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Can Teacher Ratings of Students' Skills at Kindergarten Entry Predict Kindergarten Retention?

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ABSTRACT. Though early childhood literature defines kindergarten readiness in the context of the whole child across multiple domains, there is little research to demonstrate the relative influence of these domains on success in the kindergarten year. In this study, we use teacher judgments of students at the start of the kindergarten year across multiple domains as predictors of retention in kindergarten the following year. The analyses demonstrated that low ratings of students' skills are predictive of retention, particularly for young males eligible for free or reduced-price lunch. Further, the analyses showed that of the set of domains, low ratings of literacy and numeracy skills are most closely associated with increased likelihood of retention.

Keywords: assessment, early childhood, kindergarten readiness

Early childhood researchers across the United States are focused on developing assessments of kindergarten readiness based on teachers' observations of children's skills and abilities across multiple developmental domains (Daily, Burkhauser, & Halle, 2010). Previous research has indicated that most teachers' assessments of older children's academic ability are fairly accurate when compared with their performance on standardized tests (Hoge & Coladarci, 1989; Jussim, 1989; Jussim & Eccles, 1992). Little is known, however, about the association between teacher judgments of students' abilities at the start of formal schooling and later academic achievement. In this study, we use data from one state's inventory of students' skills at the start of kindergarten to predict retention in kindergarten the following year. The analyses were designed to identify the variable influence of multiple developmental domains in predicting risk for kindergarten retention.

The Influences of Teacher Expectations and Teacher Judgment

Much has been written about the connection between teacher expectations and student achievement. Gender and social skills emerged as consistent predictors of teacher ex-

pectations of reading and mathematical ability in one longitudinal study of learning in the primary years (Hinnant, O'Brien, & Ghazarian, 2009). The authors also found that teacher expectations were more strongly related to later achievement for groups of children who might be considered to be at risk. In an earlier longitudinal study of 110 four-year-olds (Alvidrez & Weinstein, 1999), children of higher socioeconomic status and children perceived as assertive and independent were judged more positively by their teachers. In addition, teacher estimates of intelligence significantly predicted the children's grade point average and Scholastic Aptitude Test scores 14 years later, after controlling for socioeconomic status.

However, there has been significant controversy about the influence of teacher expectations on student achievement. The issue centers on the belief in the phenomenon of self-fulfilling prophecies in the classroom: Teachers' erroneous beliefs about student abilities lead to student performance consistent with teacher expectations. Jussim and Harber (2005) reviewed this controversy and found that while self-fulfilling prophecies can occur in the classroom, their effects are usually small and do not accumulate from year to year or from teacher to teacher. In fact, they found that the effects of teacher expectations are more likely to decrease rather than increase over time. In addition, teacher expectations may be predictive of student outcomes because they are true and accurate, and not because they are self-fulfilling. Other studies comparing children's performance on standardized tests to teacher assessments of children's abilities also indicate that teacher assessments are fairly accurate (Hoge & Coladarci, 1989; Jussim, 1989; Jussim & Eccles, 1992). Much of the early childhood research on teacher perceptions of readiness has focused on social skills and health over academic needs. The top three qualities that public school kindergarten teachers consider essential for school

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readiness are that a child be (a) physically healthy, rested, and well-nourished; (b) able to communicate needs, wants, and thoughts verbally; and (c) enthusiastic and curious in approaching new activities (Heaviside & Farris, 1993). A decade later, further research confirmed that teacher perceptions of kindergarten success rest on the child's health, social competence, and ability to communicate and follow directions (Lin, Lawrence, & Gorrell, 2003; Wesley & Buysse, 2003). Other studies suggest that parents and preschool teachers place greater emphasis on academic competencies and basic knowledge, such as letters of the alphabet, than kindergarten teachers (Haines, Fowler, Schwartz, Kottwitz, & Rosenhoetter, 1989; Harradine & Clifford, 1996; West, Jausken, & Collins, 1993). If a child is willing and able to learn, kindergarten teachers see that the numeracy and literacy skills will follow.

Teacher judgment also weighs heavily in decisions about retention. Bowman (2005) suggested that teacher recommendations may be biased by the teacher's personal beliefs and feelings about retention. Wang and Wang (2007) conducted a study of whether a statistical model of ninth-grade students' retention classification provided a more accurate prediction of how well the students would do in later school achievement tests than the current promotion/retention policy classification used at the school district. Stated differently, their analysis compared a retention policy based on teacher judgment to a statistical system of identification for retention. Their statistical model included the following predictors: gender, race/ethnicity, eligibility for free or reduced-price lunch, language status, eligibility for gifted or special education services, students' grade point average, and students' scores on standardized performance assessments. The analyses showed an error rate of approximately 15% indicating that students were retained or promoted inappropriately based on district policy as compared to the statistical model. The authors also found that schools with less credentialed teachers and schools with lower socioeconomic status retained more students.

Understanding Kindergarten Students' Skills

The creation of two national data sets as well as growing interest in the instruction and assessment of young children have spawned a small body of research to describe the skills that students demonstrate at the start of the kindergarten year. The U.S. Department of Education's National Center for Education Statistics (NCES; 2009a) developed a data set called the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) that looks at children's health, development, and education during the formative years from birth through kindergarten entry. Denton Flanagan and McPhee (2009) found that upon kindergarten entry, children born in 2001 demonstrated reading and mathematics knowledge and skills that varied by their race/ethnicity, family type, poverty status, primary home language, primary early care, and education setting the year prior to kindergarten. Specifically, Caucasian and Asian children had higher reading

and mathematics assessment scores than did African American, Hispanic, or American Indian/Alaska Native children. Also, children in households with two parents, incomes at or above the poverty threshold, or English as a primary home language had higher reading and mathematics scores than their counterparts.

