

## Development and Promotion of Early Literacy Skills: Using Data to Help Children Succeed

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A large body of research evidence highlights the required conditions for children to become skilled readers. Within the past decade, research also has uncovered the fact that the origins of skilled reading begin to develop even before children start school. The intent of this paper is to provide a brief summary of what is known about the development of skilled reading in early elementary grades, to highlight the key findings concerning the developmental precursors to the successful acquisition of skilled reading, and to review recent advances in tools that can be used by early childhood professions to identify children who may be at risk for reading difficulties before these children experience the negative consequences of reading failure. Use of these tools can provide the means for teachers and other early childhood professions to provide the focused experiences and activities that will help children succeed in becoming skilled readers.

### **Development of Skilled Reading**

Learning to read and write is a key developmental milestone in a literate society. Children who learn to read early, without significant difficulties, and well tend to be more avid readers than children who experience difficulties in learning to read. As a consequence, these children experience more exposure to print, both solidifying and expanding their skills in reading and writing. These reading skills serve as the cornerstone to acquiring content knowledge in other domains both in school and throughout life. Significantly, a relatively large degree of children's exposure to and acquisition of vocabulary and other language skills is through reading.

In contrast to those children who acquire reading skills early and without much difficulty, children who are poor readers tend to continue to struggle with reading and writing, read less than their peers who are more skilled in reading, and receive less exposure to content knowledge, vocabulary, and other language skills.

Whereas many children learn to read without significant difficulty, a sizable percentage of children experience at least some difficulty, and a significant number of children experience substantial difficulties. The most recent results of the National Association of Educational Progress (November, 2003) indicated that among 4th grade children in the United States, only 31% performed at or above the proficient level in reading and 37% performed below the basic level in reading. Although it is tempting to conclude from these findings that schools are doing worse in educating children, examination of results of the NAEP across years reveals that the percentage of children performing at proficient levels has remained constant. The problem is not that schools are increasingly failing to teach children to read. The problem is that the societal demands for literacy are increasing.

Knowledge about the causes, correlates, and predictors of children's reading success and failure in the early elementary grades has expanded greatly in the past three decades. Much of the research that has contributed to this knowledge base has been funded by the National Institute of Child Health and Human Development (NICHD), and has been summarized in two influential documents, the report of the National Research Council, *Preventing reading difficulties in young children* (Snow, Burns, & Griffin, 1998) and the report of the National Reading Panel (NRP), *Teaching children to read* (NRP, 2000). This knowledge has been incorporated into many current reading curricula with the intent that children exposed to this pedagogy have a greater chance of learning to read successfully. Methods of identifying,

monitoring, and helping struggling readers in kindergarten through grade 3 have been developed. Most recently, this knowledge of the development of skilled reading and effective instruction has been incorporated into Federal education policy as a part of the No Child Left Behind (NCLB) legislation.

The National Research Council's report (Snow et al., 1998) identified three basic problems that represent early impediments to developing into a skilled reader:

- Problems in understanding and using the alphabetic principle to acquire fluent and accurate word reading skills.
- A failure to acquire verbal knowledge and strategies that are needed for the comprehension of written material.
- The absence or loss of the initial motivation to read or a failure to develop a mature appreciation of the rewards of reading.

Based on the NRP's findings, Reading First, the component of NCLB that focuses on improving reading outcomes for children, requires that reading instruction include a focus in five domains:

- Phonemic Awareness
- Phonics
- Fluency
- Vocabulary
- Comprehension strategies

These five areas represent a developmental hierarchy of skills that children need to be able to engage in to accomplish the ultimate purpose of learning to read, to be able to understand, learn from, use, and enjoy written language.

Progress in many of these areas is strongly interconnected, and research evidence on the consequences of falling seriously behind in the development of these skills is sobering.

Longitudinal studies indicate that children who remain poor readers by the end of the first grade almost never acquire average-level reading skills by the end of elementary school (Francis,

Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Juel, 1988 Torgesen & Burgess, 1998; Torgesen, Rashotte, & Alexander, 2001). There are two key components to successful reading. One is the ability to accurately and fluently identify individual words in print, and the second is good general language comprehension skills (Torgesen, 2002a). Although learning and use of some specific comprehension strategies can increase reading comprehension to a degree, the majority of reading skill in children and adults can be explained by these two components (Hoover & Gough, 1990).

