

Does early reading instruction help reading in the long-term? A review of empirical evidence

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ABSTRACT. Widespread and extensive changes have seen early reading instruction become an educational target for preschool and kindergarten aged children. Surprisingly, empirical researchers and policy makers have by and large paid little attention to the effects that early reading instruction has on later reading development. In this critical review, I outline five main arguments for early reading and examine their logical and evidential basis. Then I present research that has compared groups of children over the long-term as a function of whether they received early formal reading instruction or not. I conclude, on the basis of the evidence and critique, that children do not show better long-term reading performance that is attributable to their having received earlier formal reading instruction.

Keywords: Early reading; reading development; early childhood; long term; reading; language

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In the last decade, both sides of the Atlantic and virtually all corners of the Pacific experienced centrally driven pressure to lower school entry ages and increase the academic content of preschool and kindergarten curricula. In the United Kingdom, the Early Years Curriculum—which British wryly termed the “nappy curriculum”—entailed binding early academic curricula and standards for children sometimes younger than four (House, 2005). Germany experienced what has been called the PISA shock, after reportedly unsatisfactory findings from the Programme for International Student Assessment (PISA) studies. In both instances, the earlier fostering of academic skills was seen to be the solution to a number of perceived problems, such as (a) reducing illiteracy, (b) reducing social divides between the “haves” and the “have-nots” (i.e., Matthew Effects), and (c) bolstering economic performance through having a more dynamic workforce or, perhaps more cynically, having children in the workforce and paying taxes sooner.

Although a study of the social and political influences in education is fascinating and enlightening, the purpose of this paper is to examine the claim on an evidential basis that early reading leads to greater later achievement. Clearly, the first question to resolve is precisely whether early reading leads to later advantages before one can consider whether early childhood curricula should focus early on this academic skill. In this brief review, I first clarify what is meant by early reading and then consider scientific arguments for early reading before outlining the empirical studies that have to-date been conducted.

What is early reading?

Early reading can be defined in a number of different ways, such as reading before children are readily able learn to read, before children are in school, before children are perceived as being sufficiently developed in other non-academic areas first, or before the transition into middle childhood (e.g., the first dentition). Pragmatically, a historical and comparative analysis would say that formal reading instruction beginning when children are four or five, as in the English speaking world, would be considered early and formal reading beginning around age six or seven, as in much of continental Europe, would be considered late. My preferred approach has been to divide the issue of early and late according to optimality (Suggate, in press). Specifically, educationalists tend to focus on *capability* in discussions of when to teach reading, whereby it is emphasised that children can in fact learn to read when they are very young (Ehri, Nunes, Stahl, & Willows, 2001a). Instead, I reason that it is more important to ask whether it is *optimal* to teach children to read a certain ages, in the sense that the alterations in child development arising from having experienced reading instruction and acquired reading skills needs to be considered.

A second feature of the above characterisation is that I have referred to when *formal schooling* begins, or to *formal reading instruction*. My purpose in doing so is to emphasise that this paper focuses in the process of instructing children in reading through explicit and programmatic teaching of text reading and decoding skills. In other words, I refer to reading instruction when this is clearly directed from outward onto children—regardless of whether adults attempt to do this in a playful way or not—it is fundamentally different from playful learning where the child is the initiator of nearly all activity.

Arguments for Early Formal Reading Instruction

Numerous educational practitioners, scientists and policy makers recommend that children be taught some combination of phonemic awareness, print knowledge, word reading, strategy, or decoding skills during kindergarten or preschool, with intervention offered to those who make insufficient progress in acquiring reading skills (e.g., Aram & Biron, 2004; Coyne & Harn, 2006; Hintze, Ryan, & Stoner, 2003; Lyon & Chhabra, 1996; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004). Good and colleagues concisely expressed the argument:

[B]y third or fourth grade, students are performing well below their peers, and it is too late to modify beginning reading instruction to promote the acquisition of initial reading skills. What is needed for prevention of reading failure is to *begin early*... (emphasis is original authors', Good, Gruba, & Kaminski, 2002, p.699).

Other scholars have focused on the idea that children who are not reading successfully in class will progressively disengage from instruction, disrupt their peers, and fall further behind in reading, establishing a “pattern of reading failure” (Shinn, Shinn, Hamilton, & Clarke, 2002, p. 113).