An earlier but similar study, the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K; U.S. Department of Education, NCES, 2009b), followed a nationally representative sample of 22,000 kindergartners from the fall of 1998 through their Grade 5 year. West, Denton, and Germino-Hausken (2000) reported on students' skills at kindergarten entry. In early literacy, 66% were proficient in recognizing their letters, 29% were proficient in understanding beginning sounds, and about 17% were proficient in understanding ending sounds. In mathematics, nearly all kindergartners were proficient in identifying numbers and shapes, 58% were proficient in understanding relative size, and 20% were proficient in understanding ordinal sequence. With regard to social skills, teachers reported that about 75% of first-time kindergartners were accepting of peer ideas and were able to form friendships. Of the students in the sample, teachers reported that 71% persisted at tasks often or very often, 75% seemed eager to learn, and 66% were able to pay attention most of the time.

What Do We Know About Grade Retention?

Failure to meet grade-level expectations in reading is the most cited reason for retention in the early grades (Snow, Burns, & Griffin, 1998). Research suggests that approximately 10% of students in kindergarten through eighth grade have been retained in a grade during their school career (Planty et al., 2009). Zill, Loomis, and West (1997) reported a kindergarten retention rate of about 5% in 1995 based on data from the National Household Education Survey. Previous research has identified several factors associated with a higher likelihood of retention. McCoy and Reynolds (1999) identified associations between grade retention and both gender and mathematics and reading achievement, but found that retention was not associated with either eligibility for free lunch or special education placement. The authors also found that higher levels of parental participation significantly reduced the incidence of retention in elementary grades. Another study found that Hispanic or African American elementary school children were more than twice as likely to be retained as Caucasian students, and students who were economically disadvantaged were likely to be retained than those who were not (Texas Education Agency, 2002). In addition, elementary-aged limited English proficiency (LEP) students were more likely to repeat a grade than non-LEP students. Students in special education programs were more likely to be retained than those who were not (Texas Education Agency, 2002). Burkam, LoGerfo, Ready, and Lee (2007) found that boys, children from low socioeconomic backgrounds, and children who enter kindergarten younger than typical age standards are

consistently at risk of repeating kindergarten. Age has been associated with retention rates in other studies as well (Corman, 2003; Elder & Lubotsky, 2009; Verachtert, De Fraine, Onghena, & Ghesquiere, 2010). Other studies have found that children who have poor emotional well-being (Jimerson & Schuder, 1996), adjustment problems (Reynolds, 1992), or whose teachers perceive them as having poor peer relationships (Cadigan, Entwisle, Alexander, & Pallas, 1988; Jimerson & Schuder, 1996) are more likely to repeat a grade. Additional reasons for retention include the maturity level of the student, his or her failure to meet standards for promotion, frequent absences from school, or a belief that the child will be more successful with an additional year of schooling (Bowman, 2005).

Past research has demonstrated the negative effects of retention on both school achievement and social/psychological development (Holmes, 1989; Peterson, DeGracie, & Ayabe, 1987; Shepard & Smith, 1987; Silberglitt, Jimerson, Burns, & Appleton, 2006). Children who repeat grades experience low levels of self-esteem, and there is a high correlation between grade retention and dropout rates (Bowman, 2005). Another potential problem may be that the student's environment is not conducive to his or her learning, and keeping the student in the same environment for another year will not improve academic success (Kenneady, 2004). Hong and Raudenbush (2005) found that children who were retained learned less than they would have had they instead been promoted. In a study of kindergarten retention using data from the ECLS-K, Burkham et al. (2007) found that most children appear to receive little or no cognitive benefit from repeating kindergarten. A recent longitudinal study by Silberglitt, Appleton, Burns, and Jimerson (2006) used hierarchical linear modeling to examine the reading achievement growth curves of students in first to eighth grade who were retained, students who were promoted but performed similarly to the retained students, and a random sample of students. Results showed that the retained students did not benefit from the repeated year of schooling, nor did they have significantly different growth rates from the promoted students. The authors concluded that "considering the expense of students repeating a grade, the lack of positive effects yielded in this study, and the deleterious long-term outcomes reported in related research, it is disconcerting that the practice of retention persists" (Silberglitt, Appleton, et al., 2006, p. 268). Though it is known that teachers' assessments of older students' academic ability are fairly accurate, little is known about the association between teacher judgments of students' abilities at the start of formal schooling and later academic achievement. Early childhood literature defines readiness in the context of the whole child across multiple domains, but there is little research to demonstrate the relative influence of these domains on success in the kindergarten year. In this study, we use teacher judgments of students at the start of the kindergarten year across multiple domains to predict kindergarten retention. Specifically, our research questions were the following:

Research Question 1: Are teacher judgments of students' skills on the six domains of the Kindergarten Entrance Inventory (KEI; Connecticut State Department of Education, 2007) predictive of kindergarten retention, after controlling for demographic characteristics of the child?

Research Question 2: Are the six domains of the KEI equally influential in predicting kindergarten retention, after controlling for demographic characteristics of the child?

In Connecticut, retention policies vary by district varies from district to district. This study was designed to validate the KEI and inform emerging definitions of readiness nationwide. While the intention was not to inform the issue of retention, we believe a clear, current definition of readiness can affect decisions about kindergarten entry and interventions that may ultimately prevent the need for retention. The methodology is described in the next section.

Method

Connecticut state data provide for the analysis of the association between the domains of kindergarten readiness and kindergarten retention. In this study, teacher ratings of students' skills at kindergarten entry from Connecticut's KEI from 2008 were used as predictors of the students who repeated kindergarten in 2009. This section includes an overview of the instrument and data collection techniques, the study participants, and statistical analyses used to examine the data.

Instrumentation

In 2005 and 2006, Connecticut passed legislation requiring the implementation of a statewide developmentally appropriate assessment that measures a child's level of preparedness for kindergarten. In response to this legislation the Connecticut State Department of Education (2007) developed the KEI, which was designed to provide a statewide snapshot of the skills students demonstrate, based on teachers' observations, at the beginning of the kindergarten year. The KEI is a rating form of six domains: language skills, literacy skills, numeracy skills, physical/motor skills, creative/aesthetic skills, and personal/social skills. Each domain is defined by 3–5 specific indicators. As an example, the language domain includes the following indicators: participates in conversations, retells information from a story read to him or her, follows simple two-step verbal directions, speaks using sentences of at least five words, communicates feelings and needs, and listens attentively to a speaker.