The most common cause of early reading difficulties is a weakness in children's phonological processing skills--the ability to apprehend, manipulate, and use the sound structure of spoken language. Children with poor phonological processing skills have difficulty cracking the alphabetic code that connects the graphemes in written language to the phonemes in spoken language. These children do not have an effective strategy for decoding an unfamiliar word when it is encountered in print. They tend to rely too heavily on contextual cues to guess the unfamiliar word rather than using knowledge of phonics to decode it. Consequently, their attempts to decode unfamiliar words result in many word reading errors. Reading grade-level material is difficult, and many of these children begin to develop negative attitudes about reading, resulting in reduced opportunities to practice reading (Oka & Paris, 1986). Fluent decoding appears to depend heavily on a well-developed sight-word repertoire (words that are processed quickly based on stored spelling patterns), which is built through repeated accurate readings of a word (Ehri, 1998; Torgesen, Rashotte, & Alexander, 2001). Consequently, children with poor phonological processing skills have difficulty developing the large corpus of sight-words required to become a fluent reader both because of inaccurate readings of words and because of reduced exposure to print associated with low motivation.

Effective reading instruction for children who have difficulty understanding and using the alphabetic principle must be systematic and explicit. Results of intervention studies over the past decade suggests that highly intensive systematic instruction can reduce the rate of severe failures in reading (defined as scoring at or below the 30th percentile on measures of word reading) to 4 to 6 percent of the population (Torgesen, 2002b). However, it is not clear that even with these most effect interventions children will maintain their gains in reading, that gains in reading accuracy will translate into fluency, or that reading comprehension will be within the average range. Many of these children have already experienced significant reading difficulties, and the consequences of those early failure experiences may resonate in unknown ways throughout school. Can children who are at risk for reading difficulties be identified before they fail?

### **Development of Early Literacy Skills in Pre-Readers**

Whereas knowledge of the development of reading in school age children has been building over the past three decades, it is only within the past 10 years that substantial efforts have been directed toward understanding the development and contribution of reading-related skills prior to school entry. This growing body of research evidence highlights the significance of the preschool period for the development of critically important early literacy skills (e.g., see Snow et al., 1998; Whitehurst & Lonigan, 1998). This area of study is often referred to as emergent literacy (Sulzby, 1989; Sulzby & Teale, 1991; Teale & Sulzby, 1986; Whitehurst & Lonigan, 1998). Emergent literacy skills represent the developmental precursors to conventional reading and writing skills. Whereas traditional approaches to the study of reading often take as their starting point children's entry to the formal school environment, an emergent literacy approach conceptualizes the acquisition of literacy as a developmental continuum with its origins early in the life of a child, rather than an all-or-none phenomenon that begins when children start

school. The emergent literacy approach departs from other perspectives on reading acquisition in suggesting there is no clear boundary between pre-reading and reading.

Whitehurst & Lonigan (1998) proposed that emergent and conventional literacy consisted of two interdependent sets of skills and processes, *outside-in* and *inside-out*. Outside-in skills represent children's understanding of the context in which the target text occurs (e.g., knowledge of the world, semantic knowledge, and knowledge of the written context in which a particular sentence occurs). Inside-out skills represent children's knowledge of the rules for translating the particular writing they are trying to read into meaningful sounds (e.g., letter knowledge, phonological processing skills, and perhaps vocabulary). Inside-out skills reflect code-related components of reading that are mostly specific to reading, whereas outside-in skills reflect more general abilities, like language and general knowledge that support comprehension. Whitehurst & Lonigan (1998) hypothesized that inside-out (code-related) skills would be most important early in the sequence of learning to read, when the primary task is the development of accurate and fluent decoding skills, whereas outside-in (language) skills would become more important later in the sequence of learning to read, when the task shifted to comprehension. Skilled reading is a complex task that requires the coordination and interaction of many skills. Although these processes may be difficult to separate in a mature, skilled reader, it is unlikely that they are well integrated in the early stages of learning to read.

