

A Working Paper: New Information about School Readiness

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This literature review was completed by conducting searches in these online databases: Academic Search Premier, Health Source - Consumer Edition, Health Source – Nursing/Academic Edition, MedLineProfessional Development Edition, PsycArticles, and Google Scholar. Despite this focused effort, it is still possible that something critical has been missed. Please let us know if you have information that should be added to this working paper.

Every year, preschool teachers work to get children ready for school. Every year, parents send new kindergartners to school wondering how they will do. Every year, kindergarten teachers ask how many of their new students will be ready to engage in kindergarten learning and how many will lack readiness skills.

Just as education researchers have addressed gaps in school achievement, they have also recognized gaps in school readiness. School achievement and readiness have been linked by long-term studies of children’s learning outcomes.



One solution to the achievement gap problem can be found in early education (Pianta, Barnett, Burchinal, & Thornburg, 2009). “Across the country, educators and policymakers are now looking to early childhood for opportunities to close the achievement gap” (National Governors Association, 2004). An explosion of research is identifying the school-entry characteristics and skills that predict children’s later academic success.

It is important for us, as early childhood educators, to stay current with such research both to inform our understanding of young children and school readiness and to ensure that we use best practices. This paper attempts to clarify and synthesize the most recent studies. The Appendix describes how this literature review was conducted.

This paper asks and answers four questions about school readiness.

1. What is a current definition of school readiness?
2. Why is the focus on school readiness and academic success so important?
3. Which school readiness skills are associated with later academic success?
4. What are the implications for early educators?

Question 1: What is a current definition of school readiness?



Answer: One definition is that school readiness means **children having the skills to achieve later academic success**. The U.S. Department of Health and Human Services conducted a 2008 working meeting that focused on synthesizing current early childhood readiness research. The meeting record included the statement that, “In theory, a definition of school readiness should identify the foundational skills, content knowledge, and concepts that children need when they enter school in order to achieve academic success in early elementary school and beyond” (National Center for Children in Poverty & Abt Associates Inc., 2008, p. 6).

How did our current view of readiness evolve to embrace this goal?

School Readiness and the Early Theorists

Definitions of school readiness vary by who is defining readiness and why. Every perspective on readiness has an influence on when children begin school and how we approach their instruction. One of the early theorists was Gesell, who along with his followers believed that children were ready to go to school when they had moved through certain developmental stages. Development was predetermined, and parents and teachers were cautioned to be patient as each child developed according to his or her own schedule. If a child wasn't ready for kindergarten, the advice given was to delay entry into kindergarten—a practice called “red shirting.” But research on children in grades 7 through 12 has found that red shirting is an ineffective practice (Martin, 2009). Additionally, red shirting has served only to delay children, including those with learning disabilities (Barnard-Brak, 2009), from receiving the education they need most.

Another view, based on Vygotsky and others, suggests that children benefit from having certain psychological skills (e.g., self-regulation), in place before beginning school (Leong & Bedrova, 2003). But to understand when and how to use such school readiness skills, “a child actually has to participate in school activities and to enter specific social interactions with teachers and other students. Therefore, Vygotsky views school readiness as being formed during the first months of schooling and not before school entry” (p. 163). This means that children should begin school at the expected age and that teachers will plan and implement instruction that meets their individual needs.

School Readiness and the National Agenda

Our approach to school readiness is also influenced by the national agenda. The influential 1983 report *A Nation at Risk* called for action to improve educational outcomes for all children (National Commission on Excellence in Education, 1983). Within six years, federal and state officials responded by creating the National Education Goals Panel. The panel's first goal stated, “By the year 2000, all children in America will start school ready to learn” (National Education Goals Panel, 1997). Among the objectives of Goal 1 was: “Children will receive the nutrition, physical activity experiences, and health care needed to arrive at school with healthy minds and bodies, and to maintain the mental alertness necessary to be prepared to learn” (1997).

