



**SC EDUCATION  
OVERSIGHT COMMITTEE**

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**(REVISED)  
AGENDA**

**Early Readiness Assessment Subcommittee**

January 26, 2015  
2:00 pm  
Brown Building, Room 415

- I. Welcome & Introductions ..... Mrs. Barbara Hairfield
- II. Action: Approval of Minutes - November 17, 2014
- III. Progress Update and Discussion ..... Dr. Dan Wuori  
Deputy Director  
SC First Steps to School Readiness
- IV. Cognitive Skills ..... Dr. Sandra M. Linder  
Assistant Professor  
Early Childhood Mathematics Education  
Clemson University
- V. Language and Literacy..... Dr. Bill Brown  
Professor  
Department of Educational Studies  
University of SC
- VI. Wrap Up and Discussion
- VII. Adjournment

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**Minutes**  
**Early Readiness Assessment Subcommittee**  
**November 17, 2014**  
**10:00 A.M., Lexington 4 Early Childhood Center**

Subcommittee Members Present: Ms. Barbara Hairfield (Chair); Mrs. Margaret Anne Gaffney (Vice-Chair), Ms. Deb Marks; Senator Mike Fair; Andy Patrick; Mrs. Anne Bull

EOC Staff Present: Melanie Barton; Hope Johnson-Jones; Bunnie Ward

Welcome and Introductions

Ms. Hairfield opened the meeting by asking members of the subcommittee and those in attendance to introduce themselves. Ms. Hairfield also provided an overview of the mission and timeline of the Early Readiness Assessment Subcommittee.

Overview of Readiness Domains

- Dr. Leigh Kale D'Amico (Research Assistant Professor at USC College of Education) provided overview of conceptual framework for four-year-old kindergarten. As part of this discussion, she discussed readiness domains and the critical need for young children to be assessed for progress monitoring and evaluation of program performance. Dr. Bill Brown (Professor at USC College of Education) also responded to Subcommittee members' questions regarding language and literacy development and the CIRCLE assessment.
- Leigh Bolick (Director, DSS Division of Early Care and Education) introduced Subcommittee to the SC Early Learning Standards and discussed the ongoing multi-state consortium that is developing a Kindergarten Entry Assessment. The constructs for each domain have been determined and the standards for physical and motor development have been drafted. Dr. Dan Wuori (Assistant Director, Office of First Steps) also provided informal comments about South Carolina's involvement in the consortium.
- Mary Lynne Diggs (Director, SC Head Start Collaboration Office) and Dwayne Frederick (Director, Head Start of Beaufort and Jasper Counties) provided information about the SC Head Start Standards and their alignment with current SC Early Learning Standards. Head Start's social and emotional standards have been incorporated into the current social and emotional development standards for the state. Mr. Frederick also spoke briefly about the importance of social and emotional development in young children.

## Discussion of Approaches to Learning and Social/Emotional Domains

- Lillian Atkins (Principal, Lexington 4 Early Childhood Center) addressed interventions and learning approaches employed by her staff to support children social and emotional needs.
- Dave Morley (Early Childhood Committee Co-Chair, SC Council on Competitiveness) provided an update on his Committee's work to develop the profile of a ready kindergartner. Through his extensive experience with social and emotional development and parenting programs, Mr. Morley discussed the importance of school readiness to the economic development of South Carolina.

The Committee adjourned at 12:20.

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Predictors of School Readiness in Literacy and Mathematics: A Selective Review of the Literature

Sandra M. Linder, Ph.D.

M. Deanna Ramey

Serbay Zambak

Clemson University, School of Education

### Abstract

This paper presents findings from a selective review of the literature related to predictors of school readiness in literacy and mathematics. School readiness was defined as what children are expected to know and do in a variety of academic domains and processes of learning prior to entering a formal classroom setting. Seven themes emerged, based on a review of selected empirical research published over a sixteen-year period. Twenty-four predictors of success for school readiness were categorized under these themes. Implications for practice and recommendations for future research are presented.

### Introduction

Young children are increasingly entering academically rigorous school settings where an emphasis on accountability and standards has replaced an emphasis on child development. However, many young children enter school unprepared for both academic and social expectations. Research suggests (Aunola, Leskinen, Lerkkanen, & Nurmi, 2004) that if students enter kindergarten at a disadvantage, early gaps in understandings of literacy or mathematics tend to be sustained or widened over time; this appears to be particularly true for children of poverty (McLoyd & Purtell, 2008). It is imperative for the field to identify strategies that move young children toward becoming independent and reflective learners, to increase the likelihood of their school success in later years.

In order to achieve this vision, we must first identify the specific characteristics or factors that enable certain children to enter formal schooling at an advantage while others enter at a disadvantage. Since the 1950s, researchers have investigated how external factors can influence or predict student success in school, and particularly school readiness (Milner, 1951), but a comprehensive list of factors that may affect cognitive, social, emotional, or language development in the school-age years has yet to be compiled. This literature review focuses on school readiness in the areas of literacy and mathematics. Its purposes are to provide stakeholders such as parents, caregivers, and teachers with insight into factors that research has identified as possibly contributing to children's successful entry into formal schooling and to enable them to identify whether particular children are affected by these factors.

Many definitions of school readiness can be found in the research literature. For some, school readiness relates to students' cognitive abilities (Nobel, Tottenham, & Casey, 2005). For others, readiness is more related to maturational, social, and emotional domains of development (Ray & Smith, 2010) or to whether or not students have the tools necessary to work effectively in a classroom setting (Carlton & Winsler, 1999). For the purposes of this study, school readiness was defined as children's preparedness

for what they are expected to know and do in academic domains and processes of learning when they enter a formal classroom setting. Rather than focusing on specific activities such as counting to ten or saying the alphabet, this definition considers such components as children's social-emotional characteristics, cognitive processes related to conceptual understanding, and their ability to communicate about their understandings.

## Methods

A systematic review of the literature was conducted over three months during the spring of 2011. The question guiding the literature review was: What predictors of school readiness in mathematics and literacy have been identified by empirical research in education?

## Data Collection and Analysis

The research team determined parameters for conducting searches by first examining already published literature reviews or meta-analyses relating to early childhood literacy or mathematics and relating to issues of school readiness. Four criteria emerged for articles to be included: (1) publication after 1995; (2) publication in a reputable peer-reviewed journal; (3) grounding in empirical research; and (4) use of rigorous research methods. These criteria are similar to those used in examples found in the preliminary review of the literature (Justice, 2003; La Paro & Pianta, 2000); however, many previous analyses were limited to large scale quantitative studies. During the preliminary review, meta-analyses of this literature published in 1995 or before were identified (Bus, Ijzendoorn, & Pellegrini, 1995). Therefore, this literature review focused on research following those publications to determine if any changes have occurred.

Having established parameters, the research team searched the literature to compile articles relevant to the research question. Both criterion and snowball sampling methods were used to identify literature. For criterion sampling, the research team conducted electronic searches of a variety of databases and search engines to identify articles that met the established parameters. Snowball sampling involved examining reference sections from theoretical articles related to school readiness, school achievement, early childhood mathematics, and early childhood literacy to find empirical research relevant to the research question. Snowball sampling was also conducted on the reference sections for each empirical study identified in the review to determine if additional sources could be included.