Teachers use a trichotomous rating scale for each of the six domains. For the purposes of this study, the ratings for each domain were each treated as separate scores (e.g., the six ratings assigned to each student were not summed). The KEI rating scale is based on the consistency with which the student demonstrates the skills and the level of instructional support required for skill demonstration. A rating of 3 is used for students who consistently demonstrate the skills in the

TABLE 1. Means and Standard Deviations of
Kindergarten Entrance Inventory Domain Scores

	M	SD
Language	2.14	0.76
Literacy	2.09	0.76
Numeracy	2.16	0.73
Physical	2.35	0.68
Creative	2.36	0.68
Personal	2.24	0.72

specified domain and require minimal instructional support. A rating of 1 is used for students who demonstrate emerging skills in the specified domain and require a large degree of instructional support. No guidance is offered on how to assign a rating for a student who has variable abilities on a set of skills within a single domain. The scale was treated as continuous as to follow how the data are used by the state. The means and standard deviations for the KEI domain scores are included in Table 1, and correlations among the domain scores are included in Table 2. A factor analysis of the ratings for the six domains shows that the ratings are measuring one factor, which accounts for 69.9% of the variance among ratings. Cronbach's alpha was calculated as a measure of reliability for the single factor (Cronbach's α = .91). The complete KEI is available in the Appendix.

Participants

In 2008, 40,713 children in Connecticut enrolled in kindergarten. Of these students, 52% were boys, 31% received free or reduced-price lunch, 8% were identified as receiving special education services (SWD), and 9% were labeled as having LEP. Most students (61%) were Caucasian, while 20% were Hispanic/Latino, 13% were African American, 5% were Asian, and less than 1% were American Indian. The average age of these students as of September 1, 2008, was 63 months In Connecticut, students must turn 5 in the calendar year in which they begin formal schooling (i.e., by December 31). September 1 was used to represent the start of the kindergarten year and to allow for a structure to group students who are younger than their peers.

Of the 40,713 students enrolled in kindergarten in 2008, 1,480 (4%) repeated kindergarten in 2009. The majority of

the retained students were boys (61%) and received free or reduced-price lunch (64%). Also, 77% of retained students received SWD, and most (81%) were LEP. Just over a third (38%) of the repeating students were Hispanic//Latino and 38% were Caucasian. Of the remaining students, 22% were African American, 2% were Asian, and less than 1% were American Indian. The average age of the students was 59.70 (SD = 3.38) months, which was statistically significantly lower than the nonrepeater average age of 63.0 months (SD = 4.38 months), $t(1671.56) = 36.47, p < .001$. Demographic data for all students enrolled in kindergarten in 2008, as well as a breakout of those who repeated in 2009 and those who did not, are provided in Table 3.

Data Analyses

Our purpose was to examine whether teacher judgments of students' skills on the six domains of the KEI are predictive of kindergarten retention. Student demographics and the KEI ratings were used as independent variables at the student level in a series of hierarchical generalized linear models (HGLMs; H. Goldstein, 1995; Raudenbush & Bryk, 2002; Snijders & Bosker, 1999) to predict kindergarten retention. Data were clustered by district ($n = 170$), as efforts to cluster by school did not yield enough schools with retained students. The average number of students entering kindergarten in each district was 225, and, on average, eight students in each district were retained at the end of the school year. The average percentage of students retained in each district was 2.68%; 34 districts retained no students, while one district retained five of its 25 (20%) kindergarteners in 2008. All but seven districts retained less than 10% of its students, and 145 districts retained less than 5% of its kindergarteners.

These analyses include four models. First, the null model was run to examine the predicted probability of repeating kindergarten for a student in the sample, accounting for the clustered nature of the data. Next, we included the six teacher ratings from the KEI as predictors of kindergarten retention and then ran a separate model with the demographic variables as predictors. The final model includes the statistically significant teacher ratings from the KEI and student demographic variables.

Several data elements were recoded to facilitate interpretations of the model estimates. KEI ratings were recoded from a 1, 2, 3 scale to a 0, 1, 2 scale. Demographic data were coded

TABLE 2. Correlations Between Kindergarten Entrance Inventory Domain Scores

	Literacy	Numeracy	Physical	Creative	Personal
Language	.72	.71	.60	.62	.67
Literacy		.80	.57	.56	.55
Numeracy			.62	.60	.57
Physical				.71	.62
Creative					.67

TABLE 3. Demographic Information for 2008 Kindergarten Students

	2008 repeaters		2008 nonrepeaters		All 2008 students	
	n	%	n	%	N	%
Gender						
Male	897	60.61	20,140	51.33	21,037	51.67
Female	583	39.39	19,093	48.67	19,676	48.33
Race						
White	556	37.57	24,153	61.56	24,709	60.69
Hispanic	566	38.24	7,589	19.34	8,155	20.03
Black	319	21.55	5,162	13.16	5,481	13.46
Asian	33	2.23	2,148	5.47	2,181	5.36
American Indian	6	0.41	181	0.46	187	0.46
Free or reduced-price lunch						
No	530	35.81	27,588	70.32	28,118	69.06
Yes	950	64.19	11,645	29.68	12,595	30.94
Special education						
No	1,134	76.62	36,230	92.35	37,364	91.77
Yes	346	23.38	3,003	7.65	3,349	8.23
Limited English proficiency						
No	1,198	80.95	35,982	91.71	37,180	91.32
Yes	282	19.05	3,251	8.29	3,533	8.68
Kindergarten day						
Full	1,077	72.77	20,840	53.12	21,917	53.83
Half	331	22.36	14,777	37.66	15,108	37.11
Extended	72	4.86	3,616	9.22	3,688	9.06
Total	1,480	100.00	39,233	100.00	40,713	100.00

Note. The repeaters are 2008 data for students who ultimately repeated kindergarten in 2009.

as follows: female $= 1$, eligible for free or reduced-price lunch $= 1$, English language learners $= 1$, and minority $= 1$. Initially, age was grand mean centered to allow for the comparison of average aged students to younger and older students.

