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# Assessing Noncognitive Aspects of School Readiness: The Predictive Validity of Brief Teacher Rating Scales of Social–Emotional Competence and Approaches to Learning

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## ABSTRACT

*Research Findings:* Head Start teachers completed brief rating scales measuring the social–emotional competence and approaches to learning of preschool children (total  $N = 164$ ; 14% Hispanic American, 30% African American, 56% Caucasian; 56% girls). Head Start lead and assistant teacher ratings on both scales demonstrated strong internal consistency and moderate interrater reliability. When examined longitudinally, preschool teacher–rated approaches to learning made unique contributions to the prediction of kindergarten and 1st-grade academic outcomes, need for supplemental services, and grade retention, even after we accounted for preschool academic skills. In contrast, preschool teacher–rated social–emotional competence made unique contributions to the prediction of reduced behavior problems and peer difficulties in kindergarten and 1st grade. *Practice or Policy:* The findings demonstrate that preschool teachers are able to provide distinct and reliable ratings of child social–emotional competence and approaches to learning using brief rating scales, with validity for predicting elementary school adjustment.

The landscape of early childhood education in the United States has changed notably over the past 15 years, as kindergarten programs have become increasingly academic in focus, with corresponding increases in expectations for academic school readiness (Bassok, Latham, & Rorem, 2016). At the same time, emerging research underscores the critical importance of early noncognitive skills for long-term school and life success—particularly the ability to get along and cooperate with others, manage strong feelings, focus attention, and persist at challenging tasks (Denham & Burton, 2003; Jones, Greenberg, & Crowley, 2015). For this reason, national early learning standards established by Head Start recommend a balanced approach in preschool, with a focus on promoting development in two noncognitive skill domains (social–emotional competence and approaches to learning) along with focusing on academic and physical school readiness (Office of Head Start, 2015). To address these early learning standards, preschools seek to monitor children’s developmental progress across these domains in order to guide program planning and promote school readiness and later success (Office of Head Start, 2015).

However, preschool teachers are limited in their ability to track and support children’s development of social–emotional competence and approaches to learning because of the lack of measures that are easy to use, with strong psychometric properties and demonstrated predictive validity (Campbell et al., 2016). The need for such measures is particularly acute for programs that serve children growing up in poverty, who are especially likely to face delays in these important areas of

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school readiness (Macmillan, McMorris, & Kruttschnitt, 2004). The present study addressed this need by examining brief preschool teacher-rated measures of children's social-emotional competence and approaches to learning and exploring their predictive validity to dimensions of academic, social, and behavioral school adjustment after children transitioned to kindergarten and first grade.

### ***Social-emotional competence and approaches to learning***

Social-emotional competence reflects a set of skills that enable children to create and sustain meaningful relationships with others, including empathy, cooperation, perspective taking, and the capacity to manage strong emotions and inhibit impulsive behaviors (Denham, 2006; Office of Head Start, 2015). A significant body of research demonstrates that social-emotional competence is associated with emergent academic skills in preschool (Arnold, Kupermidt, Voegler-Lee, & Marshall, 2012) and facilitates school adjustment at kindergarten entry (Ladd, Birch, & Buhs, 1999; Ladd, Kochenderfer, & Coleman, 1996). Socially competent children are able to form positive relationships with teachers and peers, enjoy school, participate effectively in classroom activities, and in turn have higher achievement than children who enter school with low levels of social-emotional competence (Izard et al., 2001; Raver, Garner, & Smith-Donald, 2007). Conversely, less socially competent children are often disengaged from classroom activities, and many exhibit disruptive behavior problems that undermine their classroom adjustment and academic progress (Blair & Raver, 2015; Chen, Huang, Chang, Wang, & Li, 2010; Konold & Pianta, 2005).

The other noncognitive skill of focus, approaches to learning, refers to a set of skills that enable children to engage fully in learning, including self-regulation and executive functions (Office of Head Start, 2015). In theory, approaches to learning facilitate classroom learning engagement by helping children attend to academic stimuli, persevere on difficult tasks, and approach problems creatively. Indeed, research has documented positive links between these learning behaviors and concurrent academic performance in preschool (McWayne, Fantuzzo, & McDermott, 2004) as well as predictive links from approaches to learning measured in preschool and later elementary school adjustment and attainment (McDermott, Rikoon, Waterman, & Fantuzzo, 2012; McWayne, Green, & Fantuzzo, 2009).