Finally, the research team conducted preliminary readings of the articles to obtain an overall understanding of the data. Following this analysis, articles were clustered based on similarity of findings. After clustering, articles underwent a secondary analysis to establish predictors of school readiness in mathematics and literacy.

## Results

In general, literature relating to predictors of success in early childhood literacy was more prevalent than literature relating to early childhood mathematics. Therefore, more predictors of success relating

to literacy were identified in this review. It is likely then that the findings do not encompass all potential predictors of school readiness in mathematics.

Seven themes emerged from the literature review regarding factors associated with school readiness in mathematics and literacy: (1) child care experience; (2) family structure and parenting; (3) home environment; (4) learning-related skills; (5) social behavior; (6) mathematical and literacy-based tasks; and (7) health and socioeconomic status. The sections that follow describe findings relating to each of these themes.

**Child care experience.** Several studies reviewed noted correlations between children's exposure to high-quality child care and their performance on measures of school readiness in literacy and mathematics. In a longitudinal study conducted by the NICHD Early Child Care Research Network (2002), participation in high quality, center-based child care was associated with higher language performance (NICHD, 2002). However, increased time spent in child care did not increase language performance, and a higher number of hours spent in child care was associated with increased behavior problems, as reported by caregivers (NICHD, 2002).

Ramey and Ramey (2004) reported the results of multiple randomized controlled trials investigating experiences in preschool education and their connection to school readiness. The authors identified seven types of experiences that are "essential to ensure normal brain and behavioral development and school readiness" (2004, p. 474). These experiences should: "(1) encourage exploration, (2) mentor in basic skills, (3) celebrate developmental advances, (4) rehearse and extend new skills, (5) protect from inappropriate disapproval, teasing, and punishment, (6) communicate richly and responsively, and (7) guide and limit behavior" (Ramey & Ramey, 2004, p. 474).

The authors indicate that children's exposure to high-quality child care built around these types of experiences can better prepare children for school. Magnuson and colleagues (2004) also examined the relationship between quality of care and school readiness and, in particular, how different types of preschool experiences may affect children of economically advantaged and disadvantaged families. Child care was categorized as parental care, center-based care, Head Start, or other non-parental care. Using a sample from the Early Childhood Longitudinal Study, Kindergarten Class (ECLS-K), the authors found that children who attended center-based programs before kindergarten performed better in math and reading than children who experienced only parental care. Having attended center-based programs was associated with greater benefits for children from "disadvantaged" families than for those with higher economic status, including enhancement of mathematics performance (Magnuson, Meyers, Ruhm, & Waldfogel, 2004).

High quality child care was not always defined in the literature reviewed for this study, but some of the literature did examine aspects of high-quality care. Klein, Starkey, Clements, Sarama, and Iyer (2008) examined the effects of a preschool mathematics curriculum on children's levels of school readiness. Their findings suggest that use of high-quality curricula implemented with fidelity can lead to higher levels of school readiness in mathematics (Klein, Starkey, Clements, Sarama, & Iyer, 2008). Bracken and Fischel (2007) examined the impact of a supplementary literacy-based curriculum on Head Start

preschoolers' mathematics and literacy achievement and social and behavior skills. More students displayed positive behavior and social skills when engaging with the supplementary curriculum; these skills were associated with higher levels of performance on literacy tasks (Bracken & Fischel, 2007). Characteristics of instruction have also been considered in determining child care quality. Chien and colleagues (2010) investigated the types of engagement young children could encounter in child care settings (free play, group or individual instruction, and scaffolded learning). Children in settings with more free play showed smaller gains than their peers on literacy and mathematics indicators at the preschool level. Individual instruction tended to be a stronger predictor of success on preschool assessments (Chien, Howes, Burchinal, Pianta, Ritchie, Bryant, Clifford, Early, & Barbarin, 2010). However, that study focused only on the types of engagement as predictors of achievement success and did not discuss the potential positive implications of free play and group instruction on other domains of development.

**Parenting Style and Family Structure.** Parenting styles, parent and child relationships, and family structure were considered as factors potentially related to school readiness in some of the studies in this literature review. Hill (2001) examined the relationship between parenting styles and kindergarten children's school readiness in African-American and Euro-American families with comparable socioeconomic status. Maternal warmth or acceptance was found to be positively related to children's performance on a pre-reading measure, while "short temper" and lack of patience were associated with lower scores. Also positively related to children's performance were teachers' perception of the extent to which parents valued education, and the quality of parent involvement (high quality was characterized by primarily parent-initiated involvement; lower quality by primarily teacher-initiated parent involvement). Mothers' expectations for grades were positively related to children's performance on the pre-reading measure. Hill (2001) also compared parenting styles to kindergarten children's performance on a measure of quantitative concepts. Again, maternal warmth and high expectations for good grades were associated with higher scores on the pre-mathematics measure, while lack of patience was connected to lower scores. However, no significant relationship was found between children's performance and teacher-parent contact; the teacher-parent relationship alone did not predict better performance.

Wu and Qi (2006) examined the relationship between parenting styles and African American children's achievement in the areas of reading, math, and science. They found that parents' perceptions of children's abilities and expectations for good grades were strong predictors of success for students at all grade levels. These predictors were just as strong as parents' socioeconomic status (Wu & Qi, 2006). While parental involvement is commonly cited in the literature as a strong predictor of success, in this study, parental involvement was not shown to have a large impact on student achievement. Wu and Qi (2006) reported that their study "found limited positive effects of school-based parental involvement and, in addition, some negative effects of home-based parental involvement on achievement test scores" (p. 426). Lahaie (2008) found parental involvement to be a predictor of success for children of immigrants; that study's analysis of data from the ECLS-K indicated a correlation between higher levels of parental involvement and young children's higher proficiency in English and mathematics.

Family structure has also been cited as an important predictive factor relating to school readiness in mathematics and literacy. For example, Entwisle and Alexander (1996) investigated the relationship between children's literacy and mathematics school readiness and parent configuration, or family type, in a random sample of Baltimore children. Mothers who were single parents were found to have lower expectations for their children's grades in both reading and mathematics than mothers in two-parent families. However, regardless of family type, children in families with greater economic resources and who had a parent or parents with high expectations for success "consistently outperformed other children in reading and math" (Entwisle & Alexander, 1996, p. 341).

Home Environment. The research literature on school readiness includes several studies of the relationship between daily home activities and school readiness. Clarke and Kurtz-Costes (1997) examined the educational quality of the home environment and the influence of television-watching on readiness. They interviewed children and caregivers of low-income, African-American families and compared these data to school readiness assessments. Negative correlations were found between the amount of time spent watching television and number of books in the home, and between television viewing time and amount of parent-child instructional interactions. More television viewing time also predicted lower scores on readiness assessments (Clarke & Kurtz-Costes, 1997). Wright and colleagues (2001) investigated the relations between young children's television viewing experiences and their performance on tests of school readiness and vocabulary. Television programming was divided into 4 categories: (1) child-audience, informative or educational; (2) child-audience, fully animated cartoons with no informative purpose; (3) child-audience, other programs (neither of the above); and (4) general-audience programs. According to the authors, "for very young children [2-3], viewing informative programming designed for children was associated with subsequent letter-word skills, number skills, receptive vocabulary and school readiness" (Wright, Huston, Murphy, St. Peters, Pinon, Scantlin, & Kotler, 2001, p. 1361). The authors found this difference to be stable across the study; young children who frequently watched educational television at ages 2 and 3 performed better on a battery of tests at age 3 than did infrequent viewers. However, children who were frequent viewers of non-educational cartoons or general-audience programs at ages 2 and 3 had lower scores than infrequent viewers.