Null model. The empty model, or a model with no predictors, provides a convenient starting point for developing a prediction model for kindergarten retention. From the empty model, we can learn about the overall estimate of repeating kindergarten in this sample, as well as variability in the probability of repeating kindergarten between districts. The following equations define each level of the null model:

Level 1:

$$\eta_{ij} = \beta_{0j}$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$

With no explanatory variables, the β_{0j} represents the log-odds or logit of repeating kindergarten for children in the jth school and γ_{00} represents the log-odds of repeating kindergarten across districts. The district average log-odds varies across districts, var $\mu_{0j} = \tau_{00}$.

Random intercept model. In the analyses presented here, we initially modeled only the intercept from the student-level models; that is, we fit a random-intercept model. The generalized probability predictions from the models presented here are thus the overall retention probabilities for a student in district j. The models and predictors we investigated were chosen to provide insight into the existence of an association between student demographics, KEI ratings or a combination and kindergarten retention. The general form of the models at the student and the district level are given by the following expressions:

Level 1:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(variable_1) + \beta_{2j}(variable_2)$$
$$+ \beta_{3j}(variable_3) + \beta_{4j}(variable_4)$$
$$+ \beta_{5j}(variable_5) + \beta_{6j}(variable_6)$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{3j} = \gamma_{30}$$
$$\beta_{4j} = \gamma_{40}$$
$$\beta_{5j} = \gamma_{50}$$
$$\beta_{6j} = \gamma_{60}$$

Under the logit link, the prediction at the student level is the logit (log of the odds) for the ith student in the jth district, and corresponds to the likelihood that the group of students would be retained in kindergarten. Because the outcome is either 0 or 1, the sampling model is Bernoulli. Hence, the errors are heteroscedastic as the variance estimate depends on the probability of the event occurring. Thus, the error term is not included in the student-level logit model. The student effects may vary by district; modeling these student effects to account for the clustered nature of the data is the purpose of the multilevel modeling. The logit predictions can easily be transformed to the estimated odds of retention for a given collection of explanatory variables, exp(logit). Three variations of the random intercepts models were estimated: one with the six teacher ratings from the KEI as predictors of kindergarten retention, one with the demographic variables as predictors, and a final model that included the statistically significant teacher ratings from the KEI and student demographic variables.

Results

This section is an overview of the results of the HGLM analyses. We present the results of the null model and the set of random intercepts models.

Null Model

The null model or empty model is a model with no predictors, which results in the overall estimate of repeating kindergarten in this sample, as well as variability in the probability of repeating kindergarten between districts. Results for the empty model are presented in Table 4. The data showed that the average logit for a typical district was -3.80, which is statistically different from zero. The logit represents the log of the odds of repeating kindergarten and can be exponentiated to calculate the estimated odds of repeating kindergarten for these students ($\exp^{-3.80} = .022$). The odds, in turn, can be used to calculate the estimated probability of repeating kindergarten in an average district. In these data, the probability—calculated as odds/(1 + odds)—was .022. Based on this model, accounting for the clustered nature of the data, it was estimated that 2.2% of students would repeat kindergarten. This estimate was comparable to the overall proportion of students who repeated kindergarten in this sample (3.6%). In addition, there was considerable variability in the collection of districts ($\tau_{00} = .58$), $\chi^2(169, n = 170) = 1935.24, p < .001$. This variability can be modeled by the inclusion of predictor variables at the district level in future models, though our goal here was to focus on student-level predictors of retention. Parameters of the null model also allow for the calculation of the intraclass correlation coefficient (ICC; Snijders & Bosker, 1999) as a measure of the degree to which individuals in a given cluster are similar to each other. In this study, the clusters were the school districts. The ICC (calculated as $\tau_{00} / \tau_{00} + 3.29$, where

$3.29 = \pi^2/3$, the variance of the logistic distribution) was .15, which indicates that 15% of the variability in repeating kindergarten can be attributed to the district. An ICC of .15 represents a strong effect of clustering and indicates that multilevel modeling is appropriate for further analyses.

Random Intercept Models

In the second analysis, the six ratings from the KEI were used as predictors of whether a student is retained in kindergarten. The model was the following:

Level 1:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(language) + \beta_{2j}(literacy)$$
$$+ \beta_{3j}(numeracy) + \beta_{4j}(physical)$$
$$+ \beta_{5j}(creative) + \beta_{6j}(personal)$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{3j} = \gamma_{30}$$
$$\beta_{4j} = \gamma_{40}$$
$$\beta_{5j} = \gamma_{50}$$
$$\beta_{6j} = \gamma_{60}$$

The analysis showed that teacher ratings of language, literacy, numeracy, and personal skills had a statistically significant effect on the estimated logit of a child repeating kindergarten ($p < .001$) and that teacher ratings for the creative and physical domains were unrelated to the estimated logit of a child repeating kindergarten (see Table 5). Note that all of these variables had a negative effect, which indicated that as the teacher ratings increase, the estimated logit decreased. Stated differently, students with higher teacher ratings were less likely to repeat kindergarten. Similar to logistic regression, the odds ratio from HGLM analyses can also be viewed as a measure of the practical significance of the effect of the variables. Odds ratios close to 1.0 represent a weak relationship between variables, whereas odds ratios over 3.0 for positive associations and less than one third for negative associations indicate strong relationships (Haddock, Rindskopf, & Shadish, 1998). In these data, the coefficient had a negative relationship with the probability of repeating kindergarten. As such, odds ratios closer to zero represent stronger relationships. In this analysis, teacher ratings for literacy and numeracy had the greatest effect on the estimated logit of repeating kindergarten.