#### *Empirical Links Between Early Skills and Later Reading*

The National Early Literacy Panel (2004) conducted a meta-analysis of studies published in peer-reviewed English-language journals through 2003 that included data concerning the predictive relation between a skill measured in preschool or kindergarten and reading outcomes for children learning to read in an alphabetic language. A subset of the results of this meta-

analysis is shown in Table 1. The data reported in table include the average zero-order correlation for decoding and reading comprehension across all retrieved studies, the number of studies contributing to each average correlation, and the number of children contributing data to the correlation across studies.

What is apparent from the data in Table 1 is that measures of both alphabet knowledge and phonological awareness (i.e., measures of detection or manipulation of rhyme, syllables, onset-rime, phonemes) have sizable relations with both decoding skills and reading comprehension. Concepts of print measures have a substantial relation with decoding skills; however, there were too few studies relating concepts of print with reading comprehension in the literature to synthesize. Other predictor variables like RAN Graphological [naming letters or digits] and RAN non-Graphological [naming objects or colors] (both phonological processing skills) and oral language have moderate relations with decoding skills and comprehension, whereas phonological memory (phonological STM in the table) has a relatively weak relation with decoding skills and a moderate relation to reading comprehension. Additional analyses revealed that with only a few exceptions, whether these skills were measured in preschool or in kindergarten did not influence the size of the correlations.

To the extent that it was possible to examine different aspects of oral language and their relations with decoding skills and reading comprehension in these studies, the results suggested that more complex aspects of oral language, such as listening comprehension, understanding syntax, and definitional vocabulary had stronger associations with decoding and comprehension than did expressive or receptive vocabulary. Although the average correlations between oral language and decoding skills and reading comprehension were only moderate, the strength of the correlation was similar for decoding skills and reading comprehension, a finding not consistent

with the distinction between the relative temporal contribution of inside-out and outside-in skills proposed by Whitehurst and Lonigan (1998).

Multivariate studies in which the longitudinal predictive influences of multiple emergent literacy skills are examined simultaneously provide some clarification of the findings from these zero-order correlations. Lonigan, Burgess, and Anthony (2000) studied the relations between phonological awareness, letter knowledge, and oral language to decoding skills in a group of preschool children followed longitudinally for one year and found that only phonological awareness and letter knowledge contributed unique variance to the prediction of decoding skills. Although oral language was correlated with the code-related skills and decoding, it was not related to reading once phonological awareness and letter knowledge were in the model. Sénéchal, and LeFevre (2002) also failed to show an independent relation between oral language and reading in the first and second grades. In one of the most comprehensive studies to date, Storch and Whitehurst (2002) followed 626 children from preschool through fourth grade. They measured code-related skills (i.e., print knowledge, print concepts, phonological awareness), and oral language in preschool and kindergarten, and they measured decoding skills and reading comprehension in the first through fourth grades. The results of this study revealed a strong connection between code-related skills and oral language during preschool, that reading skill during the early elementary period was determined primarily by children's code-related skills, and that reading comprehension in later elementary school was significantly influenced by children's oral language skills.

Taken together, these findings indicate that, similar to evidence concerning the development of reading skills in school-age children, phonological processing skills, particularly phonological awareness, and print knowledge (alphabet knowledge, concepts of print) are

important determinants of early reading acquisition for children when measured in preschool and kindergarten. Multivariate studies (Lonigan et al., 1998; 2000; Sénéchal & LeFevre, 2002; Shatil & Share; 2003; Storch & Whitehurst, 2002) indicate that early in development, code-related skills and oral language skills are interrelated. However, these studies also reveal that the code-related skills are relatively more important for the acquisition of decoding than are oral language skills, whereas both code-related skills and oral language are important for developing good reading comprehension.

Another significant finding from the longitudinal studies concerns the striking continuity between the levels of reading-related skills displayed by preschool children and the levels of reading-related skills displayed by these children when they are in kindergarten (e.g., Lonigan et al., 2000; Storch & Whitehurst, 2002). This degree of consistency across time in reading-related skills is similar to what is found with grade-school children (Wagner, Torgesen, & Rashotte, 1994). This high degree of longitudinal continuity indicates that the developmental and environmental antecedents of the skills that underlie the acquisition of reading are found early and prior to the onset of formal schooling.

### *Key Emergent Literacy Skills*

The collective findings across this growing body of empirical evidence indicate that oral language, phonological processing skills, and print knowledge are strongly predictive of how well and how easily children will learn to read and write once they are exposed to formal reading instruction from kindergarten through the third grade.