A longitudinal study of children's reading abilities and the literacy environment in the home (Burgess & Hecht, 2002) found that the home literacy environment (HLE) was significantly related to young children's oral language ability, word decoding ability, and phonological sensitivity. The authors define the home literacy environment in two ways: (1) Passive HLE, or "those parental activities that expose children to models of literacy usage (e.g., seeing a parent read a newspaper)" (2002, p. 413), and (2) Active HLE, or, "those parental efforts that directly engage the child in activities designed to foster literacy or language development (e.g., rhyming games, shared readings)" (2002, p. 413). In a study in the Netherlands, Leseman and de Jong (1998) examined three issues related to home literacy: the potential influence of affective factors, such as cooperation, co-construction, or social-emotional constructs; the influence of contextuality, or cultural or social background factors; and causality, the impact of home literacy on language development. They found that home literacy environment factors determined children's school literacy achievement when controlling for confounding factors. Their

findings suggest that combining exposure to literacy in the home with co-construction opportunities increased the predictive value of home literacy in relation to early literacy achievement.

Learning-related characteristics. "Learning-related characteristics" include children's behaviors and dispositions related to engaging in tasks as well as their strategies for completing tasks. McClelland, Morrison, and Holmes (2000) studied the relationship between work-related social skills and student performance in kindergarten classrooms and again in second grade. Examples of children's work-related social skills included the ability to follow directions, take turns in group activities, and stay on task. When child demographic information (e.g., IQ, entrance age, ethnicity, parental education level, and home literacy environment) was controlled, findings showed that work-related skills contributed to children's academic success in mathematics. Children with poor work-related skills performed significantly worse in mathematics upon school entry and at the end of second grade (McClelland, Morrison, & Holmes, 2000). McClelland, Acock, and Morrison (2006) later examined the influence of learning-related skills in kindergarten on academic math and reading success in elementary school. In this study, the math and reading abilities of children rated as having poor learning-related skills were compared to children rated as having high learning-related skills. Findings suggested that learning-related skills such as self-regulation and social competence predicted math and reading achievement between kindergarten and sixth grade. These effects were strongest between kindergarten and second grade but were still significant through sixth grade (McClelland, Acock, & Morrison, 2006).

Social behavior. Connections between school readiness and children's temperament, or the innate aspects of their personality, have been addressed in the research literature. A child's tendency to display characteristics such as being active or sociable may be correlated with school readiness; Chang and Burns (2005) examined the connection between temperament and attention skills for children attending Head Start. Findings from their multiple regression analysis indicate that temperament and motivational development are related to levels of attention in young children, similar to findings from research conducted with older children (Chang & Burns, 2005).

Konold and Pianta (2005) examined the predictive value of particular cognitive processes and social behaviors related to self-regulation on typically-developing children's kindergarten and first grade achievement. The authors developed six normative profiles of patterns of school readiness: (1) attention problems; (2) low cognitive ability; (3) low-to-average social and cognitive skills; (4) social and externalizing problems; (5) high social competence; and (6) high cognitive ability and mild externalizing (Konold & Pianta, 2005). Findings suggest that cognitive ability and social skills should be considered predictors of school readiness, and that although these factors are interrelated, they can operate independently of each other in terms of their predictive value. For example, children with high cognitive abilities performed better on achievement measures, regardless of social skills, while students with average cognitive ability and higher social competence also tended to perform at higher levels than did those with average to low cognitive ability and average social competence (Konold & Pianta, 2005).

Normandeau and Guay (1998) investigated the relationship between cognitive self-control and prosocial behaviors such as collaboration and effective communication in kindergarten-age children. Cognitive self-control was correlated with increased student achievement, which was evidenced when following these children to the end of first grade. Aggressive behaviors were negatively correlated to cognitive self-control while prosocial behaviors had a positive correlation. Children who displayed more aggressive behaviors tended to have less self-control when attempting to complete school tasks, which led to poorer student achievement (Normandeau & Guay, 1998). Dobbs and colleagues (2006) examined the relationship of prosocial behaviors to mathematics skills in preschoolers. The authors found that when students participated in an early math intervention, which consisted of over 85 mathematical tasks that their teachers could select to implement, they were less likely to display negative behaviors such as aggression or a lack of attention.

Performance on mathematical and literacy-based tasks. Correlations between young children's readiness-related literacy and mathematics skills and their experience with mathematics- and literacy-based tasks were explored in some of the literature reviewed during this study. Tasks might include such activities as examining concepts about print (literacy) and playing number games or block building (mathematics). Siegler and Ramani (2008) examined the role that playing numerical board games could play in preparing children in low-income families for school. They found that the numerical ability of children from affluent families was significantly higher than the numerical ability of children from impoverished families; however, the gap between groups in terms of their understanding of numerical magnitude was closed as a result of the intervention (Siegler & Ramani, 2008). Following this study, Ramani and Siegler (2008) sought to determine if playing linear numerical board games had an impact on a broader range of mathematical topics and whether this impact was stable over time by exploring informal board game play in the home environment (Ramani & Siegler, 2008). They reported the positive connection between informal board game play in the home environment and numerical ability. Playing card games and video games did not have the same results (Ramani & Siegler, 2008).

Building spatial sense through block play has also been considered as a potential predictor of success in terms of school achievement in the elementary years and beyond. Hanline, Milton, and Phelps (2009) examined the relationship between block play at the preschool level and later school success in math and reading. Although no significant relationships were identified in this study between block play and later math achievement, a significant relationship was identified between block play and later reading ability. Higher levels of sophistication in young children's representations through block construction correlated with greater success in reading during the early elementary years (Hanline, Milton, & Phelps, 2009). While block play may not be a predictor of mathematics success at the early elementary level, it has been found to be a predictor of success for later school achievement in mathematics. Wolfgang, Stannard, and Jones (2001) reported the positive predictive relationship of levels of preschool block play (as determined by the Lunzer Five Point Play Scale) and mathematics achievement during middle and high school. Similar findings were reported regarding construction-type play with LEGOs and later school achievement (Wolfgang, Stannard, & Jones, 2001).

Health and socioeconomic status. Characteristics of child and parent health have long been cited in the literature as possible correlates of children's school readiness, and are sometimes included as confounding variables when authors are attempting to identify alternative predictors (such as child care or parent-child interactions). Janus and Duku (2007) examined five constructs they identified as having a potential impact on school readiness: (1) socioeconomic status, (2) family structure, (3) parent health, (4) child health, and (5) parent involvement. Their Early Development Instrument, an assessment of school readiness, was built around these five factors in an effort to determine which of the five factors would be most relevant in predicting school readiness. Based on this assessment, health (including current health and low-birth weight) and gender of the child (boys are twice as likely to struggle with school readiness compared to girls) were the strongest predictors. In addition, children from low-income families were twice as likely to have difficulty with school readiness as children from middle- or high-income families.