This statement and the other objectives described what should be provided to children so that they are prepared to learn: high-quality and developmentally appropriate preschools and support for parents so they could be effective as their child's first teacher (1997).

To provide clarity for the general objectives, the Goal 1 Resource and Technical Planning Group suggested five dimensions of early learning and development: (1) physical well-being and motor development, (2) social and emotional development, (3) approaches toward learning, (4) language development, and (5) cognition and general knowledge (Kagan, Moore, & Bredekamp, 1995, p. 3). The group offered information about each domain from the research literature that existed at that time and pointed out that the domains were interrelated (1995).

The National Education Goals Panel asked the Goal 1 Resource and Technical Planning Group (Goal 1 Group) to suggest ways to measure and further describe young children's skills as they begin school so that progress on Goal 1 could be determined. The Goal 1 Group stated that additional work was needed "by researchers and local districts to observe, describe, measure, and understand the dimensions" (Kagan et al., 1995, p. 45).

Progress in identifying readiness characteristics and skills ensued when the Department of Education funded the Early Childhood Longitudinal Studies (ECLS), beginning with the Kindergarten Cohort (ECLS-K) that followed children entering kindergarten in 1989-90 through grade 8. The studies were also intended to provide policymakers and researchers with adequate information to support decision making regarding the development and learning experiences of America's young children. "No large national study had followed a cohort of children from kindergarten entry to middle school until the ECLS-K" (National Center for Educational Statistics, undated). The Birth Cohort (ECLS-B) follows children from birth through kindergarten. These studies have examined the school readiness of large numbers of children across the United States, and they have analyzed the wide array of child and family characteristics that might influence readiness. Along with other large-sample, longitudinal studies, the ECLS-K and ECLS-B have produced enormous quantities of data that have changed the way school readiness is defined.

Most recently, the focus on school readiness has narrowed to examining the skills, concepts, and knowledge children need when they enter school to achieve later academic success. A major factor for this change is "No Child Left Behind" (NCLB), the common name for the federal 2001 Elementary and Secondary Education Act. Its purpose is "to close the achievement gap with accountability, flexibility, and choice, so that no child is left behind" (Public Law 107-110).

NCLB has contributed in three ways to the definition of school readiness as **children having the skills for achieving later academic success**. First there is the idea of academic success; the phrase implies measurement and standards. Second, the law emphasizes educational trajectories that measure the change in learning or progress, from year to year. Third, NCLB recognizes that children need to enter school with a set of skills that enables them to begin learning. In this definition, school readiness is inherently academic.

Question 2: Why is the focus on school readiness and academic success so important?



Answer: We've learned from the ECLS-K, ECLS-B, and other studies that some children are more prepared to enter kindergarten than others. When we look at large numbers of children, these differences are recognized as school readiness gaps. As the longitudinal studies followed children through elementary school, they revealed that school readiness gaps become achievement gaps. Likewise, we learned that better school-entry characteristics and skills are associated with later academic success.

Both federal and state agencies are concerned with achievement and school readiness gaps. The National Center for Education Statistics (NCES) publishes annual *Condition of Education* reports with special analyses sections. One report, *Special Analyses 2010: High-Poverty Public Schools* (Aud et al., 2010), states:

On each NAEP [National Assessment of Educational Progress] assessment given between 1998 and 2009, average reading scores for 4th- and 8th-grade students from high-poverty schools were lower than the scores for students from low-poverty schools. . . . On each NAEP assessment given between 2000 and 2009, average mathematics scores for 4th- and 8th-grade students from high-poverty schools were lower than the scores for students from low-poverty schools (Special Section: High-Poverty Schools, p.10).

These achievement gaps have been linked to kindergarten readiness gaps. “National data from the ECLS-K study show that the gaps in children’s reading skills and knowledge seen in the fourth grade and later . . . are already present as children begin school. For example, in kindergarten, children from poor families tend to obtain, on average, lower reading assessment scores than those from non-poor families” (Laosa, 2005, p.5). The children from poor families who begin with fewer school-entry reading skills do not catch up (Layzer & Price, 2008).