Oral language refers to the corpus of words in a child's vocabulary as well as his or her ability to use those words to understand and convey meaning (i.e., syntactic and narrative skills). Phonological processing skills refer to children's developing sensitivity to the sound structure of

his or her language (e.g., that words are made up of smaller sounds like syllables or phonemes) and the ability to use that information in cognitive processes like memory. Print knowledge refers to a developing understanding about the nature and purpose of books and print (e.g., letters, the sounds letters represent, directionality of print).

A significant number of children leave the preschool years with substantial oral language skills, a lot of knowledge about print and the alphabet, and well-developed phonological processing skills. These children are poised to “crack” the alphabetic code and become skilled readers. In contrast, many children arrive at kindergarten with low levels of these emergent literacy skills, making it less likely that they will benefit from the instruction they will receive in the early elementary grades. For these children, early reading instruction must first build the key emergent literacy skills that will allow them to break the code needed to become a skilled reader. As noted by Olson (1998), a central problem in reading instruction arises, not from the absolute level of children’s preparation for learning to read, but from the diversity in their levels of preparation.

### **Early Identification of Children who are At-Risk for Reading Difficulties**

Data from a variety of sources indicate that the prevention of reading difficulties is likely more efficacious and cost effective than the remediation of reading difficulties (Berninger et al., 2002; Coyne, Kame’enui, Simmons, & Harn, 2004; Torgesen, 2000). As noted previously, children who have difficulty acquiring the alphabetic principle and who continue to experience problems with decoding lose the opportunity to develop the fluency required to become a skilled reader. Early identification of areas in which children may need targeted intervention is essential if the cycle of failure is to be broken. Accurate assessment of the emergent literacy skills involved in the causal chain of learning to read and write is important because early

identification can lead to focused early intervention efforts to help children develop the skills needed to benefit maximally from the instruction they will receive in the early elementary grades.

Key questions asked by early childhood educators involve how to best provide for the educational needs of their children. The questions asked by a pre-k teacher might include: Which children are entering my class weak in the skills and knowledge that are required for success in my classroom and beyond? Which children in my class are most in need of extra support to achieve typical levels of emergent literacy skills by the end of the year? These are the type of questions that can be best answered by the use of assessments that provide information on children's developmental achievements in key areas of emergent literacy. Such answers provide teachers with the information they need to provide optimal learning experiences for children. Of course, assessment is not an end in and of itself. It is one part of an identification, intervention, and evaluation sequence. Whereas accurate assessment can be a powerful tool for acquiring information, it is only truly valuable in the context of a well-developed intervention program that translates the information obtained into curriculum modifications and specific instructional tactics and goals. That is, these assessments can more clearly focus educational activities on key emergent literacy skills, enabling the targeting of skill areas in which children need the most help, and provide a means for determining whether program goals have been achieved.

As knowledge concerning the development of emergent literacy skills has increased, there has been a corresponding increase in the availability of psychometrically sound and developmentally appropriate methods to measure these skills. There are at least three main forms of assessment that can be used to identify children with specific education needs or to develop education goals. These forms of assessment include informal assessment, diagnostic assessment,

and screening. The latter two forms of assessment typically involve the use of standardized measures.

### *Informal assessment*

Traditional methods of determining the skills of preschool children often involve observation of the child in either general or specific contexts. These informal assessments of children's skills can be informative and may be useful for teachers as they teach new skills or they may provide valuable information to be used in scaffolding interactions with a child (e.g., using a child's immediate responses to instructional interactions to increase or decrease the difficulty level of the interaction is making use of informal assessment). Informal assessments typically are neither standardized nor highly structured in nature. They most often provide no comparison or equivalent scores and may be difficult to use in determining whether a child has made or is making adequate progress in key skill areas. Such assessments can include teacher-created checklists, other checklists, observation of children with anecdotal notes, or portfolios of children's work products. Because of their informality, these assessments are relatively easy to create and use. In terms of identifying weaknesses in key skill domains, informal assessments may not be optimal. Because informal assessments typically do not utilize a standardized procedure, the conditions of elicitation of children's skills are not uniform across children. Therefore, whether or not a child exhibits a particular skill may be due to the child's skill, the eliciting context, or both. Moreover, the meaning of skills observed is unknown with respect to reliability or validity.