Patrianakos-Hoobler and colleagues (2009) also examined risk factors related to health of premature infants in relation to the children's eventual school readiness. They found that boys born premature were twice as likely as girls to display lower school readiness levels. Lower readiness was also identified for premature "infants born to black mothers" as compared to "infants born to nonblack mothers" (Patrianakos-Hoobler, Msall, Marks, Huo, & Schreiber, 2009, p. 4). Socioeconomic status emerged as the "strongest barrier to achieving school readiness" (Patrianakos-Hoobler, et al., 2009, p. 5).

Low socioeconomic status has been consistently negatively correlated to school readiness in the research literature. In 1997, Stipek and Ryan studied the cognitive differences and motivation of economically advantaged and disadvantaged children at school entry. Significant cognitive differences were found relative to number skills, problem solving, and memory. Economically disadvantaged children had as much motivation for learning as economically advantaged children. However, economically advantaged children showed higher levels of concern regarding performance and decreased levels of enjoyment as the study progressed (Stipek & Ryan, 1997).

## Discussion and Recommendations

Definitions of school readiness have long been under contention, and it is unclear whether the view that students should be ready for school rather than schools being ready for children is developmentally appropriate. This systematic review of empirical research literature published after 1995 and before 2013 identified seven themes for which correlates of school readiness could be categorized. Table 1 describes the 24 predictors that were categorized under each of these themes.

**Table 1**  
Predictors of school readiness in literacy and mathematics

<b>Predictor of school readiness</b>	<b>Brief Description</b>
High quality child care environment	Not always defined in the literature, but an environment that tends to include variety of spaces for play, materials to encourage exploration, and opportunities for discourse, in addition to high-quality curriculum and instruction (NICHD, 2002; Ramey & Ramey, 2004).
High quality child care curriculum	Lessons designed to allow teachers to scaffold students as they engage in tasks designed to build understanding in literacy and math (Bracken & Fischel, 2007; Klein et al., 2008).
High quality child care instruction	Practices that encourage children's investigations of ideas with teachers acting as facilitators and encouraging communication and representation (Chien et al., 2010).
Type of child care	Typically defined as parental care, center-based care, Head Start, or other non-parental care. High-quality center-based care has been shown to be a predictor of success (Magnuson et al., 2004).
Less time in child care	Although exposure to high quality care has led to increase school success, prolonged exposure to child care has been identified as a risk factor, although it is unclear what amounts to excessive time (NICHD, 2002).
Quality of parent-child interactions	Establishing communication between parents and children where both parties are actively involved (discussions rather than parents yelling or telling children what to do) has been established as a predictor of success (Hill, 2001).
Maternal warmth	Mothers displaying high levels of warmth and encouragement towards children has been established as a predictor of success (Hill, 2001).
Parent patience	Parents displaying high levels of patience with children has been identified as a predictor of success (Hill, 2001).
Perceptions of child's ability	Parents displaying positive perceptions of their children's abilities (feel that children will be successful) has been established as a predictor of success (Entwisle & Alexander, 1996; Wu & Qi, 2006).
High expectations for good grades	Parents who communicate the expectation that their children will achieve at a high level has been established as a predictor of success (Entwisle & Alexander, 1996; Hill, 2001; Wu & Qi, 2006).
Parent involvement	Although findings have been mixed, some studies have identified high levels of parent involvement in both the school environment and the home environment as a predictor of success (Lahaie, 2008).
Limited television viewing	Prolonged exposure to non-educational television is considered a risk factor. However, exposure to educational television for a short time can be a predictor of success. In addition, encouraging children to explore media (for example, making videos) can increase student success (Clarke & Kurtz-Costes, 1997; Wright et al., 2001).

**Predictor of school readiness**

**Brief Description**

Positive home literacy environment	Creating a home environment where children are exposed to and encouraged to explore literacy materials (books, pictures, newspapers, etc.) with parents can be a predictor of success (Burgess & Hecht, 2002).
Shared story book reading	Teachers and parents engaging in story book reading with children where books are starting points for discussion, exploration, and elaboration has been established as a predictor of success (Burgess & Hecht, 2002; Leseman & de Jong, 1998).
Parent literacy practices	Parents who display high levels of literacy practices (reading books/newspapers, having discussions, telling stories or making rhymes) has been identified as a predictor of literacy success (Burgess & Hecht, 2002).
Positive work-related social skills	Positive work-related social skills including the ability for children to follow directions, take turns in group activities, and stay on task have been established as predictors of school success (McClelland, Morrison, & Holmes, 2000).
Positive learning-related skills	Positive learning-related skills such as motivation, dispositions towards content, self-regulation, and social competence have been established as predictors of success (McClelland, Acock, & Morrison, 2006).
Prosocial behavior	Prosocial or positive social behaviors could include possessing self-control, initiating communication, or acting open and friendly. These types of behaviors have been established as predictors of success (Dobbs et al., 2006; Konold & Pianta, 2005; McClelland, Acock, & Morrison, 2006; Normandeau & Guay, 1998).
Positive temperament	Children displaying positive dispositions or temperaments (their natural state—i.e., calm, open, friendly) has been identified as a predictor of success (Chang & Burns, 2005).
Positive attachment patterns	Children displaying positive attachment patterns to parents/caregivers/teachers has been established as a predictor of success (Konold & Pianta, 2005).
Playing board games	Playing linear type board games where counting is required has been established as a predictor of success. These games should be implemented in both home and school environments (Ramani & Siegler, 2008; Siegler & Ramani, 2008).
Focus on counting and number sense	Developing tasks that encourage children to use counting skills and begin to explore quantities and make comparisons has been linked to school success and later school achievement (Siegler & Ramani, 2008).
Engaging in block building	Construction activities that encourage children to build structures with blocks or LEGOs and engage in discussions about their buildings have been linked to later school achievement (Hanline, Milton, & Phelps, 2009; Wolfgang, Stannard, & Jones, 2001).
Focus on literacy concepts	Developing tasks that encourage phonological awareness, decoding, awareness of print, and letter identification can lead to higher levels of literacy success (Burgess & Hecht, 2002).

While the above table describes factors that hold potential for predicting young children's school readiness, risk factors were also identified in the literature. These factors include health risks such as low birth weight, prematurity, or general health issues, as well as demographic criteria such as gender (some studies have indicated that boys are more likely to struggle than girls), family structure (single mothers tend to have lower grade expectations for their children), maternal education level (not finishing high school) or the occupation of the head of household (due to the level of income associated with this occupation). In addition, low parental income or socioeconomic status and belonging to a minority group (including African American and Hispanic ethnicities) have often been identified as risk factors for school success.

Parents, caregivers, and teachers of young children as well as the children themselves are the primary stakeholders who would benefit from early interventions designed to enhance school readiness for young children. Initiatives focusing on building positive parent-child relationships and enhancing readiness-related aspects of the home environment have the potential to influence students' readiness and later school achievement. Future research is needed on the roles parents play in children's academic success. Specifically, little research can be found regarding parent involvement at the early childhood and primary levels and the influence of role models on children's positive behavior and dispositions relative to school readiness. Research on the home environment is also necessary, including the increasing role of digital technologies and how they may influence family dynamics and, in turn, children's future school success. Further investigations of the effects of implementing literacy- and mathematics-based tasks in the home, such as increasing math talk or encouraging children to build structures in a variety of shapes, may enhance what is currently understood about how home environments affect readiness.