Several efforts are under way to reduce the gaps. The National Governors Association, for example, suggests in its publication, *Closing the Achievement Gap*, four approaches, and one concerns early childhood. “Across the country, educators and policymakers are now looking to early childhood for opportunities to close the achievement gap” (2004). If early childhood providers are going to assist with closing the gap, then we need to know which school readiness skills are the most important.

Question 3: Which school readiness skills are associated with later academic success?



Answer: The past 15 years has seen a huge increase in research studies that address school readiness. The skills that have been found to be most predictive of later academic success include school-entry math, attention, school entry-reading, and fine motor skills.

Studies that track children across multiple years have identified the school readiness skills associated with later academic success. These studies gather a wide array of information to understand how child and family characteristics influence learning. They show that the skills that predict later academic success do not fit neatly into developmental domains (Snow, 2007; Goodson, 2008; Raver, 2008; Grimm, Steele, Mashburn, Burchinal, & Pianta, 2010). For example, following directions is a social skill and a communication skill. The following section summarizes research addressing the role of specific skills as predictors of later academic success.

Predictor: School-Entry Math Skills

Current research indicates that **school-entry math skills are the single strongest predictor of later academic achievement** (Duncan et al., 2007; Hooper, Roberts, Sideris, Burchinal & Zeisel, 2010; Pagani, Fitzpatrick, Archambault, & Janosz, 2010). School-entry math skills (also known as emergent math) include the list of number names, one-to-one correspondence, and the number of items in a group (Woods, Schweingruber, & Cross, 2009). Extensive research now shows that **school-entry math skills predict later successful math skills** from the fall to the end of kindergarten (Clark et al., 2010; Welsh et al., 2010), as well as through the end of grade 8 (Duncan et al., 2007; Hooper et al., 2010).

School-entry math also predicts later literacy skills (Duncan et al., 2007; Hooper et al., 2010). One reason that math skills might predict later literacy is the involvement of executive function (Diamond, Barnett, Thomas, & Munro, 2007b; Fuchs et al., 2010). Math skills require the use of working memory—the ability to hold a quantity in mind while adding or subtracting to find a result. It is likely that the high demand for working memory and other executive functions required for math means that those functions are also available for the development of literacy and language skills (Welsh et al., 2010).

Predictor: Attention Skills

Research has identified attention as an important predictor of academic success (Duncan et al., 2007; Pagani et al., 2010). Attention is necessary for a child to learn from teachers and to complete instructional activities. To learn, children must identify the most important people, things, and situations to which they should pay attention, hold their attention to those things, and shift their attention with flexibility. Children’s kindergarten attention skills have been shown to predict both math and reading achievement at the end of grade 2 (Grimm et al., 2010; Pagani et al., 2010). Inattention and inability to stay on task are evidence of attention problems. Researchers have found that attention problems also predict lower reading and math achievement through grade 2 (Pagani et al., 2010).

Some researchers have identified attention among the key approaches to learning (ATL). “With components such as persistence, emotional regulation, and attentiveness, children’s ATL largely reflects self-regulation: the ability to manage one’s behavior, emotions, and attention in voluntary and adaptive ways” (Li-Grining et al., 2010, p. 1062). Emerging research has also looked at attention skills as a part of a class of skills called executive function, which may also predict later academic success. Executive functions enable an individual to change one’s mind, to keep one’s self from doing something, to pay attention, and to remember and then manipulate information (Clark, Pritchard, & Woodward, 2010; Diamond, Barnett, Thomas, & Munro, 2007a; Blair et al., 2007).