### *Standardized assessments*

A standardized measure is one in which a common set of stimulus materials and questions, a consistent set of administration procedures, and conventional scoring procedures are

used, and the scores are based on a norming sample. Standardized measures have a number of significant strengths. Standardized measures allow meaningful comparisons among children because they have (a) clear and consistent administration and scoring criteria (i.e., the measure is always given and scored in the same manner), (b) generally good reliability and validity, and (c) raw scores are converted into scores that reflect a child's performance relative to the performance of a normative group. Because the assessment is the same for each child administered the measure, resultant scores have consistent meaning across children, examiners, and assessment sites. Standardized measures are usually normed within relatively large representative samples. In such normative samples, the distribution of scores approximates the normal curve with 66% of those taking the test scoring between -1 and +1 standard deviations from the mean.

#### *Diagnostic assessment*

In general, diagnostic measures are those measures that provide highly detailed information about an individual skill area. Multiple items within the measure are intended to probe and explore different levels of competence or achievement of the skill. Some diagnostic assessments include multiple subtests, each intended to provide an index of strengths or weaknesses in a particular skill domain. Diagnostic measures tend to have very proscribed administration procedures, multiple items tapping a single construct, and basal and ceiling rules that allow optimal usage of assessment time in the region of a child's developmental level.

The key advantages of using standardized diagnostic assessments include in-depth examination of specific skill areas or facets of a skill area, generally high reliability (consistency of measurement), established validity of the measure (scores on the measure are related to measures of theoretically relevant constructs and unrelated to theoretically irrelevant constructs),

and they allow comparisons of children's skills to a normative context. Hence, standardized diagnostic measures can allow a meaningful, accurate, and in-depth determination of the emergent literacy skill areas in which a child has strengths or weaknesses relative to a developmental norm.

There are now a number of diagnostic measures that provide reliable and valid information about children's emergent literacy skills in each of the three core domains of emergent literacy (oral language, phonological processing, print awareness; see Lonigan, McDowell, & Phillips, 2004). Availability of preschool measures with strong psychometric characteristics is most evident for oral language, although there are currently available, or soon to be available, measures of phonological processing skills, like the *Woodcock-Johnson, 3rd Edition* (WJ-III; Woodcock, McGrew, & Mather, 2001) or the *Preschool Comprehensive Test of Phonological and Print Processing* (Pre-CTOPPP; Lonigan, Wagner, Torgesen, & Rashotte, in press), and print knowledge, like the *Test of Early Reading Achievement, 3rd Edition* (TERA-III; Reid, Hresko, & Hammill, 2001) or the Pre-CTOPPP (Lonigan et al., in press). A more complete summary of measures can be found at

[http://www.fcrr.org/assessment/pdffiles/prek\\_kassessments.pdf](http://www.fcrr.org/assessment/pdffiles/prek_kassessments.pdf).

The key disadvantages of using standardized diagnostic assessments are their costs--both in terms of the financial costs of purchasing the measure and in terms of the time required to administer the measure to individual children--and the level of training or expertise required to administer the measure and interpret the results. Hence, there should be a plan for the use of the specific information derived from the assessments to justify the cost of this more complete and refined assessment procedure.

### *Screening assessments*

It is unlikely that every child in a program needs to be administered an extensive battery of standardized diagnostic assessments. One mechanism for selecting children who may be in need of more extensive assessment is the use of a screening measure. Screening measures are generally brief, easy to administer assessments that provide a global picture of skill development in an area. Screening measures are not intended to provide the type of in-depth information about the various facets of a skill like that obtained with a diagnostic assessment. Screening measures are often used to identify children who may require a more in-depth assessment of skills or to provide a quick “snapshot” of how children are developing in a skill area. Screening measures are usually standardized, and they are typically validated by the degree of “false positives” (children identified as delayed in a skill who have no actual delay) and “false negatives” (children identified as developing a skill at average or above levels who have a true delay in the area) they produce. At present, there are no validated screening measures for preschool children’s emergent literacy skills. That is, there is no measure that has been established as a valid screen of the need for more in-depth assessment by comparison of the false positives and false negatives when compared to an in-depth diagnostic assessment.