Given the apparent correlation between child care quality and children's school readiness, initiatives to improve early childhood teacher quality and the overall quality of public and private child care programs could have the potential to promote children's school readiness in literacy and mathematics. The research identified in this review did not yield consistent definitions for high-quality child care. Future studies comparing types of child care settings could help to clarify what is high-quality care, considering such components as teacher quality and instructional practices, classroom environments, and curricula (e.g., presentation of mathematical and literacy-based tasks), and the longitudinal effects of such factors on student success.

The research included in this review was not consistent regarding types of assessments used to measure children's school readiness. Many studies indicated that an effective tool for measuring school readiness has yet to be developed (Kilday & Kinzie, 2009). Recommendations for future research include the development and validation of a school readiness assessment that measures constructs across domains of development. Once such an assessment has been validated, it could be used for further investigation of the factors identified in this review.

Finally, initiatives specifically focused on young children could include interventions that enhance prosocial behaviors, motivation toward learning, and academic skills. Such interventions could occur in the context of the home, community, or child care setting. Some factors in school readiness and success that are specifically related to demographics (e.g., socioeconomic status, entrance age, belonging to a minority group) or health (e.g., birth weight) are difficult to isolate for the purposes of interventions that might enhance or reduce their influence on children's school readiness and success. Often these factors occur simultaneously with additional factors within the child, parent, or teacher as described above; thus, future research on ways that some predictors may mediate the effects of demographic or health-related risk factors could be particularly helpful to the field.

Given the importance attached to children's school readiness, any research that sheds further light on its components and processes is likely to enable adult stakeholders to better discern what constitutes the best possible environments and experiences for children. These environments and experiences can provide young children with the foundation for success on whatever paths they choose in the future.

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#### Author Information

Dr. Sandra M. Linder is an assistant professor of early childhood mathematics education at Clemson University. Her research centers on improving early childhood teacher quality and student understandings in mathematics.

Sandra M. Linder, Ph.D.

Assistant Professor of Early Childhood Mathematics Education

Coordinator of Early Childhood Education

Clemson University, School of Education

407F Tillman Hall

Clemson, SC 29634-0705

864-656-5102

sandram@clemson.edu

M. Deanna Ramey is a Ph.D. student in curriculum and instruction at Clemson University, studying literacy and early childhood education. Her research interests include young children's experiences with informational text, motivation and engagement, and self-regulation.

V. Serbay Zambak is a Ph.D. student in curriculum and instruction at Clemson University with an emphasis on mathematics education. He has taught mathematics in İstanbul and Amsterdam and has supported practicing teachers' instructional technology skills for mathematics education.

- Assessment defined: refers to any type of appraisal of young children. In a narrower sense, refers to information from multiple indicators and sources of evidence that is organized and interpreted and then evaluated to make an appraisal. Types of assessment: performance (authentic is a type of performance assessment), formative vs. summative, portfolio.
- Screening defined: use of a brief procedure or instrument designed to identify, from within a large population of children, those who may need further assessment to verify developmental and/or health risks.
- Why domains? Relevant capabilities for children to succeed in school and in life. Domains are bigger than cognition and knowledge; they also address children's ability to regulate emotions and attention; form social relationships with peers and non-familial adults; to learn from participation, direct instruction and observation; and to direct their own learning.
- Quality and Utility of Assessments:
  - Validity: Assessment accurately measures an outcome. Is the assessment doing what it is supposed to do?
  - Reliability: A type of validity evidence that relates to the consistency of the assessment. Is the assessment consistent when repeated or when different versions are used or when used in different forms? Reliability determined by reliability coefficients – investigating the proportion of variance.
- Two primary types of assessment: direct and observation-based. Generally believed it is wiser to invest in training teachers to be assessors than to spend resources on outside assessors to administer tests to children in unfamiliar contexts. One large study documents that early childhood teachers could be trained to use outcomes-based measurement reliably, and 42% of the teachers had a high school diploma.
  - Direct: adult sitting with child and asking questions. More commonly used in large scale research projects and accountability efforts. Found to be predictive of school achievement but are strongly associated with socio economic status and may not show whether a program is supporting children across all developmental domains. Young children's nature is not well-suited for the demands of a testing environment.
  - Observation- based: observation of children's behaviors or a portfolio collecting records of observations together with products of children's work. Used to plan and guide teacher's instruction. Must trust in teachers' and caregivers' judgements, and they must be well trained. May be inclined to inflate ratings, and periodic monitoring must occur. However, observation-based may be used for instructional as well as accountability purposes.

# Research Summary: Early Childhood Assessment, National Research Council **2015**

Domain	Definition	Assessment Characteristics	Notes
Physical well-being and motor development	Issues of health, intactness of sensory systems, growth, fitness and motor development.	Bayley Scales of Infant Development; Denver II; Fitness measures (height, weight, body mass index)	
Social and emotional development	Issues of : (1) Social competence – the degree of effectiveness the child has in social interactions (2) Self-regulation – modulating thought, affect, behavior by means of deliberate and as well as automated responses (3) Maladjustment - clusters of symptoms that emerge over time in more than one relationship that impede children’s ability to adapt and function in family and peer group	Measurement in two large areas: <ul style="list-style-type: none"> <li>• Socioemotional functioning</li> <li>• Self-regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Substantial agreement about importance</li> <li>• Many states address SED in their early learning guidelines</li> <li>• Children’s skills in SED at school entry are predictors of how well they make the adjustment to the new formal schooling setting and progress academically</li> <li>• Substantial evidence that it is possible to improve SED at the point of school entry or earlier</li> <li>• Measurement issues: (1) SED impacted by early childhood environment and teacher-child relationships (2) heavy reliance on teacher and parent reports</li> <li>• Measurement equivalence for subpopulations of children ignored. Different predictive validity among subpopulations (race, ethnicity, culture)</li> </ul>
Approaches to learning	Distinct observable behaviors that indicate ways children become engaged in classroom interactions and learning activities. Issues of: (1) Initiative and curiosity (2) Engagement and persistence (3) Reasoning and problem solving skills	Most widely used measures are questionnaires completed by teachers. Preschool Learning Behavior Scale and Teacher Rating Scale.	<ul style="list-style-type: none"> <li>• General consensus in this area and as of 2008, 16 states included this area in their early learning standards</li> <li>• Significant evidence of impact of learning-related behavior and academic performance.</li> <li>• ATL predicts emotion regulation; math and literacy skills</li> </ul>