A second HGLM analysis evaluated the relationship between available demographic variables and kindergarten retention. The model with student-level demographic variables was defined by the following equations:

TABLE 4. Multilevel Logistic Empty Model

Fixed effects	Coefficient (SE)	Odds ratio	$t(df)$	p
Model for repeater (β_0)				
Intercept (γ_{00})	−3.80 (0.08)	0.022	−49.68 (169)	<.001
Random effects	Variance	df	χ^2	p
Var. in repeater (τ_{00})	.58	169	1935.24	<.001

Level 1:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(gender) + \beta_{2j}(age) + \beta_{3j}(freelunch)$$
$$+ \beta_{4j}(SWD) + \beta_{5j}(LEP) + \beta_{6j}(minority)$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{3j} = \gamma_{30}$$
$$\beta_{4j} = \gamma_{40}$$
$$\beta_{5j} = \gamma_{50}$$
$$\beta_{6j} = \gamma_{60}$$

Gender was dichotomous with 0 = female and 1 = male. Age was calculated in months based on state data and represents the students' age at the start of school in 2008. Lunch was a dichotomous variable, where 1 = eligible for free or reduced-price lunch. Students who were eligible for SWD at the start of 2008 were coded as 1; students who were not were coded as 0. LEP was coded as 1 for students who had LEP and as 0 for those who did not. Minority was a dichotomous variable in which a value of 1 represented students who were non-Caucasian.

Results of this model are presented in Table 6. The analysis showed that all of the demographic variables were associated with the log-odds of repeating kindergarten except for the minority indicator. The directionality of the coefficient and the odds ratio helps to define the associations between the variables. Children who were male, were eligible for free or reduced-price lunch, received SWD, and had LEP had an increased likelihood of repeating kindergarten. Older children were less likely to repeat kindergarten. Based on the odds ratios, a child who had been identified as receiving SWD was most likely to repeat kindergarten. Students who were eligible for free or reduced-price lunch were also more likely to repeat kindergarten than their peers. The odds ratios of the remaining demographic variables were of similar magnitude.

In the third analysis, the statistically significant variables from the analysis of KEI ratings and kindergarten retention (language, literacy, numeracy, personal) were combined with the demographic variables (gender, age,

TABLE 5. Multilevel Logistic Model with Kindergarten Entrance Inventory Ratings as Predictors

Fixed effects	Coefficient (SE)	Odds ratio	$t(df)$	p
Model for repeater (β_0)				
intercept (γ_{00})	−1.81 (0.09)	0.162	−18.19 (169)	<.001
Model for language (β_1)				
intercept (γ_{10})	−0.36 (0.06)	0.696	−5.72 (39686)	<.001
Model for literacy (β_2)				
intercept (γ_{20})	−0.90 (0.11)	0.404	−7.92 (39686)	<.001
Model for numeracy (β_3)				
intercept (γ_{30})	−0.82 (0.10)	0.436	−7.73 (39686)	<.001
Model for physical (β_4)				
intercept (γ_{40})	−0.15 (0.09)	0.853	−1.74 (39686)	.081
Model for creative (β_5)				
intercept (γ_{50})	0.06 (0.06)	1.066	0.99 (39686)	.322
Model for personal (β_6)				
intercept (γ_{60})	−0.28 (0.05)	0.755	−5.45 (39686)	<.001
Random effects	Variance	df	χ^2	p
Var. in repeater (τ_{00})	.74	169	1071.58	<.001

TABLE 6. Multilevel Logistic Model With Kindergarten Entrance Inventory Ratings as Predictors

Fixed effects	Coefficient (SE)	Odds ratio	$t(df)$	p
Model for repeater (β_0)				
intercept (γ_{00})	−4.74 (0.12)	0.008	−38.24 (169)	<.001
Model for gender (β_1)				
intercept (γ_{10})	0.40 (0.08)	1.49	4.97 (39686)	<.001
Model for age (β_2)				
intercept (γ_{20})	−0.22 (0.02)	0.79	−9.51 (39686)	<.001
Model for freelunch (β_3)				
intercept (γ_{30})	0.66 (0.09)	1.94	7.03 (39686)	<.001
Model for SWD (β_4)				
intercept (γ_{40})	1.11 (0.11)	3.06	10.06 (39686)	<.001
Model for LEP (β_5)				
intercept (γ_{50})	0.35 (0.13)	1.42	2.60 (39686)	<.001
Model for minority (β_6)				
intercept (γ_{60})	0.19 (0.11)	1.21	1.68 (39686)	.091
Random effects	Variance	df	χ^2	p
Var. in repeater (τ_{00})	.73	169	1143.28	<.001

Note. SWD = special education services; LEP = limited English proficiency.

freelunch, SWD, LEP). Interactions among the significant demographic variables were also considered; however, each interaction proved nonsignificant in the final model. In addition, SWD and LEP were not statistically significant and were eliminated from subsequent analyses. The final model included language, literacy, numeracy, personal, gender, age, and freelunch. Also in this model, the age variable was dichotomized to facilitate interpretation. Younger students were defined as those students who were 58 months or younger, or one standard deviation below the mean age of 63 months, at the start of the kindergarten year. The final model was the following:

Level 1:

$$\eta_{ij} = \beta_{0j} + \beta_{1j}(gender) + \beta_{2j}(age_{DICHOTOMOUS})$$
$$+ \beta_{3j}(freelunch) + \beta_{4j}(language) + \beta_{5j}(literacy)$$
$$+ \beta_{6j}(numeracy) + \beta_{7j}(personal)$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{3j} = \gamma_{30}$$
$$\beta_{4j} = \gamma_{40}$$
$$\beta_{5j} = \gamma_{50}$$
$$\beta_{6j} = \gamma_{60}$$