### ***The importance of assessing the developing noncognitive skills of low-income children***

Monitoring and supporting the acquisition of noncognitive skills is especially important for low-income children, who often face early adversity and experience delays in noncognitive skill development (Blair & Raver, 2015; Macmillan et al., 2004). Head Start was developed to reduce the gap in school readiness evident at school entry due to socioeconomic disparities, and in addition most states now provide publicly funded prekindergarten programs with a similar goal of boosting both cognitive and noncognitive skill development among children from low-income families (García, 2015; U.S. Department of Education, 2007). Addressing early delays in these skill domains is important, given that children who begin school unprepared for its learning and behavioral demands typically remain low achievers throughout elementary school and are more likely than their more advantaged peers to experience learning disabilities, conflictual relationships with teachers and peers, grade retention, early school dropout, and long-term underemployment (Ryan, Fauth, & Brooks-Gunn, 2006).

The broad use of preschool student outcome assessments to track the impact of the preschool program on these school readiness outcomes is relatively recent. The 1998 reauthorization of Head Start required programs to assess child outcomes in areas of early literacy, language, and numeracy skills; however, it was not until the 2007 reauthorization that programs were required to conduct standardized and structured assessments in all five domains of the early learning standards, including social-emotional competence and approaches to learning. Assessing these two noncognitive domains is challenging in large part because of the relatively small amount of research on measures

designed for preschool children (Darling-Churchill & Lippman, 2016). Moreover, most of the assessment measures currently used by Head Start and state prekindergarten programs are time consuming to complete and fail to distinguish between social-emotional competence and approaches to learning (Ackerman & Coley, 2012; Halle & Darling-Churchill, 2016; Halle, Zaslow, Wessel, Moodie, & Darling-Churchill, 2011).

### ***The predictive validity of preschool noncognitive skills***

When preschool measures intend to assess children's school readiness, evidence of predictive validity to elementary school adjustment is of critical importance. By definition, school readiness reflects the acquisition of foundational skills that foster a child's success in school after kindergarten entry, and hence measures of school readiness should predict to early elementary school measures of school adjustment, performance, and attainment. Yet very few measures of noncognitive school readiness have been studied predictively to determine whether preschool scores actually indicate a readiness that is associated with success in the elementary school context. Research on the predictive validity of school readiness measures has historically focused on academic skills, with little attention to the social-emotional domain. For example, in a meta-analysis of 70 longitudinal studies examining predictive links between school readiness measures collected in preschool and kindergarten or first-grade adjustment (La Paro & Pianta, 2000), only two studies examined the predictive validity of teacher-rated social-emotional competence, and only one of those two studies found evidence of predictive validity. Specifically, Ladd and Price (1987) found that preschool teacher ratings of social competence (sharing, peer involvement) and task mastery assessed using the California Preschool Social Competency Scale (Flint, Hick, Horan, Irvine, & Kukuk, 1980) each significantly predicted similar dimensions of adjustment in kindergarten ( $r = .21-.52$ ). Although not included in that meta-analysis, an additional study conducted in 1985 found that preschool teacher ratings of approaches to learning (i.e. a 7-item scale describing attention, concentration, and interest in activities) significantly predicted first-grade achievement tests (reading,  $r = .52$ ; math,  $r = .39$ ) and teacher-rated academic performance (reading,  $r = .47$ ; math,  $r = .43$ ; Birrell, Phillips, & Stott, 1985).

Since that 2000 review, several additional studies have examined the predictive validity of preschool measures of social-emotional competence or approaches to learning. For example, Pianta and Stuhlman (2004) found that teacher-rated social competence rated on the California Preschool Social Competency Scale significantly predicted reduced teacher conflict in kindergarten and first grade ( $r = -.50$  and  $-.25$ , respectively) and first-grade social competence ( $r = .44$ ). Similarly, Daniels (2014) found that teacher-rated social competence in preschool significantly predicted kindergarten social competence ( $r = .44$ ). Burchinal and colleagues (2008) also documented significant associations between preschool teacher ratings of social competence (using the Teacher-Child Relationships Scale) and kindergarten social competence ( $r = .34$ ) as well as kindergarten reading ( $r = .21$ ) and math ( $r = .20$ ) skills.

Focusing on approaches to learning, McDermott, Leigh, and Perry (2002) found that the 29-item Preschool Learning Behavior Scale significantly predicted kindergarten academic performance ( $r = .15-.32$ ), social skills ( $r = .22-.34$ ), and work habits ( $r = .23-.35$ ) as well as first-grade academic performance ( $r = .18-.35$ ) and work habits ( $r = .25-.38$ ). Another study found positive links between preschool teacher-rated approaches to learning (composed across three measures) and later achievement tests in kindergarten ( $r = .27$  math,  $.14$  reading) and in first grade ( $r = .30$  math,  $.27$  reading; McWayne et al., 2009).

These studies document the potential promise of using preschool teacher ratings to assess social-emotional competence and approaches to learning in ways that predict kindergarten school adjustment. However, they fall short of establishing whether preschool teachers are able to rate these two noncognitive skill sets reliably in ways that predict differentially to dimensions of children's future school adjustment when using brief scales.