# Research Summary: Early Childhood Assessment, National Research Council **2015**

Domain	Definition	Assessment Characteristics	Notes
Language and literacy	Vocabulary is the most widely assessed component. Importance of other skills depends on the goals. Measures of extended discourse (comprehension or production of stories and explanations) and emergent literacy (understanding of print) also important.	Diagnosing delays requires more direct assessments. Difficult to use monolingual tests on bilingual children. Vocabulary and phonological awareness are widely assessed with formal tests.	<ul style="list-style-type: none"> <li>• Oral language skills developed during the preschool period are closely associated with success in literacy. Some disagreement that early reading outcomes are better predicted by the emergent literacy skills of letter recognition and phonological awareness. However there is very strong evidence that vocabulary at school entry is a powerful predictor of later reading outcomes.</li> <li>• Language and emergent literacy skills are sensitive to the quality of the language and literacy environment both in home and out-of-home settings.</li> </ul>
Cognitive	Ability to understand complex ideas, to adapt effectively to the environment, to learn from experiences, to engage in various forms of reasoning and to overcome obstacles by thinking. Encompasses general intellectual functioning; knowledge of specific topics (math, science and social studies), executive function, attention and memory.	Measures of general cognitive skills: <ul style="list-style-type: none"> <li>• Bayley Scales of Infant Development measure mental, motor development &amp; behavior for 1-42 months.</li> <li>• Wechsler tests most widely used for 3-8 year olds.</li> <li>• Stanford Binet, Woodcock-Johnson III and Kaufman Assessment Battery for Children also used.</li> <li>• K-ABC assesses sequential and simultaneous processing as well as achievement.</li> <li>• WJ-III assesses specific</li> </ul>	<ul style="list-style-type: none"> <li>• CS are associated with important child outcomes. Measures of effortful control and inhibitory control and attention-shifting in preschool predict math and literacy skills in kindergarten. Working memory and inhibitory control are related to math skills. Phonological memory and processing is critical in reading and other academic skills.</li> <li>• Most impact of cognitive skills evident in intensive interventions such as Abecedarian (5 years of full time child care) and High Scope/Perry Preschool (2 years of preschool and home visit/parenting).</li> </ul>

# Research Summary: Early Childhood Assessment, National Research Council **2015**

Domain	Definition	Assessment Characteristics	Notes
		cognitive and achievement skills. Executive function involves laboratory-based tasks.	
Math (as a specific aspect of Cognitive skills)	Foundational learning of number sense, spatial sense and reasoning (geometry), measurement, classification and patterning (algebra) and mathematical reasoning.	<ul style="list-style-type: none"> <li>• Formative and summative assessment should measure skills in the different subdomains and not focus only on number sense.</li> <li>• Important that problems in assessments be familiar and involve materials that children can use to solve the problem and show their thinking.</li> <li>• Assessments are buried in curricula but some standardized tests like WJ-III for 2-5 year olds assess number sense, geometry, measurement and algebraic skills.</li> </ul>	<ul style="list-style-type: none"> <li>• U.S. students in the bottom third in international comparative studies.</li> <li>• Mathematical concepts (number knowledge and ordinality) at school entry are strongest predictors of later academic achievement, even stronger than early literacy skills.</li> </ul>

**APPENDIX TABLES:  
5-1 THROUGH 5-7—TABLES OF PRESCHOOL INSTRUMENTS<sup>1</sup>**

**APPENDIX TABLE 5-1** Physical Well-Being and Motor Development Instruments

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Physical development</b>	Denver II	Creative Curriculum Development Continuum for Ages 3-5 The Work Sampling System (WSS)	Growth Charts Creative Curriculum Development Continuum for Ages 3-5 The Work Sampling System (WSS)	Denver II
<b>Motor development</b>	Bayley Scales of Infant Development (BSID), Third ed. Denver II			Denver II
<b>Well-being Nutrition</b>		Toddler-Parent Mealtime Behavior Questionnaire	Indices of Obesity Toddler-Parent Mealtime Observation	
<b>Motor control</b>	NEPSY Bayley Scales of Infant Development (BSID), Third ed.		Games as Measurement for Early Self-Control (GAMES)	

<b>Impulse control/ delay gratification</b>			Games as Measurement for Early Self-Control (GAMES)
<b>Processing speed</b>	Woodcock-Johnson III (WJ-III)		Clinical Evaluation of Language Fundamentals (CELF)-Preschool Behavioral Observation Checklist
<b>Physical activity</b>			
<b>Perceptual motor development</b>		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)
<b>Music and movement</b>		High/Scope Child Observation Record (COR)	High/Scope Child Observation Record (COR)
<b>Motor quality</b>	Bayley Scales of Infant Development (BSID), Third ed., Behavioral Rating Scale (BRS)		
<b>Play and leisure time</b>			Vineland Social-Emotional Early Childhood Scales (SEEC)

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<sup>1</sup>These listings do not imply any approval or endorsement by the committee of particular instruments. They are included to provide examples of instruments available for measuring various domains and outcomes. Appendix D provides information on where reviews of the instruments may be found.

**APPENDIX TABLE 5-2** Social-Emotional Development Instruments

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Attachment</b>			Strange Situation	Attachment Q-Sort
<b>Behavior problems</b>		Child Behavior Checklist  Social Skills Rating Scale (SSRS)	The Work Sampling System (WSS)	Social Skills Rating Scale (SSRS)
<b>Emotion regulation</b>	Bayley Scales of Infant Development (BSID), Third ed., Behavioral Rating Scale (BRS)		Delay-of-Gratification Task	
<b>Social skills</b>		Social Skills Rating Scale (SSRS)  ECLS-K Adaptation of the Social Skills Rating System (SSRS), Task Orientation/Approaches to Learning Scale  Adaptive Social Behavior Index	The Work Sampling System (WSS)	Social Skills Rating Scale (SSRS)
<b>Negative reaction tendency</b>		Adapted EZ-Yale Personality/Motivation Questionnaire (Adapted EZPQ)		

**Outer directedness**

Adapted EZ-Yale Personality/Motivation Questionnaire (Adapted EZPQ)

**Self-regulation tasks**

Games as Measurement for Early Self-Control (GAMES)

**Behavior rating scale**

Bayley Scales of Infant Development (BSID), Third ed.

**Fatigue/ boredom/ frustration**

Clinical Evaluation of Language Fundamentals (CELF)-Preschool Behavioral Observation Checklist

**Social-emotional development**

Creative Curriculum Development Continuum for Ages 3-5

Creative Curriculum Development Continuum for Ages 3-5

**Social development**

The Galileo System for the Electronic Management of Learning (Galileo)

The Galileo System for the Electronic Management of Learning (Galileo)

*continued*

APPENDIX TABLE 5-2 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Social relations</b>		High/Scope Child Observation Record (COR)	High/Scope Child Observation Record (COR)	
<b>Personal and social development</b>		The Work Sampling System (WSS)	The Work Sampling System (WSS)	
<b>Attention/ arousal</b>	Bayley Scales of Infant Development (BSID), Third ed., Behavioral Rating Scale (BRS)			
<b>Clinical scales</b>		Behavioral Assessment System for Children (BASC)		
<b>Composites</b>		Behavioral Assessment System for Children (BASC)		
<b>Syndromes</b>		Child Behavior Checklist (CBCL) and Caregiver- Teacher Report Form (C-TRF)		

<b>Summary scales</b>	Child Behavior Checklist (CBCL) and Caregiver-Teacher Report Form (C-TRF)	
<b>DSM-oriented scales</b>	Child Behavior Checklist (CBCL) and Caregiver-Teacher Report Form (C-TRF)	
<b>Factor analytically derived subscales</b>	Connor's Rating Scales-Revised (CRS-R)	
<b>Auxiliary scales</b>	Connor's Rating Scales-Revised (CRS-R)	
<b>Protective factors scale</b>	Devereux Early Childhood Assessment (DECA)	
<b>Behavioral concern</b>	Devereux Early Childhood Assessment (DECA)	
<b>Externalizing symptoms</b>	Infant-Toddler Social and Emotional Assessment (ITSEA)	Infant-Toddler Social and Emotional Assessment (ITSEA)

*continued*

APPENDIX TABLE 5-2 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Internalizing symptoms</b>		Infant-Toddler Social and Emotional Assessment (ITSEA)		Infant-Toddler Social and Emotional Assessment (ITSEA)
<b>Dysregulation</b>		Infant-Toddler Social and Emotional Assessment (ITSEA)		Infant-Toddler Social and Emotional Assessment (ITSEA)
<b>Competence</b>		Infant-Toddler Social and Emotional Assessment (ITSEA)		Infant-Toddler Social and Emotional Assessment (ITSEA)
<b>Overall adjustment scales</b>		Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.		
<b>Peer social interactions scales</b>		Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.		
<b>Adult social interactions scales</b>		Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.		
<b>Social competence</b>		Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.		