Results of the model are shown in the Table 7. The analysis showed the gender, age, and freelunch variables were associated with the log-odds of repeating kindergarten, accounting for the other variables in the model. As in prior analyses, younger children who were male and eligible for free or reduced-price lunch had an increased likelihood of repeating kindergarten, while children who were older had a decreased likelihood. Similarly, higher ratings on the KEI were associated with a decreased likelihood of kindergarten retention. Even after accounting for demographic differences, KEI literacy and numeracy ratings were most closely associated with kindergarten retention. The odds ratio for the dichotomized age variable indicates a strong relationship between a young age and kindergarten retention (Haddock et al., 1998). Note that in the prior analysis, age was measured in months as such the odds ratio for age was for the incremental increase of age by month. The final HGLM model can be used to predict the probability of kindergarten retention based on specified demographic and KEI data profiles. The final HGLM model yields the predicted logit, which is transformed into the odds ratio (explogit) and then to the predicted probability—calculated as odds / (1 + odds). The predicted probability represents the differential probability that a student of the specified demographics would repeat kindergarten as compared to a student for whom the demographic variables are set to zero (i.e., a girl who is not young and not eligible for free or reduced-price lunch). The predicted probabilities for several demographic groups were examined, and Table 8 represents the predictions for males only. Based on the table, a young boy who is eligible for free or reduced-price lunch with all 1s on the KEI is 29% more likely to be retained in kindergarten than a female who is neither young nor eligible for free or reduced-price lunch with the same KEI ratings. A boy who is neither young nor eligible for free or reduced-price lunch with all 1s on the KEI is 10% more likely to be retained than a girl in similar circumstances.

TABLE 7. Multilevel Logistic Model with Significant Kindergarten Entrance Inventory Ratings and Demographic Variables as Predictors

Fixed effects	Coefficient (SE)	Odds ratio	$t(df)$	p
Model for repeater (β_0)				
intercept (γ_{00})	−2.44 (0.12)	0.08	−19.57 (169)	< .001
Model for gender (β_1)				
intercept (γ_{10})	0.22 (0.07)	1.25	3.16 (39685)	.002
Model for age (β_2)				
intercept (γ_{20})	1.08 (0.14)	2.97	7.59 (39685)	< .001
Model for freelunch (β_3)				
intercept (γ_{30})	0.23 (0.10)	1.26	2.27 (39685)	.023
Model for language (β_4)				
intercept (γ_{40})	−0.35 (0.06)	0.70	−5.39 (39685)	< .001
Model for literacy (β_5)				
intercept (γ_{50})	−0.88 (0.11)	0.41	−7.89 (39685)	< .001
Model for numeracy (β_6)				
intercept (γ_{60})	−0.79 (0.10)	0.45	−7.26 (39685)	< .001
Model for personal (β_7)				
intercept (γ_{70})	−0.29 (0.05)	0.74	−6.10 (39685)	< .001

Random effects	Variance	df	χ^2	p
Var. in repeater (τ_{00})	.74	169	963.26	< .001

TABLE 8. Predicted Probabilities of Kindergarten Retention for Males

	Kindergarten Entrance Inventory (KEI) ratings				
	Literacy	Numeracy	Language	Personal	Predicted probability
Young/Eligible for free or reduced-price lunch					
	1	1	1	1	0.29
	2	1	1	1	0.22
	2	2	1	1	0.11
	2	2	2	1	0.05
	2	2	2	2	0.04
Young/Not eligible for free or reduced-price lunch					
	1	1	1	1	0.24
	2	1	1	1	0.18
	2	2	1	1	0.09
	2	2	2	1	0.04
	2	2	2	2	0.03
Not young/Eligible for free or reduced-price lunch					
	1	1	1	1	0.12
	2	1	1	1	0.09
	2	2	1	1	0.04
	2	2	2	1	0.02
	2	2	2	2	0.01
Not young/Not eligible for free or reduced-price lunch					
	1	1	1	1	0.10
	2	1	1	1	0.07
	2	2	1	1	0.03
	2	2	2	1	0.01
	2	2	2	2	0.01

Note. The predicted probabilities represent the increased probability as compared with a girl who is not young and not eligible for free and reduced-price lunch and has ratings of 1 on the significant KEI domains.

Discussion

Our data indicate that teacher ratings on the domains of the KEI are predictive of kindergarten retention. The analyses also indicate that after controlling for student demographic characteristics, low ratings of literacy and numeracy skills are most closely associated with increased likelihood of retention. Of the multiple developmental domains used to define students' skills at kindergarten entry, data from this study suggest that literacy and numeracy skills are more influential in defining academic outcomes than language, creative, personal/social, and physical/motor skills. These findings may speak to the changing nature of the kindergarten classroom. Higher academic standards are being imposed on kindergarten students. These students are expected to read whereas a few decades ago reading skills did not enter the curriculum until first grade (Lazarus & Ortega, 2007; Litty & Hatch, 2006). The balanced, whole child approach favored by the early childhood community may end in kindergarten. Students who do not consistently and independently demonstrate these early literacy and numeracy skills at the very start of the kindergarten year are at risk for retention, especially if they are young males eligible for free or reduced-price lunch. It is possible that our current culture of accountability has changed expectations for children in the very first weeks of school. Kindergarten success may involve more than the child's health, social competence, ability to communicate, and ability to follow directions, as suggested by previous researchers (Lin et al., 2003; Wesley & Buysse, 2003).

The accuracy of teacher perceptions at the start of kindergarten warrants further study. This study along with other research on this instrument (J. Goldstein & Behuniak, 2012) suggest that teacher perceptions of kindergarten students' knowledge and skills at the start of the year are associated with kindergarten retention and proficiency on the state's summative assessment in Grade 3. This finding is aligned with previous research that confirms the association between teacher judgments and academic outcomes (Hoge & Coladarci, 1989; Jussim, 1989; Jussim & Eccles, 1992). The data are also supportive of earlier research of young children regarding associations between gender and teacher perceptions (Hinnant et al., 2009) and socioeconomic status (Alvidrez & Weinstein, 1999).

The KEI may be more useful for the educational system if it were restructured to allow teachers to share more about what they know of their students. For example, literacy can be expanded to include letter recognition, familiarity with books, and emergent writing skills. Numeracy can be characterized as number recognition, measurement, and shapes and patterns. Earlier analyses of KEI data (J. Goldstein & McCoach 2011) suggested that readiness evaluations can address the following skills: expressive language, receptive language, responses to stories, familiarity with books, familiarity with letters, emergent writing, counting, shapes and patterns, measurement, fine motor skills, gross motor skills, conflict resolution, social engagement, engagement with self-selected activities, and creative skills.