In essence, there are three main aspects to the argument above, namely: (a) early poor readers remain poor readers, (b) early reading interventions are effective, and (c) children become ever worse if early help is not provided. A fourth aspect that has recently come to enter the debate is that reading and language are one and the same, such that it does not matter when children learn to read. Finally, it is often argued that early reading improves language. Each of these arguments will be considered in turn.

Start behind, stay behind?

Correlational studies are research designs in which two variables are statistically related to one another to explore possible cause and effect relations. One example is correlating the incidence of lung cancer in a population with the number of cigarettes people smoke. Crucially, correlational designs can only ever indicate causality, they cannot demonstrate it. For example, the news magazine *Der Spiegel* reports that its readers have greater knowledge, but this correlation does not allow us to determine that reading *Der Spiegel* makes its readers more knowledgeable, as it could be that more knowledgeable readers read the magazine in the first place.

Bearing this *Spiegel* analogy in mind, correlational evidence links: (a) pre-school reading to school reading performance (Lonigan, Schatschneider, Westberg, & The National Early Literacy Panel, 2008). However, from this evidence it is not possible to determine whether it was having these early reading skills that caused greater reading later on. Given that most reading skills are discrete entities that can be acquired quickly under the right conditions (Suggate, in press), it is unlikely that learning reading skills early *per se* was the key factor. Rather other influences probably led to both early and later reading skill, such as the: socio-economic status; home literacy environment; parental pressure; parental involvement; child care, school, or preschool focus; and engagement in reading. In other words, it cannot be concluded that “starting behind” *per se* leads to “staying behind”, in reality it is likely that both starting behind and staying behind have the same underlying cause in most cases.

Additionally, this correlational evidence is not as clear cut as Good and colleagues’ (2002) quote above indicates. First, correlations between early reading skills and later reading tend to weaken greatly over time (e.g., Blatchford & Plewis, 1990). Additionally, what early reading skills correlate with is complicated and it is actually early *language* skills that emerge as a solid predictor of later reading comprehension (Storch & Whitehurst, 2002; Vellutino, Tunmer, Jaccard, & Chen, 2007). Logically, complicated language comprehension is clearly the important factor for reading comprehension, once elementary decoding skills have been mastered (Suggate, in press).

Finally, a third problem is that predictive correlation coefficients only reflect the extent to which low scores at time 1 relate to low scores at time 2. Many doomsday prophecies have been ventured based on findings showing that lower readers in one grade are also the lower readers in another grade (e.g., Juel, 1988). However, forming ranks of children according to percentile and quartile and then comparing these ranks across times provides little insight into reading problems other than that there is some stability in reading across time. If a child’s reading performance lies at the 10th percentile, it may simply be that that child’s reading ability actually places him or her 90th in a race of a 100 children – if that child ‘wins’ by improving his or her rank, then another must ‘lose’ by going down. Stability in predictive evidence (e.g., Juel, 1988) is, by itself, little cause for alarm, but instead it would be more disconcerting if education had the effect of turning the best readers into the poorest (Suggate, 2012).

In short, correlational evidence has robustly established associations between preschool predictors and elementary school achievement. However, because of difficulty inferring causation from these correlational data, this evidence does not lend itself to the conclusion that early reading development is necessary for, or specifically causal of, later reading skill.

Reading intervention

A second tenet in the argument for early reading is that early reading programmes improve children’s reading skill. The gold-standard in such research is a randomized-controlled experimental design, yet few such studies exist in the preschool period and none of these follow children well into primary school (Bus & van Ijzendoorn, 1999; Ehri et al., 2001a; Ehri et al., 2001b, Suggate, 2010) raising questions as to publication bias. Therefore, the claim that early reading interventions improve children’s reading long term cannot be upheld.

Matthew Effects

Dangers around early disadvantage in reading are eloquently illustrated by the Matthew Effect (Stanovich, 1986). According to the Matthew Effect, the rich become richer and the poor comparatively poorer, such that:

for unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath (Matthew 25:29).

