also reported significantly more involvement, on average, in mathematics activities at home than White, non-Hispanic parents, $t(383) = 2.23$, $p = .026$, Cohen's $d = .09$; Hispanic parents, $t(327) = -2.64$, $p = .009$, Cohen's $d = .15$; or Asian parents, $t(254) = -2.10$, $p = .036$, Cohen's $d = .17$.

Sources of Parents' Knowledge of Their Children's Reading and Mathematics Skills

Teachers' reports of parents' involvement at school moderated the relation of parent rating and actual child ability in both reading ($\beta = .023$), $t(432) = 2.47$, $p = .014$, and mathematics ($\beta = .019$), $t(432) = 2.15$, $p = .032$. That is, when teacher-reported parent involvement was higher, the correlation between parent ratings and children's reading and mathematics scores were higher. In contrast, parents' reports of their involvement at school did not moderate the correlation between their ratings of their children's relative ability and children's scores in reading ($\beta = .016$), $t(432) = 1.29$, $p = .199$, or mathematics ($\beta = .011$), $t(432) = 1.08$, $p = .283$. Interestingly, parents who reported more involvement at home had lower correlations between their ratings of their child's ability and the child's reading ($\beta = -.03$), $t(432) = 1.97$, $p = .050$, and mathematics scores ($\beta = -.03$), $t(432) = 2.15$, $p = .032$.

Discussion

This study extended research into parents' knowledge of their children's development by investigating how ratings given by parents of their third-grade students' reading and mathematics skills correlated with children's scores on standardized achievement tests, and whether parents' home interactions with their children or their observations/interactions at school moderated the correlations. There were three noteworthy sets of findings. One, parents' ratings were moderately related to their children's reading and mathematics scores. Although the correlations were statistically significant, these findings suggest a need to improve parents' knowledge of their children's academic competencies in order that they may more effectively assist their children. Contrary to our predictions, correlations between parents' ratings and children's scores in reading were *not* significantly different from those in mathematics. However, consistent with our predictions, there were systematic income- and ethnicity-related differences in the correlations.

Ratings by nonpoor parents were significantly more highly correlated with their children's reading and mathematics scores than ratings by poor parents. Ratings by White, non-Hispanic parents of their children's reading were more highly correlated with their children's scores than were correlations between Black, non-Hispanic, Asian, or Hispanic parents and their children's scores. The pattern was different for

ratings of mathematics scores: correlations between parents' ratings and children's scores were comparable for White, non-Hispanic and Asian parents. Again, it is worth noting that the strongest correlations, for White, non-Hispanic parents, fell only in the moderate range.

Two, consistent with prior research (Garcia Coll et al., 2002; Davis-Kean, 2005; Keels, 2009; Nzinga-Johnson et al., 2009) and our own predictions, there were group-related differences in parents' patterns of reported involvement. Poor parents were reportedly less involved at home and school than nonpoor parents. White, non-Hispanic parents were more involved at school than other parents.

Three, correlations between parents' ratings and children's reading and mathematics scores were slightly higher when they were more involved at school (as reported by teachers). Such findings are consistent with those by Galindo and Sheldon (2012), who also used the ECLS-K data set and found that kindergarten parents' involvement at school but not at home was related to children's end-of-the-year scores in reading and mathematics (see also Dearing et al., 2006). Somewhat similarly, Fan and Chen (2001) found that parents' reported involvement at home was not related to children's school-based achievement (see also Pezdek et al., 2002).

How can we explain the different outcomes for school- and home-based involvement? In the classroom, parents can see instructional processes, see their children's performance relative to others and get suggestions from teachers. Parents may need more explicit guidance when interacting at home to infer correct information about their children's academic skills. In fact, consistent with findings by Miller et al. (1991), many parents may have overestimated their children's skills. Sixty-seven percent reported that their children were doing better than peers in reading and mathematics.

The overestimation of their children's skills may help explain the negative correlations between increases in parents' reported home involvement and the correlations between their ratings of children's relative skills and the children's scores. That is, parents may use incorrect standards or information at home to judge how well their children are learning (see also Pezdek et al., 2002).

Why were teachers' reports of parent involvement at school but not parents' reports significantly related to children's scores? The parent reported scale included school activities beyond just meeting with the teacher or assisting in the classroom. Such activities may be important for supporting the school's mission and for showing children that their parents support their schooling; however, they do not inform the parent how the child is progressing academically.

As noted previously, there were consistent income- and ethnicity-related differences in the relations between mothers' ratings and their children's reading/mathematics scores and mother's involvement at home and school. Nonpoor and White, non-Hispanic mothers had higher correlations and reportedly were more involved at home and school. As other research indicates, poor, Black, non-Hispanic and Hispanic children are most at risk for academic difficulties (Connell, 2002). Findings with poor and minority children highlight the need for teachers to make extra effort to reach out to parents of these children to make sure parents are well informed about how their children are faring and to develop ways to improve their skills.

There were five limitations to this study. One, this research used an existing data set (ECLS-K) to investigate sources of parents' knowledge and how that relates to their knowledge of their children's academic skills. Although the data set offers access to a large sample of nationally representative families, research is limited by what questions were asked. Our understanding of how parents learn about their children's academic skills would benefit from a more refined set of probes. Two, the information about parent involvement came from self-reports so may not reflect actual levels of involvement. Three, the items used to assess parents' home involvement in the ECLS-K came from the HOME Inventory (Caldwell & Bradley, 1984). We used only those items we thought most directly relevant for reading and mathematics development. Although we did not use all the items from the HOME Inventory, the ECLS-K dataset also did not include the full set of items. Four, the number of items in the parent- and teacher-reported indices of school involvement differed (five vs. four). However, these two indices were used in separate analyses. Five, although the reported findings were statistically significant, the effect sizes were small.

In conclusion, research shows that parent involvement is positively related to children's academic outcomes (Galindo & Sheldon, 2012; Jeynes, 2005). However, there are consistent ethnic- and income-related differences in parents' involvement. As this study shows, there are also differences in parents' knowledge about their children's academic skills. If educators want parents to be effectively involved in their children's education, it is important to help them become more aware of their children's progress. Being active in the classroom and meeting with teachers is one important means of increasing parents' awareness. But this may not be a realistic means for parents whose schedules limit their availability to come to school. Thus, educators should look for other, effective ways to increase parents' awareness. This is particularly important for poor and minority parents.

NOTE

1. We combined Hispanic-race specified and Hispanic-race not specified respondents into one group. The other group consisted of the combination of Pacific Islanders, Native Americans, multirace individuals, and unknowns. Because there were relatively few children in these groups, we combined the groups.

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