## The current study

This study evaluated the utility of two brief preschool teacher rating scales of social-emotional competence and approaches to learning in a sample of low-income preschool children. There were three primary research aims. The first goal was to describe the internal consistency and interrater reliability of each of the scales. The second goal was to explore the predictive validity of each preschool rating scale by computing correlations with kindergarten and first-grade achievement, behavior problems, peer relation difficulties, need for school services, and grade retention. The third goal was to determine the unique and differential predictability of each scale to the set of kindergarten and first-grade outcomes and establish the extent to which they extended the prediction of school adjustment above and beyond predictions based on direct assessments of child emergent literacy skills.

## Method

### Participants

Participants included two cohorts of 4-year-old children (total  $N = 164$ ; 14% Hispanic American, 30% African American, 56% Caucasian; 56% girls) recruited from 22 Head Start preschool classrooms in three counties in Pennsylvania who served as the usual practice comparison group for an intervention trial. None of these children received the intervention. At the time of baseline assessment, children were on average 4.59 years old ( $SD = 0.32$ , range = 3.87–5.82). Their families all met the requirements for participation in Head Start; the median annual family income was \$18,000, which is below the national poverty threshold.

Lead teachers ( $N = 22$ ; 85% Caucasian, 10% African American, 5% Hispanic; 100% female) had an average of 6 years of experience teaching in Head Start ( $SD = 5.8$ , range = 0.04–23) and had taught elsewhere for an average of 4.7 years ( $SD = 6.31$ , range = 0–26). Their primary language was English (100%), and six teachers used Spanish for work (29%). Most of these teachers had a 4-year degree, some with additional graduate coursework ( $n = 14$ ); the rest had a 2-year degree ( $n = 8$ ). Assistant teachers ( $N = 22$ ; 95% Caucasian, 5% African American; 100% female) had an average of 5 years of experience teaching in Head Start ( $SD = 5.56$ , range = 0–18) and an average of 2 years of experience teaching elsewhere ( $SD = 3.85$ , range = 0–14). One teacher spoke Spanish primarily, and three used Spanish at work. A few had a 4-year ( $n = 2$ ) or a 2-year ( $n = 2$ ) college degree. One had a child development associate certificate. The rest ( $n = 17$ ) had a high school diploma and (for most) some additional coursework toward a certificate or 2-year degree.

At the beginning of the preschool year, brochures describing the research project were distributed to parents of all 4-year-old children in the participating classrooms, and 86% elected to participate in the study and completed initial assessments. Children were then followed longitudinally as they transitioned from the original 22 Head Start classrooms to 113 kindergarten classrooms and then 121 first-grade classrooms. All but seven children participated in the follow-up assessment at the end of kindergarten (96% retention), and all but eight children participated in the follow-up assessment at the end of first grade (95% retention). *T* tests comparing the children who were missing in kindergarten and first grade with the other children who remained in the study revealed no significant differences on any of the study measures.

### Procedures

Each year, research assistants delivered rating measures to teachers at the end of the year (April/May); teachers completed the measures and returned them to the project. Teachers were compensated financially for their time. Child assessments were conducted at school by trained assessors. Preschool assessments were conducted in April/May 2003 (Cohort 1) and 2004 (Cohort 2) and included two individual pull-out sessions (30–45 min each). Subsequently, in kindergarten (2004–2005) and first grade (2005–2006), assessments were conducted in March/April during one

individual session. Assessors were college students or community members with child development backgrounds who were trained to proficiency on all instruments before testing sessions. After attending training workshops, assessors conducted three pilot assessments with supervision and feedback and were then observed in the field for several assessments. Study procedures aligned with the American Psychological Association standards for ethical conduct of research and were approved by the university institutional review board.

## Measures

### School readiness

To measure school readiness at the end of preschool, this study used the School Readiness Questionnaire developed for the Research-Based, Developmentally-Informed (REDI) project (Bierman et al., 2008). This questionnaire included nine items describing approaches to learning that were similar to those used by Birrell et al. (1985). Item content included being able to sit at a table and do work, being ready for the cognitive demands of school, and being able to work independently, each rated on a 6-point scale ( $\alpha = .97$ ). Response options ranged from *strongly disagree* to *strongly agree*. The Social Competence Scale (Conduct Problems Prevention Research Group, 1995) assessed prosocial behaviors (e.g., sharing, understanding others' feelings) and emotional regulation (e.g., can calm down when excited or upset) using 10 items rated on a 6-point Likert scale (0 = *never* to 6 = *always*;  $\alpha = .95$ ). Head Start lead and assistant teachers provided independent ratings in the prekindergarten baseline year. For each of these scales measuring noncognitive skills, the total score represents an average item rating.