The accuracy of teacher judgments at the start of the year also speaks to the importance of early childhood education. Our study shows that teachers can identify struggling students at the very start of school. Lazarus and Ortega (2007) argued that retention in kindergarten and later grades could be prevented with the implementation of universal prekindergarten in conjunction with universal screening. Other alternatives to grade retention for at-risk students include summer school, tutoring, longer school days, and before- and after-school programs (Bowman, 2005). High-quality prekindergarten programs would identify children who are at risk of developing difficulties with reading and other cognitive skills in the future. Earlier detection of and differentiated instruction for students at risk of academic problems can aid in getting these students where they need to be intellectually before entering kindergarten, thus decreasing the amount of variability of skills and readiness among children entering kindergarten.

Although this research sheds light on an important issue, this study has several limitations. First, we used data from one state's assessment and for only one cohort of students. Results should be validated by analyses with students who entered kindergarten in different years. Also, retention policies vary by district in Connecticut and within district variability may be related to policy issues rather than students' skills at the start of the year. Finally, this research is limited by the instrumentation. The KEI is a brief instrument with a broad rating scale. Future researchers should focus on the association between more specific skills within each of the six domains of the KEI and retention. Additional study of teacher- and district-level predictors is also warranted. In addition, further analyses of the KEI could help to improve the instrument and better identify students at risk for retention.

REFERENCES

Alvidrez, J., & Weinstein, R. S. (1999). Early teacher perceptions and later student academic achievement. *Journal of Educational Psychology*, *91*, 731–746.

Bowman, L. J. (2005). Grade retention: Is it a help or hindrance to student academic success? *Preventing School Failure*, *49*(3), 42–46.

Burkam, D. T., LoGerfo, L., Ready, D., & Lee, V. E. (2007). The differential effects of repeating kindergarten. *Journal of Education for Students Placed at Risk*, *12*, 103–136.

Cadigan, D., Entwisle, D. R., Alexander, K. L., & Pallas, A. M. (1988). First grade retention among low achieving students: A search for significant predictors. *Merrill-Palmer Quarterly*, *34*, 71–88.

Connecticut State Department of Education. (2007). *Fall Kindergarten Entrance Inventory*. Hartford, CT: Author.

Corman, H. (2003). The effects of state policies, individual characteristics, and neighbourhood characteristics on grade repetition in the United States. *Economic of Education Review*, *22*, 409–420.

Daily, S., Burkhauser, M., & Halle, T. (2010, June 17). Early childhood highlights: A review of school readiness practices in the states: Early learning guidelines and assessments. *Child Trends*, *1*(3), 1–12.

Denton Flanagan, K., & McPhee, C. (2009). *The children born in 2001 at kindergarten entry: First findings from the kindergarten data collections of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B)* (NCES

2010–005). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Elder, T. E., & Lubotsky, D. H. (2009). Kindergarten entrance age and children's achievement: Impacts of state policies, family background, and peers. *The Journal of Human Resources, 44*, 641–683.

Goldstein, H. (1995). *Multilevel statistical models*. London, UK: Edward Arnold.

Goldstein, J., & Behuniak, P. (2002, October). *The crystal ball: Linking assessments from the start kindergarten to third grade proficiency*. Paper presented at the Annual Meeting of the Northeastern Educational Research Association (NERA), Rocky Hill, CT.

Goldstein, J., & McCoach, D. B. (2011). The starting line: Developing a structure for teacher ratings of students' skills at kindergarten entry. *Early Childhood Research and Practice, 13*(2). Retrieved from http://ecrp.uiuc.edu/v13n2/goldstein.html

Haddock, C. K., Rindskopf, D., & Shadish, W. R. (1998). Using odds ratios as effect sizes for meta-analysis of dichotomous data: A primer on methods and issues. *Psychological Methods, 3*, 339–353.

Haines, A. H., Fowler, S. A., Schwartz, I. S., Kottwitz, E., & Rosenhoetter, S. (1989). A comparison of preschool and kindergarten teacher expectations for school readiness. *Early Childhood Research Quarterly, 4*, 75–88.

Harradine, C. C., & Clifford, R. M. (1996, April). *When are children ready for kindergarten? Views of families, kindergarten teachers, and child care providers*. Paper presented at the Annual Meeting of the American Educational Research Association, New York, NY.

Heaviside, S., & Farris, E. (1993). *Public school kindergarten teachers' views on children's readiness for school* (NCES 93–410). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Hinnant, J. B., O'Brien, M., & Ghazarian, S. R. (2009). The longitudinal relations of teacher expectations to achievement in the early school years. *Journal of Educational Psychology, 101*, 662–670.

Hoge, R. D., & Coladarci, T. (1989). Teacher-based judgments of academic achievement: A review of literature. *Review of Educational Research, 59*, 297–313.

Hong, G., & Raudenbush, S. W. (2005. Effects of kindergarten retention policy on children's cognitive growth in reading and mathematics. *Educational Evaluation and Policy Analysis, 27*, 205–224.

Jimerson, S. R., & Schuder, M. R. (1996, April). *Is grade retention an appropriate academic intervention? Longitudinal data provide further insights*. Paper presented at Head Start's Third National Research Conference, Washington, DC.

Jussim, L. (1989). Teacher expectations: Self-fulfilling prophecies, perceptual biases, and accuracy. *Journal of Personality and Social Psychology, 57*, 469–480.

Jussim, L., & Eccles, J. (1992). Teacher expectations II: Construction and reflection of student achievement. *Journal of Personality and Social Psychology, 63*, 947–961.

Jussim, L., & Harber, K. D. (2005). Teacher expectations and self-fulfilling prophecies: Knowns and unknowns, resolved and unresolved controversies. *Personality and Social Psychology Review, 9*, 131–155.

Kenneady, L. M. (2004). *Good for nothing: In-grade retention*. San Antonio, TX: Intercultural Development Research Association. Retrieved from ERIC database. (ED484914)

Lazarus, P. J., & Ortega, P. (2007). Universal pre-kindergarten in conjunction with universal screenings: An antidote to grade retention. *Journal of Educational Research and Policy Studies, 7*, 54–75.