A measure that may be used to provide the type of “snapshot” assessment typical of a screening measure is the *Get Ready to Read!* screening tool (*GRTR!*; National Center for Learning Disabilities, 2001). The *GRTR!* is a 20-item measure that was designed in collaboration with researchers involved in early literacy and literacy research to provide a brief assessment of 4-year-olds’ code-related emergent literacy skills (e.g., print knowledge, phonological awareness). The *GRTR!* screening tool was designed so that it could be administered and interpreted by individuals with minimal training in assessment. Hence, it is well suited to be used

by preschool teachers and others to provide a global picture of children's emergent literacy skills. Items on *GRTR!* screening tool ask children to point to one of four pictures in response to a question (e.g., "Find the picture that has letters in it"), and it includes content assessing print knowledge (understanding of books, printed letters and words, letter sounds) and phonological awareness (rhyming, segmenting words).

The *GRTR!* screening tool is available in both English- and Spanish-language versions. The English-language *GRTR!* screening tool has adequate internal consistency reliability ( $\alpha = .78$ ), and it has good concurrent validity as measured by its correlations with a diagnostic measure of early literacy, the *Developing Skills Checklist* (CTB/McGraw-Hill, 1990;  $r = .69$ ), the *Peabody Picture Vocabulary Test* ( $r = .58$ ), a measure of letter knowledge ( $r = .66$ ), and a measure of phonological awareness ( $r = .58$ ). Likewise, the Spanish-language *GRTR!* screening tool has adequate internal consistency reliability ( $\alpha = .76$ ), and it has good concurrent validity as measured by its correlations with a diagnostic measure of early literacy, the Pre-CTOPPP in both the domains of print knowledge ( $r = .68$ ) and phonological awareness ( $r_s = .37$  to  $.48$ ), and with a measure of Spanish oral language skill ( $r = .31$ ).

There are now at least two studies other than the development studies for the *GRTR!* screening tool that provide additional data concerning its utility and validity. Molfese, Molfese, Modglin, Walker, and Neamon (2004) examined the concurrent relations between scores on the *GRTR!* screening tool and measures of general cognitive ability, expressive and receptive vocabulary, rhyming, blending, and environmental print with a sample of 3- and 4-year-old children attending preschool programs for children from economically disadvantaged families. *GRTR!* mean scores were 7.9 and 11.5 for 3-year-old children and 4-year-old children, respectively. Scores on the *GRTR!* screening tool had moderate to large and significant

correlations with all measures except the blending task for 4-year-old children and with all measures except environmental print for 3-year-old children. These results indicate that the *GRTR!* screening tool can be used with 3-year-olds, and they provide a replication of the development data concerning the concurrent validity of the measure.

Phillips, Lonigan, and Wyatt (2005) examined both concurrent and longitudinal predictive relations between scores on the *GRTR!* screening tool and scores on measures of vocabulary, phonological awareness, print knowledge, and decoding. The mean interval between the administration of the *GRTR!* screening tool and the follow-up testing was 20, 28, or 35 months depending on the subsample of children examined. There was evidence of significant predictive relations across each of the follow-up intervals. Of particular interest were the predictive relations at the longest follow-up interval. Using age-standardized scores (a conservative test of cross-time correlations), scores on the *GRTR!* screening tool administered when children were between 3- and 5-years of age were significantly and strongly correlated with scores on the Word Identification ( $r = .51$ ) and Word Attack ( $r = .46$ ) subtests of the *Woodcock Reading Mastery Test-Revised* and with the *Gray Oral Reading Test* ( $r = .56$ ) administered when children were over 7-years-old.

The data from these studies indicate that even relatively brief, easy to administer assessments in preschool can reliably identify key reading-related skills. That scores on an assessment like the *GRTR!* screening tool administered in preschool relate strongly to scores on reading measures administered when most children were in second grade provides substantial evidence of the importance and ability to identify which preschool children may be at risk of having problems learning to read. For a typical screening measure there is often a score below which children are judged to be in need of more extensive assessment. There currently is no such

established cut point for the *GRTR!* screening tool. However, the broader norms provided for the *GRTR!* screening tool can be used to identify children who have relative weaknesses in the development of emergent literacy skills relative to their same-age peers or to identify children most likely to benefit from a more extensive diagnostic assessment (e.g., children scoring in the below average range on the *GRTR!* screening tool). Children identified as exhibiting below average skills on the *GRTR!* screening tool could be administered a battery of standardized diagnostic assessments to determine the exact nature of their strengths and weaknesses in emergent literacy skill development. Children with below average skill development could then be exposed to focused educational activities designed to promote development of these key skills.