<b>Internalizing problems</b>	Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.	
<b>Externalizing problems</b>	Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.	
<b>General adaptation</b>	Social Competence and Behavioral Evaluation (SCBE), Preschool Ed.	
<b>Interpersonal relationships</b>		Vineland Social-Emotional Early Childhood Scales (SEEC)
<b>Coping skills</b>		Vineland Social-Emotional Early Childhood Scales (SEEC)
<b>Personal and social skills</b>		Denver II

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**APPENDIX TABLE 5-3** Approaches to Learning Instruments

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)	
<b>Executive functioning</b>	NEPSY		Tower of Hanoi	
<b>Inhibitory control</b>	NEPSY, CPT			
<b>Emotion regulation</b>			Delay-of-Gratification Task	
<b>Academic mastery motivation</b>		Adapted EZ-Yale Personality/Motivation Questionnaire (Adapted EZPQ)		
<b>Engagement in learning</b>		ECLS-K Adaptation of the Social Skills Rating Scale (SSRS), Task Orientation/ Approaches to Learning Scale		
<b>Organization</b>		ECLS-K Adaptation of the Social Skills Rating Scale (SSRS), Task Orientation/ Approaches to Learning Scale		

<b>Creativity</b>		ECLS-K Adaptation of the Social Skills Rating Scale (SSRS), Task Orientation/ Approaches to Learning Scale	
<b>Adaptability</b>		ECLS-K Adaptation of the Social Skills Rating Scale (SSRS), Task Orientation/ Approaches to Learning Scale	
<b>Visuospatial processing</b>	NEPSY		
<b>Attention to task</b>			CELF-Preschool Behavioral Observation Checklist
<b>Self-help</b>		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)
<b>Initiative</b>		High/Scope Child Observation Record (COR)	High/Scope Child Observation Record (COR)
<b>Orientation/ engagement</b>	Bayley Scales of Infant Development (BSID), Third ed., Behavioral Rating Scale (BRS)		
<b>Adaptive behavior scales</b>		Behavioral Assessment System for Children (BASC)	

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**APPENDIX TABLE 5-4** Cognitive Skills Instruments

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Intelligence</b>	Expressive One-Word Picture Vocabulary Test (EOWPVT) Woodcock-Johnson III (WJ-III)			
	Bayley, Stanford-Binet, Wechsler Preschool and Primary Scale of Intelligence (WPPSI), WISC			
<b>Executive functioning</b>	NEPSY		Tower of Hanoi	
<b>Cognitive control</b>			Games as Measurement for Early Self-Control (GAMES)	
<b>Sustained attention</b>			Games as Measurement for Early Self-Control (GAMES)	
<b>Memory and learning</b>	NEPSY			
<b>Sequential processing</b>	Kaufman Assessment Battery for Children (K-ABC)			

<b>Simultaneous processing</b>	Kaufman Assessment Battery for Children (K-ABC)	
<b>Mental processing</b>	Kaufman Assessment Battery for Children (K-ABC)	
<b>Achievement scale</b>	Kaufman Assessment Battery for Children (K-ABC) Woodcock-Johnson III (WJ-III)	
<b>Spatial</b>		Primary Test of Cognitive Skills (PTCS)
<b>Memory</b>		Primary Test of Cognitive Skills (PTCS)
<b>Concepts</b>		Primary Test of Cognitive Skills (PTCS)
<b>Short-term memory</b>	Stanford-Binet Intelligence Scale, Fourth ed. (SB-IV) Woodcock-Johnson III (WJ-III)	
<b>Long-term retrieval</b>	Woodcock-Johnson III (WJ-III)	

*continued*

APPENDIX TABLE 5-4 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
Visual-spatial thinking	Woodcock-Johnson III (WJ-III)			
Auditory processing	Woodcock-Johnson III (WJ-III)			
Fluid reasoning	Woodcock-Johnson III (WJ-III)			
Response latency			Clinical Evaluation of Language Fundamentals (CELF)-Preschool Behavioral Observation Checklist	
Phonological awareness	Woodcock-Johnson III (WJ-III)			
Cognitive development		Creative Curriculum Development Continuum for Ages 3-5	Creative Curriculum Development Continuum for Ages 3-5	
Early cognitive development		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)	

APPENDIX TABLE 5-5 General Knowledge Instruments

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
	Woodcock-Johnson III (WJ-III), Peabody Individual Achievement Test (PIAT), Peabody Individual Achievement Test-Revised (PIAT-R)		Work Sampling Plans, Portfolio, Summative Instructional Tools (e.g., COR)	
<b>Mental scale</b>	Bayley Scales of Infant Development (BSID), Third ed.			
<b>Colors</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Performance IQ</b>	Wechsler Preschool and Primary Scale of Intelligence, Third ed. (WPPSI-III)			
<b>Full-scale IQ</b>	Wechsler Preschool and Primary Scale of Intelligence, Third ed. (WPPSI-III)			

*continued*

APPENDIX TABLE 5-5 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Sizes</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Comparisons</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Shapes</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Direction/position</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Self-/social awareness</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Texture/material</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Quantity</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Time/sequencing</b>	Bracken Basic Concept Scale-Revised (BBCS-R)			
<b>Abstract/visual reasoning</b>	Stanford-Binet Intelligence Scale, Fourth ed. (SB-IV)			

<b>Academic progress</b>	Expressive One-Word Picture Vocabulary Test (EOWPVT)		
<b>Creative arts</b>		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)
<b>Creative representation</b>		High/Scope Child Observation Record (COR)	High/Scope Child Observation Record (COR)
<b>Social studies</b>		The Work Sampling System (WSS)	The Work Sampling System (WSS)
<b>The arts</b>		The Work Sampling System (WSS)	The Work Sampling System (WSS)

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**APPENDIX TABLE 5-6** Math and Science Instruments

<b>Assessment Subscales</b>	<b>Data-Gathering Method</b>			
	<b>Direct Assessment</b>	<b>Questionnaire</b>	<b>Observation</b>	<b>Interview</b>
<b>Mathematics</b>	Woodcock-Johnson III (WJ-III), Peabody Individual Achievement Test (PIAT), Peabody Individual Achievement Test-Revised (PIAT-R), Test of Early Mathematics Ability (TEMA)		Work Sampling Plans, Portfolio, Summative Instructional Tools	
<b>Science</b>	Woodcock-Johnson III (WJ-III), Peabody Individual Achievement Test (PIAT)		Work Sampling Plans, Portfolio, Summative Instructional Tools	
<b>Quantitative reasoning</b>	Stanford-Binet Intelligence Scale, Fourth ed. (SB-IV)			
<b>Number/ counting</b>	Bracken Basic Concept Scale-Revised (BBCS-R)/SRC			
<b>Sizes</b>	Bracken Basic Concept Scale-Revised (BBCS-R)/SRC			
<b>Shapes</b>	Bracken Basic Concept Scale-Revised (BBCS-R)/SRC			