Brief screening measures also evaluated emergent literacy skills at the end of the preschool year. Three subscales testing early literacy skills were drawn from the Pre-Comprehensive Test of Phonological Processing (Pre-CTOPP) (later the Test of Preschool Early Literacy; Lonigan, Wagner, Torgesen, & Rashotte, 2007). Blending and Elision assessed phonological processing. Children were asked to combine different parts of a word, such as "hot" and "dog" or "b" and "air," and point to the correct picture or say the full word ( $\alpha = .86$ ); children were also asked to deconstruct compound words, pointing to the correct picture or saying the correct word (e.g., "Point to *snowshoe* without 'snow,'" "Say *airport* without 'air'";  $\alpha = .83$ ). On the Print Awareness subtest, children identified pictures of letters or words and named letters ( $\alpha = .97$ ). Prior research has reported correlations in the range of  $r = .43$  to  $r = .88$  between these three subscales and the acquisition of initial reading skills (Lonigan, 2006). Scores from these three subscales were standardized and averaged to create a preschool literacy achievement composite.

### Kindergarten and first-grade adjustment

Multiple dimensions of elementary school adjustment were assessed, including academics, behavior problems, peer difficulties, need for school services, and grade retention.

Achievement tests administered in kindergarten and first grade included two subtests from the Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999). The Sight Word Efficiency subscale measured the number of words read accurately within 45 s, and the Phonemic Decoding Efficiency subscale measured the number of nonwords sounded out accurately within 45 s (test-retest reliability reported by the developers = .85–.90). A prior study of 202 ethnically diverse first-grade students (Hagan-Burke, Burke, & Crowder, 2006) documented strong convergent validity for the Test of Word Reading Efficiency subtests, which correlated significantly with the Dynamic Indicators of Basic Early Literacy Skills Nonsense Word Fluency scale ( $r_s = .73$ –.74).

Two subtests from the Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001) were also administered. The Letter-Word Identification subscale assessed children's letter recognition and basic sight word knowledge; the Applied Problems subscale presented children with a series of math-related questions that became increasingly difficult (such as showing two fingers, counting objects, and adding or subtracting small numbers). These subtests were drawn

from a standardized diagnostic battery with strong reliability (coefficient  $\alpha > .80$  for ages 6–8). High levels of content validity and structural validity are documented in the manual, along with a set of studies that have established concurrent validity with other established achievement tests (Woodcock et al., 2001). Total scores on these four academic achievement measures were standardized and averaged to create a composite score representing achievement at both kindergarten and first grade.

Teachers rated child academic performance at kindergarten and first grade using 13 items assessing early achievement skills drawn from the Language and Literacy scale of the Early Childhood Longitudinal Study (National Center for Education Statistics, 2011). Items measured early reading (demonstrates phonetic understanding, reads independently, identifies letters), writing (writes simple words, understands conventions of print), and memory skills (follows two-step directions, writes from memory) and were rated on a 4-point Likert scale from *not yet* to *proficient*. The average item score was used to represent teacher-rated academic performance ( $\alpha = .97$ ) at both grades.

To assess early elementary behavior problems, teachers rated child aggressive-disruptive behavior problems using the Teacher Observation of Child Adaptation–Revised Authority Acceptance scale (Werthamer-Larsson, Kellam, & Wheeler, 1991). The seven items included overt aggression (e.g., yells, fights) and oppositional behaviors (e.g., stubborn, breaks rules) rated on a 6-point Likert scale from *almost never* to *almost always*. Items were averaged to form a total behavior problems score ( $\alpha = .89$ ), with higher scores reflecting higher levels of behavior problems. In an ethnically diverse sample of children at risk for conduct problems from the Fast Track Project, 754 children’s scores on the Teacher Observation of Child Adaptation–Revised Authority Acceptance scale (administered in kindergarten) were significantly correlated with later measures of parent-rated school adjustment ( $r_s = -.27-.41$ ), teacher-rated behavior problems ( $r_s = .35-.41$ ) and social competence ( $r_s = -.33-.38$ ), and self-rated school adjustment ( $r_s = -.16-.31$ ) in sixth, eighth, and 11th grades (Racz et al., 2013).

To assess early elementary peer difficulties, teachers rated four items from the Excluded by Peers subscale of the Child Behavior Scale (Ladd & Profilet, 1996). The items were “is liked by classmates,” “is disliked by classmates” (reverse scored), “is left out or ignored by classmates,” and “is teased or picked on by classmates.” Average item scores were used to reflect peer difficulties ( $\alpha = .84$ ). Correlations between the Excluded by Peers subscale of the Child Behavior Scale and observations of kindergarten children (two cohorts each with  $n = 206$ ) showed that the scale was correlated negatively with positive peer interactions ( $r = -.19-.22$ ) and positively with nonsocial behaviors ( $r = .15-.17$ ; Ladd & Profilet, 1996). Among both low- and high-risk children ages 4 to 7 years old, correlations between the Excluded by Peers subscale and the Strengths and Difficulties Questionnaire ranged from .59 to .87 (Goodman & Scott, 1999).