Predictor: School-Entry Language and Reading Skills

Research has found that certain early language and reading skills predict later successful reading skills (Duncan et al., 2007; Pagani et al., 2010). Developing Early Literacy is the 2009 report of the National Early Literacy Panel (2008). “The panel’s primary purpose was to synthesize research to contribute to decisions in educational policy and practice that affect early literacy development and to determine how teachers and families could support young children’s language and literacy development” (p. iii). Meta-analysis identified alphabet knowledge, phonological awareness, rapid letter and word naming, writing name, and memory for sentences (phonological short term memory) as predictors (Lonigan, Schatschneider, Westberg, & The National Early Literacy Panel, 2008). “The findings also suggest that instruction focused on these skills may provide valuable literacy preparation, particularly for children at risk for developing reading difficulties” (p. 78).

Predictor: Fine Motor Skills

Recent research has also considered whether motor skills predict later academic success. Grissmer, Grimm, Aiyer, Murrah, & Steele (2010) and Pagani et al. (2010) both added the motor skill data gathered for three of the Duncan et al. meta-analytic studies to their work. Gross motor skills did not predict achievement, but fine motor skills predicted later math and reading achievement. “Comparisons of statistical significance between fine motor skills and attention measures showed that fine motor skills were almost always as significant or more statistically significant than attention” (Grissmer et al., 2010, p. 1010). Pagani confirmed the importance of fine motor skills, indicating that it was a better predictor of grade 2 math and general achievement than was receptive language.

Moderator of Academic Success: Health and Well-Being

Health and well-being are associated with school readiness. Health has a complex role that influences the acquisition of school readiness skills. A child’s health from birth onward supports or inhibits the development of cognitive, language, fine motor, and social skills during the preschool years (Pati, Hashim, Brown, Fiks, & Forrest, 2009). These skills in turn predict later academic success (Fiscella & Kitzman, 2009).

Uncertain Predictors: Internalizing Behavior, Externalizing Behavior, and Social Skills

The early childhood field has long considered social-emotional development and behavior as predictors of academic success. The perspective is that if a child can get along socially, he or she will be able to draw upon teacher-student and peer-peer relationships to access needed instruction (Brock et al., 2009). This view has been challenged by results of a meta-analysis (Duncan et al., 2007) that found that “none of the socialemotional behavior categories show predictive power” (p. 1439).

Following the work of Duncan and his team, the federal government funded multiple research efforts to understand and expand on their results. Different studies have found different results. One study found that certain social-emotional behaviors, “specifically hyperactivity/ impulsivity, prosocial behavior, and anxiety/depression, were significant predictors of 3rd-grade math and reading” (Romano, Babchishin, Pagani, & Kohen, 2010, p. 995). Another study repeated the work of Duncan and others and found that results “generally support their conclusion that attention skills were more important than children’s behavior in predicting academic achievement and changes in academic achievement” (Grimm et al., 2010, p. 982). To clarify the results, researchers have looked at specific aspects of behavior, including withdrawn and depressive behaviors, aggression, and prosocial behavior. These studies have not found consistent results (see Fantuzzo et al., 2007; Grimm et al., 2010; Pagani et al., 2010; and Romano et al., 2010).

Question 4: What are the teaching practices that promote readiness skills and later academic success?



Answer: Researchers have found that explicit instructional supports, emotionally supportive interactions, and well-managed classrooms are critical to children’s acquisition of school readiness skills and their later academic success.

Multi-state studies are providing important evidence that a number of commonly-held early education practices are not making a difference in children’s school readiness. We discuss the practices that are effective in the following sections.

Explicit Instructional Supports

Explicit instructional supports occur across three dimensions: promoting higher-order concept development (“why” and “how” understanding rather than “what is that” instruction); providing quality feedback so children can extend their understanding rather than simply hearing that they are in error; and modeling language to enable children to increase their communication skills and vocabulary (Hamre & Pianta, 2007). Explicit instruction in school-entry math and reading is associated with larger gains in those areas (Burchinal, Vandergrift, Pianta, & Mashburn, 2010). Teachers need to plan activities carefully that teach “target skills in a manner that matches children’s skill levels” (Pianta et al., 2009, p. 72). Explicit instruction in school-entry math and reading does not mean relying on worksheets to ensure learning (La Paro et al., 2009).