<b>Quantity</b>	Bracken Basic Concept Scale-Revised (BBCS-R)		
<b>Achievement scale–arithmetic subtest</b>	Kaufman Assessment Battery for Children (K-ABC)		
<b>Formal mathematics</b>	Test of Early Mathematics Ability, Second ed. (TEMA-2)		
<b>Informal mathematics</b>	Test of Early Mathematics Ability, Second ed. (TEMA-2)		
<b>Achievement–broad mathematics</b>	Woodcock-Johnson III (WJ-III)		
<b>Achievement–mathematical calculation skills</b>	Woodcock-Johnson III (WJ-III)		
<b>Achievement–mathematical reasoning</b>	Woodcock-Johnson III (WJ-III)		
<b>Early mathematics</b>		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)

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APPENDIX TABLE 5-6 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
Nature and science		The Galileo System for the Electronic Management of Learning (Galileo)	The Galileo System for the Electronic Management of Learning (Galileo)	
Logic and mathematics		High/Scope Child Observation Record (COR)	High/Scope Child Observation Record (COR)	
Mathematical thinking		The Work Sampling System (WSS)	The Work Sampling System (WSS)	
Scientific thinking		The Work Sampling System (WSS)	The Work Sampling System (WSS)	

**APPENDIX TABLE 5-7** Language and Literacy Instruments

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>General language</b>		The Galileo System for the Electronic Management of Learning (Galileo) High/Scope Child Observation Record (COR) The Work Sampling System (WSS)	The Galileo System for the Electronic Management of Learning (Galileo) High/Scope Child Observation Record (COR) The Work Sampling System (WSS)	
		Clinical Evaluation of Language Fundamentals (CELF), MacArthur-Bates Communicative Development Inventories (CDI), Test of Language Dominance (TOLD), Woodcock-Johnson III (WJ-III), NEPSY	Creative Curriculum Development Continuum for Ages 3-5	Creative Curriculum Development Continuum for Ages 3-5
<b>Vocabulary</b>	Peabody Picture Vocabulary Test (PPVT), Expressive One-Word Picture Vocabulary Test (EOWPVT)	MacArthur-Bates Communicative Development Inventories (CDI)		

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APPENDIX TABLE 5-7 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Phonological awareness</b>	Comprehensive Test of Phonological Processing (CTOPP), Woodcock-Johnson III (WJ-III)			
<b>Grammar</b>	Diagnostic Evaluation of Language Variation (DELV)			
<b>Literacy</b>	Test of Early Reading Ability (TERA), Woodcock-Johnson III (WJ-III), Peabody Individual Achievement Test (PIAT) Concepts About Print (Clay) Sulzby Classification Schemes: Emergent Storybook Reading (1985)		Work Sampling Plans, Portfolio, Summative Instructional Tools	
<b>Reading recognition</b>	Peabody Individual Achievement Test-Revised (PIAT-R)			
<b>Reading comprehension</b>	Peabody Individual Achievement Test-Revised (PIAT-R)			
<b>Spelling</b>	Peabody Individual Achievement Test-Revised (PIAT-R)			

<b>Verbal reasoning</b>	Stanford-Binet Intelligence Scale, Fourth ed. (SB-IV)		
<b>Verbal</b>		Primary Test of Cognitive Skills (PTCS)	
<b>Letters</b>	Bracken Basic Concept Scale-Revised (BBCS-R)		
<b>Verbal IQ</b>	Wechsler Preschool and Primary Scale of Intelligence, Third ed. (WPPSI-III)		
<b>Receptive language</b>	Clinical Evaluation of Language Fundamentals-Preschool (CELF-Preschool) Test of Early Language Development, Third ed. (TELD-3)	Sequenced Inventory of Communication Development-Revised (SICD-R)	Sequenced Inventory of Communication Development-Revised (SICD-R)
<b>Expressive language</b>	Clinical Evaluation of Language Fundamentals-Preschool (CELF-Preschool) Reynell Developmental Language Scales: U.S. Edition (RDLS) Test of Early Language Development, Third ed. (TELD-3)	Sequenced Inventory of Communication Development-Revised (SICD-R), Reynell Developmental Language Scales, U.S. ed. (RDLS)	Sequenced Inventory of Communication Development-Revised (SICD-R)

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APPENDIX TABLE 5-7 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Total language</b>	Clinical Evaluation of Language Fundamentals-Preschool (CELF-Preschool)			
<b>Quick-test</b>	Clinical Evaluation of Language Fundamentals-Preschool (CELF-Preschool)			
<b>Recall ability</b>	Kaufman Assessment Battery for Children (K-ABC), Expressive Vocabulary Subtest			
<b>Verbal expression</b>	Kaufman Assessment Battery for Children (K-ABC), Expressive Vocabulary Subtest			
<b>Words and gestures</b>	MacArthur-Bates Communicative Development Inventories (CDI)			
<b>Words and sentences</b>	MacArthur-Bates Communicative Development Inventories (CDI)			

<b>Expressive communication</b>		Preschool Language Scale, Fourth ed. (PLS-4)
<b>Auditory comprehension</b>		Preschool Language Scale, Fourth ed. (PLS-4)
<b>Verbal comprehension</b>	Reynell Developmental Language Scales, U.S. ed. (RDLS)	
<b>Spoken language quotient</b>	Test of Early Language Development, Third ed. (TELD-3)	
<b>Initial sound fluency</b>	Dynamic Indicators of Basic Early Literacy Skills, Sixth ed. (DIBELS)	
<b>Letter naming fluency</b>	Dynamic Indicators of Basic Early Literacy Skills, Sixth ed. (DIBELS)	
<b>Word use fluency</b>	Dynamic Indicators of Basic Early Literacy Skills, Sixth ed. (DIBELS)	
<b>Phoneme segmentation fluency</b>	Dynamic Indicators of Basic Early Literacy Skills, Sixth ed. (DIBELS)	

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APPENDIX TABLE 5-7 Continued

Assessment Subscales	Data-Gathering Method			
	Direct Assessment	Questionnaire	Observation	Interview
<b>Nonsense word fluency</b>	Dynamic Indicators of Basic Early Literacy Skills, Sixth ed. (DIBELS)			
<b>Oral reading fluency and retell fluency</b>	Dynamic Indicators of Basic Early Literacy Skills, Sixth ed. (DIBELS)			
<b>Alphabet</b>	Test of Early Reading Ability-3 (TERA-3)			
<b>Conventions</b>	Test of Early Reading Ability-3 (TERA-3)			
<b>Meaning</b>	Test of Early Reading Ability-3 (TERA-3)			
<b>Letter-word identification</b>	Woodcock-Johnson III (WJ-III)			
<b>Writing samples</b>	Woodcock-Johnson III (WJ-III)			
<b>Word attack</b>	Woodcock-Johnson III (WJ-III)			
<b>Language skills</b>	Denver II			Denver II