Each year, teachers also responded to a list of 12 yes/no items to describe the child’s need for and receipt of any special education or adjunct support services at school, including an individualized education plan, speech and language services, learning support, and behavioral support ( $\alpha = .89$ ). Items were summed to reflect the total number of school support services needed and used by each child. Finally, retention in kindergarten or first grade was recorded as an outcome reflecting elementary school adjustment (0 = not retained, 1 = retained in kindergarten or first grade).

### Demographic covariates

At the initial assessments, parents were asked to identify the sex and race of the child. They were also asked questions about their educational attainment and occupation and (if relevant) the education and occupation of their spouse or live-in, coparenting partner. Educational attainment and occupation were coded to represent family socioeconomic status using the Hollingshead (1975) system.

## Results

Analyses proceeded in three steps. First, analyses were undertaken to examine the internal and interrater reliability of preschool teacher ratings of social–emotional competence and approaches to learning. Second, correlations were computed to assess the associations between these two preschool

teacher ratings and subsequent kindergarten and first-grade school adjustment. Third, regressions were computed to evaluate the unique and differential predictive associations of preschool teacher ratings of social-emotional competence and approaches to learning to kindergarten and first-grade adjustment in combination with preschool early literacy skills.

### **Research Aim 1: Preschool teacher ratings of noncognitive skills**

Preschool teacher ratings of social-emotional competence were normally distributed. Ratings of approaches to learning were slightly negatively skewed ( $M$  skewness =  $-1.218$ ) and leptokurtic ( $M$  kurtosis =  $1.187$ ) but still within acceptable limits. The internal reliability of each scale was evaluated, revealing strong internal consistency ( $\alpha = .95$  for social-emotional competence,  $\alpha = .97$  for approaches to learning). Item-total correlations are shown in Table 1. To evaluate interrater reliability, we compared total scores provided by lead and assistant teachers. They were moderately to highly correlated for approaches to learning ( $r = .74$ ) and social-emotional competence ( $r = .60$ ). Analyses indicated comparable associations between lead and assistant teacher ratings and kindergarten and first-grade outcomes; thus, we averaged lead and assistant teacher ratings for subsequent analyses, creating total scores for the two scales (social-emotional competence and approaches to learning). The two noncognitive skills scales themselves (social-emotional competence and approaches to learning) were highly correlated ( $r = .79$ ).

### **Research Aim 2: Concurrent and predictive correlations**

Next descriptive analyses and a series of correlations were undertaken to examine relations between preschool teacher ratings of noncognitive skills and later elementary school adjustment. Descriptive statistics for all variables are presented in Table 2. Correlations between preschool teacher ratings and kindergarten/first-grade outcome variables are presented in Table 3. As shown in Columns 1 and 2 of Table 3, preschool ratings of approaches to learning and social-emotional competence were significantly related to multiple indices of kindergarten and first-grade school adjustment (achievement, academic

**Table 1.** Results of item-total correlation and Cronbach's alpha analysis for noncognitive skill scales ( $N = 161$ ).

Item	Item-Total Correlation	Cronbach's $\alpha$ if Item Excluded <sup>a</sup>
Approaches to learning		
This child will be successful in meeting the demands of school.	.95	.97
This child is ready for the cognitive demands of school.	.85	.97
This child is careful with his or her work.	.91	.97
This child can work independently.	.91	.97
This child is able to sit at a table and do work.	.91	.97
This child is able and willing to follow teacher instructions.	.94	.97
This child seems enthusiastic about learning new things.	.77	.97
This child has the self-control necessary to do well in school.	.87	.97
This child can follow the rules and routines that are part of the school day.	.84	.97
Social-emotional competence		
Cooperates	.87	.94
Controls temper when there is a disagreement	.74	.95
Accepts things not going his or her way	.74	.95
Stops and calms down when frustrated or upset	.81	.94
Shares with others	.86	.94
Listens well to other people's point of view	.80	.94
Understands other people's feelings	.80	.94
Expresses needs and feelings appropriately	.84	.94
Resolves problems with other children on his or her own	.70	.95
Is helpful to others	.72	.95

<sup>a</sup>Cronbach's alpha for approaches to learning = .97 and for social-emotional competence = .95.