One strategy to support provision of high-quality, explicit instruction is to use a research-based curriculum that has been found to provide gains in emergent math, literacy, and other predictive skill areas (Goodson, 2008). Such a curriculum is designed to present concepts and skills in a sequence that builds learning over time. An initial challenge in using a research-based curriculum is the need to implement the curriculum as it was designed and evaluated. Results cannot be assured if teachers pick and choose across one or more curricula. Another challenge is rejecting a familiar curriculum, such as Creative Curriculum for Preschool, that has been considered among the best, but which has not shown to be effective in promoting learning in reading and math areas (Institute of Education Sciences/What Works Clearinghouse, 2009).

A second strategy is ensuring that enough time is allocated to instruction. A research study of state-funded prekindergarten classrooms examined children's engagement throughout the day to see how learning was affected. The team identified four profiles of engagement based on how the majority of time was spent across the entire day. The profiles were identified as free play, individual instruction, group instruction, and scaffolded instruction. Children who spent 41% of their day in free play made the least gains in language and literacy and math (Chien et al., 2010).

Emotionally Supportive Interactions

Emotionally supportive interactions have three dimensions (Hamre & Pianta, 2007). Classroom climate refers to the tone of classroom, such as the warmth of relationships and connectedness among children and staff. Teacher sensitivity is responsiveness to children's needs and awareness of their feelings. Regard for student perspectives reflects the value the teacher gives to children's views, interests, and contributions. Researchers have studied the ways social environment or emotional support influences child outcomes over time (Bub, 2009). They have found that positive interactions and being responsive to children's needs, that is, "a high-quality social environment was associated positively with children's academic and literacy skills at the end of the preschool year" (Mashburn, 2008, p. 124).

These and other studies are finding that there have to be certain thresholds of quality in place before the benefit is gained. "Emotional Support was a more positive predictor of social competence and negative predictor of behavior problems in classes in the high range on Emotional Support than in classes in the low/medium range" (Burchinal et al., 2010, p. 172).

Well-Managed, Productive Classrooms

A well-managed, productive classroom contributes to the effectiveness of high-quality, explicit instructional supports and high-quality, supportive emotional interactions (Burchinal et al., 2010). The three dimensions of classroom organization refer to behavioral management (how children are helped to meet behavioral expectations), productivity (teacher strategies for maximizing learning time and minimizing wait and routine times), and instructional learning formats (the variety of instructional techniques, grouping techniques, and materials to support learning (Hamre & Pianta, 2007).

Kindergarten children have shown even stronger spring reading outcomes when all three aspects are combined, which increases children's engagement in learning activities, remaining on task, and regulating their own behavior (Ponitz et al., 2009). "Children in classrooms with better management practices (i.e., higher productivity, more proactive approaches to classroom management, and more varied approaches to instruction) were reported by their teachers as showing better behavioral and cognitive self-control in the spring of the kindergarten year and were observed as more engaged in the kindergarten classroom throughout the school year" (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009, p. 968).

Summary

Studies of children's long-term learning outcomes have linked gaps in school readiness with gaps in academic achievement. Driven in part by the ambitious objectives of the National Education Goals Panel and the federal 2001 Elementary and Secondary Education Act (No Child Left Behind), researchers and early educators have worked to identify which school-entry skills are associated with children's later academic success. This research has identified school-entry math, attention, school-entry literacy, and fine motor skills as those predictive skills. Research also shows that to enable children to acquire these skills, early childhood teachers will need to provide explicit instruction, high-quality sensitive interactions, and well-managed, productive classrooms.

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A Working Paper: New Information about School Readiness

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