### **Summary and Conclusions**

Research evidence concerning school-age children has converged on a view of the acquisition of reading skills that requires skills in five key areas: Phonemic awareness, phonics, fluency, vocabulary, and comprehension strategies. Most children with reading difficulties have weak phonological processing skills, which result in a failure to crack the alphabetic code and a failure to develop accurate and fluent word decoding skills. More recent research has identified the developmental precursors to these early reading skills. Emergent literacy skills that include phonological awareness, print knowledge, and oral language provide the foundation for early reading success. There is strong developmental continuity between these emergent literacy skills prior to school entry and later reading skills. With school-age children, explicit instruction in phonological process and phonics can reduce the rate of word-level problems substantially. However, the linkage between emergent literacy skills and later reading skills indicates that

children who are at risk of developing reading problems can be identified before school entry and prior to the emergence of actual problems in learning to read.

An increasing selection of reliable and valid assessment measures are available to assess children's strengths and weaknesses in emergent literacy skills. Some of these measures are diagnostic assessments that provide a rich report of children's skills in specific domains. However, these measures are often costly in terms of purchasing the measure, time to complete the assessment, and the required qualifications of the individual conducting the assessment. There are also some briefer screening-like measures that provide more global information about children's development of key emergent literacy skills. These screening measures are less expensive and easier to use than diagnostic assessments. Such screening measures can be used to identify children who may benefit from a more comprehensive examination of skills, using a diagnostic measure, or to identify children who, relative to their same age peers, are not developing emergent literacy skills at a typical rate and need exposure to more systematic instruction in emergent literacy and expanded opportunities to develop these skills. An emerging body of research supports the validity of the *GRTR!* screening tool by showing sizable concurrent correlations between scores on the *GRTR!* screening tool and scores on more comprehensive diagnostic assessment measures. Substantial longitudinal relations between scores on the *GRTR!* screening tool and later reading skills also have been obtained. These findings indicate that teachers and other early childhood professionals could make use of brief and easy to use measures, like the *GRTR!* screening tool, as a means to learn more about their children's abilities in key reading-related areas. The information obtained from these screening tools can allow early childhood educators to provide children with the activities and experiences

that may prevent later reading difficulties and that help children to be successful in school and later life.

Ultimately, the promise of early identification through accessible and easy to use assessments, like the *GRTR!* screening tool, requires evidence that children identified as needing assistance to promote the development of emergent literacy skills have less difficulty learning to read than they would have had no assessment been conducted. Such promise requires the development and evaluation of effective preschool intervention models and activities to promote emergent literacy skills. Emerging research supports the effectiveness of some interventions for increasing emergent literacy skills (e.g., Lonigan, 2003), and existing studies indicate that systematic instruction in phonological processing and print knowledge translates into better reading skills (Bryne & Fielding-Barnsley, 1991; 1993; 1995).

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Table 1.

*Average correlations between predictor variables measured in preschool or kindergarten and reading outcome based on meta-analysis of National Early Literacy Panel*

Predictor Variable	Reading Outcome					
	Decoding			Comprehension		
	Average $r$	$N$ Studies	$N$ Children	Average $r$	$N$ Studies	$N$ Children
Concepts of Print	.46	9	1,090	--- <sup>a</sup>		
Alphabet Knowledge	.45	26	2,826	.45	6	668
Phonological Awareness	.44	47	4,334	.41	13	1,007
RAN Graphological	.41	8	1,029	--- <sup>a</sup>		
Oral Language	.38	12	1,578	.39	10	1,024
RAN NonGraphological	.34	8	861	.37	4	509
Phonological STM	.25	21	2,384	.38	8	1,260

*Note.* RAN = Rapid Automatized Naming (lexical access). <sup>a</sup>Fewer than 3 studies retrieved from search of literature.