**Table 2.** Descriptive statistics for school readiness and outcome measures.

Measure	n	M	SD	Range
School readiness measures				
Early literacy skills	157	0.01	0.77	-1.85 to 1.72
Approaches to learning	161	4.93	0.95	1.89-6.00
Social competence	161	3.94	0.92	1.50-5.95
Kindergarten outcomes				
Achievement	157	0.00	0.79	-1.74 to 3.18
Academic performance	154	2.40	1.08	0.00-4.00
Behavior problems	154	1.96	0.83	1.00-4.57
Peer difficulties	153	1.77	0.68	1.00-3.50
Need for services	148	2.51	2.77	0.00-11.00
First-grade outcomes				
Achievement	155	0.00	0.86	-2.37 to 2.12
Academic performance	154	2.86	0.94	0.17-4.00
Behavior problems	154	1.95	0.85	1.00-5.00
Peer difficulties	154	1.83	0.80	1.00-4.00
Need for services	150	3.21	2.79	0.00-11.00
Grade retention	164	0.07	0.26	0.00-1.00

Note. We calculated scores using the average of the items with the exception of (a) early literacy skills and achievement, for which total scores for the subscales were standardized and averaged to create composite scores, and (b) need for services, which was measured dichotomously and summed to represent the number of services needed.

**Table 3.** Correlation coefficients for school readiness measures and elementary school outcomes.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Prekindergarten school readiness														
1. Approaches to learning	—													
2. Social competence	.79**	—												
3. Early literacy skills	.49**	.34**	—											
Kindergarten outcomes														
4. Achievement	.42**	.30**	.52**	—										
5. Academic performance	.50**	.38**	.53**	.67**	—									
6. Behavior problems	-.42**	-.48**	-.16**	-.17*	-.24**	—								
7. Peer difficulties	-.33**	-.35**	-.14	-.19*	-.34**	.64**	—							
8. Need for services	-.47**	-.40**	-.32**	-.35*	-.48**	.35**	.38**	—						
First-grade outcomes														
9. Achievement	.46**	.34**	.50**	.77**	.61**	-.22*	-.18**	-.36**	—					
10. Academic performance	.45**	.34**	.57**	.60**	.66**	-.13	-.23**	-.36**	.64**	—				
11. Behavior problems	-.29**	-.39**	-.08	-.04	-.10	.52**	.38**	.16	-.04	-.16*	—			
12. Peer difficulties	-.28**	-.37**	-.18*	-.25**	-.21**	.31**	.37**	.15	-.15	-.25**	.68**	—		
13. Need for services	-.56**	-.45**	-.39**	-.48**	-.54**	.41**	.35**	.59**	-.51**	-.59**	.42**	.34**	—	
14. Grade retention	-.23**	-.11	-.23**	-.28**	-.38**	-.20*	.19*	.38**	-.32**	-.21**	.03	.06	.31**	—

\* $p < .05$ . \*\* $p < .01$ .

performance, behavior problems, peer difficulties, need for services;  $r_s = .23-.50$ ). In addition, grade retention was significantly related to preschool approaches to learning ( $r = -.23$ ) but not social competence.

### Research Aim 3: Predictive regression analyses

Finally, in order to assess the degree to which preschool teacher ratings of social–emotional competence and approaches to learning uniquely and differentially predicted elementary school outcomes above and beyond prediction based on direct assessments of preschool literacy skills, we conducted a series of hierarchical multiple linear regression analyses. For each regression, control variables (child sex, child race, and family socioeconomic status) were entered first. Then teacher ratings of social–emotional competence and approaches to learning were entered in Step 2 along with preschool assessments of early literacy skills.

#### Academic domain

Results for the academic domain are displayed in Table 4. Prediction to elementary school assessments of child academic achievement are shown in the first section of Table 4, with kindergarten outcomes on the left and first-grade outcomes on the right. After we accounted for demographic control variables, the addition of preschool teacher ratings and early literacy skills together accounted for 30% of the variance in kindergarten achievement and 30% of the variance in first-grade achievement, with approaches to learning and direct assessments of early literacy skills each contributing unique variance in each model. Findings were very similar across the models predicting academic achievement in kindergarten and first grade.

Prediction to teacher ratings of children's academic performance in kindergarten and first grade is shown in the second section of Table 4. Together the preschool scores accounted for 31% of the variance in kindergarten teacher ratings of academic performance and 34% of the variance in first-grade teacher ratings of academic performance. In both years, direct assessments of early literacy skills made significant unique contributions. Preschool teacher ratings of approaches to learning also made a significant unique contribution to kindergarten academic performance, but this prediction was reduced to a trend level by first grade.

#### Social–behavioral domain

The third section of Table 4 shows predictions to kindergarten and first-grade teacher ratings of aggressive–disruptive behavior problems. Preschool teacher ratings and early literacy skills accounted for 23% of the variance in kindergarten behavior problems, and social–emotional competence

**Table 4.** Predictions from preschool teacher ratings and literacy skills to elementary school achievement and behavior.