Lin, H., Lawrence, F. K., & Gorrell, J. (2003). Kindergarten teachers' views of children's readiness for school. *Early Childhood Research Quarterly, 18*, 225–237.

Litty, C. G., & Hatch, J. A. (2006). Hurry up and wait: Rethinking special education identification in kindergarten. *Early Childhood Education Journal, 33*, 203–208.

McCoy, A. R., & Reynolds, A. J. (1999). Grade retention and school performance: An extended investigation. *Journal of School Psychology, 37*, 273–298.

Peterson, S. E., Degracie, J. S., & Ayabe, C. R. (1987). A longitudinal study of the effects of retention/promotion on academic achievement. *American Educational Research Journal, 24*, 107–118.

Planty, M., Hussar, W., Snyder, T., Kena, G., KewalRamani, A., Kemp, J., . . . Dinkes, R. (2009). *The condition of education 2009* (NCES 2009–081). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage Publications.

Reynolds, A. J. (1992). Grade retention and school adjustment: An explanatory analysis. *Educational Evaluation and Policy Analysis, 14*, 101–121.

Shepard, L. A., & Smith, M. L. (1989). *Flunking grades: Research and policies on retention*. London, UK: Falmer Press.

Silberglitt, B., Appleton, J. J., Burns, M. K., & Jimerson, S. R. (2006). Examining the effects of grade retention on student reading performance: A longitudinal study. *Journal of School Psychology, 44*, 255–270.

Silberglitt, B., Jimerson, S. R., Burns, M. K., & Appleton, J. J. (2006). Does the timing of grade retention make a difference? Examining the effects of early versus later retention. *School Psychology Review, 35*, 134–141.

Snijders, T., & Bosker, R. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London, UK: Sage.

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Texas Education Agency. (2002). *Grade-level retention in Texas public schools, 2000–01*. Austin, TX: Division of Research and Evaluation.

U.S. Department of Education, National Center for Education Statistics. (2009a). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) 9-Month—Kindergarten 2007 restricted-use data file and electronic codebook* [CD-ROM] (NCES 2010-010). Washington, DC: Author.

U.S. Department of Education, National Center for Education Statistics. (2009b). *Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) kindergarten through eighth grade full sample public-use data and documentation* [DVD] (NCES 2009-005). Washington, DC: Author.

Verachtert, P., De Fraine, B., Onghena, D., & Ghesquiere, P. (2010). Season of birth and school success in the early years of primary education. *Oxford Review of Education, 36*, 285–306.

Wang, J., & Wang, H. (2007). *Should grade retention decisions be indicators-based or model-driven?* (CSE Tech. Rep. 716). Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing.

Wesley, P. W., & Buysse, V. (2003). Making meaning of school readiness in schools and communities. *Early Childhood Research Quarterly, 18*, 351–375.

West, J., Denton, K., & Germino-Hausken, E. (2000). *America's kindergartners* (NCES 2000–070). Washington, DC: National Center for Education Statistics.

West, J., Jausken, E. G., & Collins, M. (1993). *Readiness for kindergarten: Parent and teacher beliefs* (NCES 93–257). Washington, DC: U.S. Department of Education, Office of Research and Improvement.

Zill, N., Loomis, L. S., & West, J. (1997). *The elementary school performance and adjustment of children who enter kindergarten late or repeat kindergarten: Findings from national surveys*. (NCES 98–097). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

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APPENDIX
Fall Kindergarten Entrance Inventory

The following Performance Level (PL) Literals describe the characteristics of a typical student at each performance level. These will be used to rate each student on each of the six domains.

Performance Level 1: Students at this level demonstrate emerging skills in the specified domain and require a large degree of instructional support.
Performance Level 2: Students at this level inconsistently demonstrate the skills in the specified domain and require some instructional support.
Performance Level 3: Students at this level consistently demonstrate the skills in the specified domain and require minimal instructional support.

Directions: The indicators listed below each domain are examples of the skills a student should be able to demonstrate at the beginning of the kindergarten year; however, these are not the only skills to be considered. Rate each student in your class on each of the six domains. Use the Performance Levels (PL) above and all available and pertinent information when rating a student.

Language Skills
At what level does the student:

- Participate in conversations
- Retell information from a story read to him/her
- Follow simple two-step verbal directions
- Speak using sentences of at least 5 words
- Communicate feelings and needs
- Listen attentively to a speaker

Literacy Skills
At what level does the student:

- Hold a book and turn pages from the front to the back
- Understand that print conveys meaning
- Explore books independently
- Recognize printed letters, especially in their name and familiar printed words
- Match/connect letters and sounds
- Identify some initial sounds
- Demonstrate emergent writing

Numeracy Skills
At what level does the student:

- Count to 10
- Demonstrate one-to-one correspondence while counting (e.g., touches objects as he/she counts)
- Measure objects using a variety of everyday items
- Identify simple shapes such as circles, squares, rectangles, and triangles
- Identify patterns
- Sort and group objects by size, shape, function (use), or other attributes
- Understand sequence of events (e.g., before, after, yesterday, today, or tomorrow)

Physical/Motor Skills
At what level does the student:

- Run, jump, or balance
- Kick or throw a ball, climb stairs or dance
- Write or draw using writing instruments (e.g., markers, chalk, pencils, etc.)
- Perform tasks, such as completing puzzles, stringing beads, or cutting with scissors

APPENDIX (CONTINUED)

Creative/Aesthetic Skills
At what level does the student:

- Draw, paint, sculpt, or build to represent experiences
- Participate in pretend play
- Enjoy or participate in musical experiences (e.g., singing, clapping, drumming, or dancing)

Personal/Social Skills
At what level does the student:

- Engage in self-selected activities
- Interact with peers to play or work cooperatively
- Use words to express own feelings or to identify conflicts
- Seek peer or adult help to resolve a conflict
- Follow classroom routines