Preschool Predictor	Outcome Measurement					
	Kindergarten			First Grade		
	F	$\Delta R^2$	$\beta$	F	$\Delta R^2$	$\beta$
Achievement	12.22**	.30**		11.85**	.30**	
Approaches to learning			.28*			.35**
Social competence			-.03			-.04
Early literacy skills			.39**			.33**
Academic performance	14.45**	.31**		15.09**	.34**	
Approaches to learning			.25*			.20 <sup>†</sup>
Social competence			.01			.03
Early literacy skills			.40**			.45**
Behavior problems	7.86**	.23**		4.84**	.14**	
Approaches to learning			-.11			.08
Social competence			-.41**			-.45**
Early literacy skills			.01			.02
Peer difficulties	3.69**	.11**		4.01**	.14**	
Approaches to learning			-.12			.11
Social competence			-.24 <sup>†</sup>			-.43**
Early literacy skills			.00			-.09

Note. Analyses controlled for child race, child sex, and family socioeconomic status.

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

emerged as a unique predictor. Preschool teacher ratings and early literacy skills accounted for 14% of the variance in first-grade behavior problems, with social-emotional competence again emerging as a unique predictor.

Predictions to elementary school peer difficulties are shown in the bottom section of Table 4. Preschool teacher ratings and early literacy skills accounted for 11% of the variance in peer difficulties in kindergarten and 14% in first grade. Preschool social-emotional competence ratings made unique contributions in first grade and showed a marginally significant trend in kindergarten.

### General school adjustment

Finally, predictions from school readiness indicators to child need for supplemental school services in both kindergarten and first grade are shown in the top section of Table 5. Noncognitive measures of school readiness and early literacy skills significantly predicted 20% of the variance in a child's need for services in kindergarten and 27% of the variance in first grade. At both grade levels, preschool approaches to learning was a unique predictor along with early literacy skills (marginally significant in kindergarten, significant in first grade).

Grade retention was examined in first grade, and retention was designated in either kindergarten or first grade. The preschool predictors studied here accounted for 8% of the variance in grade retention, with approaches to learning adding significant unique variance.

## Discussion

Using brief rating scales, preschool teachers provided assessments of child social-emotional competence and approaches to learning that significantly predicted multiple domains of school adjustment after children transitioned to kindergarten and first grade. The two scales showed internally consistent ratings of the noncognitive skills of focus, approaches to learning (e.g., can work independently, able and willing to follow teacher instructions) and social-emotional competence (e.g., cooperates, controls temper in a disagreement, accepts things not going his or her way). Two teachers who rated children independently showed moderate reliability when assessing approaches to learning ( $r = .74$ ) and social-emotional competence ( $r = .60$ ). Ratings of approaches to learning and social-emotional competence were highly correlated but were differentially predictive of future elementary school outcomes, reflected in distinct patterns of correlation and unique contributions in multiple regressions.

Specifically, in regression analyses including both noncognitive rating scales and preschool literacy skills, preschool approaches to learning uniquely predicted kindergarten and first-grade academic achievement, academic performance, and need for services. Correlations with these outcomes were consistent with these regressions, favoring preschool approaches to learning over social-emotional competence, with an average  $r = .46$  versus  $.36$  for the kindergarten outcomes and an

**Table 5.** Predictions from preschool teacher ratings and literacy skills to elementary school general adjustment.

Preschool Predictor	Outcome Measurement					
	Kindergarten			First Grade		
	F	$\Delta R^2$	$\beta$	F	$\Delta R^2$	$\beta$
Need for services	7.93**	.20**		12.39**	.27**	
Approaches to learning			-.29*			-.40**
Social competence			-.08			-.05
Early literacy skills			-.17 <sup>†</sup>			-.18*
Retention				2.34*	.08*	
Approaches to learning						-.28*
Social competence						.16
Early literacy skills						-.15

Note. Analyses controlled for child race, child sex, and family socioeconomic status.

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

average  $r = .49$  versus  $.37$  for the first-grade outcomes. Approaches to learning also uniquely predicted grade retention. In contrast, in regression analyses, social-emotional competence uniquely predicted behavior problems and peer difficulties in kindergarten and first grade. Correlations with these outcomes favored preschool social-emotional competence ratings over approaches to learning, with an average  $r = .42$  versus  $.37$  for the kindergarten outcomes and an average  $r = .38$  versus  $.28$  for the first-grade outcomes.

### ***The importance of measuring preschool noncognitive skills***

Countering the increasing emphasis on preschool academic learning during the past 15 years, educators and researchers alike recognize the importance of noncognitive skill development for children's school readiness and future school adjustment (Bassok et al., 2016; Yoshikawa et al., 2013). For example, a recent long-term longitudinal study showed that kindergarten teacher ratings of prosocial skills uniquely predicted key educational outcomes (high school graduation, lower grade retention rates, less need for special education services) as well as future employment and reduced criminal involvement at age 25 (Jones et al., 2015). Kindergarten teachers agree with this research (Bassok et al., 2016); when asked to list critical school readiness skills, the majority include approaches to learning (can follow directions, 91%; sits still and pays attention, 77%) and social-emotional competencies (takes turns and shares, 77%). Reflecting this growing consensus, Head Start modified its national early learning standards in 2015 to emphasize approaches to learning and social-emotional development as two of the five major early learning domains (Office of Head Start, 2015).

Despite consensus on the importance of these skill domains, the ability of preschool teachers to assess them and monitor child progress in skill acquisition has been hampered by the lack of short, practical, and valid measures. Past research has documented the predictive validity of teacher ratings collected after school entry when children are in kindergarten (Li-Grining, Votruba-Drzal, Maldonado-Carreño, & Haas, 2010; Matthews & Kizzie, 2010; McClelland, Morrison, & Holmes, 2000). However, only a few studies have examined the predictive validity of preschool teacher ratings of social-emotional competence or approaches to learning. No prior study has compared brief preschool teacher ratings of social-emotional competence and approaches to learning to determine how effectively and distinctively brief ratings can predict different domains of elementary school functioning.

The differential patterns of prediction found here are consistent with prior research that has examined each dimension separately (e.g., Ladd & Price, 1987, for social-emotional competence; McDermott et al., 2012, for approaches to learning). The differential patterns of prediction validate the separation established in Head Start's revised early learning standards, in which social-emotional competence and approaches to learning serve as distinct dimensions of school readiness (Office of Head Start, 2015). This study adds to the existing literature by demonstrating that preschool teachers can rate these two dimensions on brief scales with significant and differential predictive validity.

### ***Study limitations***

Several study limitations warrant mention. The Head Start sample followed here consisted of low-income families, and hence it is unknown whether the results would generalize to a nationally representative sample that included greater heterogeneity in family socioeconomic status. Although the teacher ratings showed sufficient interrater reliability to support predictive validity, the level of agreement was somewhat low for ratings of social-emotional competence, which suggests that additional measure refinement may be needed. Low levels of interrater agreement in social and behavioral domains are not new problems in psychometrics, as the varying expectations of raters and differences in task demands across contexts are difficult to resolve. Further precision around

operationalizing item content and response options should be a continued area of investigation in measurement, in particular for young children.

The present study assessed the general predictive validity of these brief rating scales but did not validate their use as diagnostic screeners. With the advent of prevention-oriented screening practices in school (e.g., schoolwide positive behavior support, response to intervention and instruction) it may be tempting to consider ways in which brief screenings can be used to identify children for possible support or intervention. Although the early identification of students who may benefit from support in noncognitive skill domains is a worthy goal, the current study did not test for sensitivity and specificity in the identification of individual children. In other words, it remains unclear whether these scales could be used to identify individual children who need additional services in either approaches to learning or social–emotional adjustment.

### ***Implications for practice and future directions***

Despite these limitations, the present findings offer encouragement in terms of preschool teachers' ability to assess social–emotional competence and approaches to learning using practical, brief scales. Few of the measures currently used to assess the school readiness of children in noncognitive domains have been examined in terms of their predictive validity from preschool to elementary school (Halle & Darling-Churchill, 2016; Weisenfeld, 2017), and most involve longer teacher rating scales and/or additional assessment methods, such as the Behavior Assessment System for Children, the Devereux Early Childhood Assessment Clinical Form, and the Social Skills Rating System. Given the goal of linking preschool preparation with kindergarten outcomes in a way that reduces assessment burdens on teachers and students alike, the development and validation of brief scales measuring noncognitive skills is a critical goal. Currently curriculum-based measures of achievement are often used as screeners for children entering kindergarten and take on average 30 min or more per child (Costenbader, Rohrer, & Difonzo, 2000; Weisenfeld, 2017). The two scales used in the current study consist of no more than 10 items each while still maintaining adequate psychometric properties and offer predictive value beyond that provided by achievement screeners alone, especially for behavioral outcomes. In addition, research on measures that are in the public domain as was conducted here will increase the accessibility of these tools for all providers of early childhood education. Although nationally representative norms are not yet available for the measures studied here, these measures offer value as examples of brief, practically useful scales with adequate criterion validity and present an opportunity for future measurement research (see Supplementary Material).

In general, addressing factors that contribute to the achievement gap in students from low-income families as well as identifying those students who may have difficulty with school adjustment after kindergarten entry may guide efforts to better support long-term academic success. Identifying children in need of more supports in noncognitive skill domains is a challenge given the lengthy and sometimes contextually inappropriate measures available for measuring the noncognitive skills of young children. Given these considerations, the brief, theoretically based school readiness measures studied here fill an important, practical gap.

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