Applied to reading, the Matthew Effect is the idea that children who have lesser reading skill earlier fall further behind over time because they read more slowly and have less exposure to learning opportunities. In support of this idea is the observation that an excellent middle school reader might read 10,000,000 words

in a year, whereas a poor reader only about 100,000 (Nagy & Anderson, 1984). However, empirical evidence that the gaps between the good and poor readers actually widen over time is sparse and contradictory (Bast & Reitsma, 1998; Parrila, Aunola, Leskinen, Nurmi, & Kirby, 2005; Shaywitz et al., 1995) and does not convincingly lend itself to the conclusion that early differences in reading skill widen dramatically. Even if studies were to show Matthew Effects, as with correlational evidence, one cannot be sure that the factors driving the initial differences were not also the cause of later differences. In short, evidence for the Matthew Effect is unfortunately disproportionate given the influence that this catchy idea has had in educational research and policy.

Reading is just part of language

One argument for early reading draws upon similarities between reading and language, sometimes using evidence for the latter as evidence for the former. The extreme form of this argument draws on findings demonstrating the unique phonological and broader language development in the first years of life, which may be partly grounded in neural plasticity (Lundberg, 2006). By extending the analogy to reading, it is not uncommon to hear the argument that early reading is needed to lay the foundation for later reading, particularly for children who might develop dyslexia (i.e., brain training). This argument is entirely speculative because, as reviewed above, there is no evidence to suggest that simply learning to read earlier will prevent dyslexia or that the kind of brain training that might possibly result is more beneficial than more embodied language or movement oriented experiences.

A less extreme version of this argument draws on parallels between reading and language development, arguing that they are part of the same continuum:

The term “emergent literacy” is used to denote the idea that the acquisition of literacy is best conceptualized 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. ... [A]n emergent literacy perspective views literacy-related behaviors occurring in the preschool period as legitimate and important aspects of literacy (Whitehurst & Lonigan, 1998, pp. 848-849).

Although it is indeed true that many skills needed for reading do begin developing before birth, to claim that reading can begin at any point in childhood because all experiences are reading is like claiming that wheat will turn itself into bread, without the harvester, miller, and the baker simply because the key ingredient grew out of the ground. Elementary observation testifies that there are several features of reading and language making these two entirely different from one another. To begin with, reading is visual (or tactile when the script is Braille) whereas, language for children is mostly oral and aural and reading is seldom accompanied with gesticulation. To delineate the matter further, children can talk and listen while climbing a rope, running in the playground, or chasing a ball—activities which are virtually impossible to (safely!) do while reading. In scientific language, the obvious might be stated thus:

The evidence reviewed is consistent with the notion that print knowledge may be distinct from oral language and meta-linguistic skills. The research reviewed revealed that (a) many researchers already are analyzing these behaviours separately, (b) the results of empirical tests revealed that emergent literacy is not a unitary construct; and (c) print knowledge, language, and phonological awareness were affected by different types of activities (Sénéchal, LeFevre, & Smith-Chant, 2001, p.446).

Reading improves language

One final argument that is often voiced is that reading is needed to improve language development. Certainly, the language in written text is different to that in spoken text, making it conceivable that a precocious reader might learn words that a non-reader would not learn. However, the opposite is also true, a child that is spending time indoors reading compared to children playing together outside is also missing out on experiences that other children have. Additionally, the kind of reading skills that children can acquire early are unlikely to enable them to read particularly complicated texts, which is why some have suggested that

only children in grade 3 or 4 would be expected to learn new vocabulary from reading (Nagy & Anderson, 1983). In our empirical studies comparing language development for children in play-oriented kindergartens versus formal school, we have not been able to find advantages in language skill for early readers (Suggate, Reese, Lenhard, Neudecker, & Schneider, 2012; Suggate, Schaughency, & Reese, 2011). Finally, we have also gathered empirical evidence suggesting that competent readers in grade 2 and 4 in Germany learn fewer words from independent reading than from hearing stories (Suggate, Lenhard, Neudecker, & Schneider, in press). In summary, there is little reason to believe that early reading exerts meaningful improvements in language skill.

Comparative evidence on early reading

One surprising observation of scientific discussion on early reading is that investigators have focused on tangential lines of evidence and reasoning—correlation, intervention, Matthew Effect evidence—and almost totally ignored the evidence that actually compares groups of children who learned to read at different ages. This evidence, which I have reviewed elsewhere in more detail (Suggate, 2011, Suggate, 2012, Suggate, in press), is briefly outlined.

Evidence from preschool programs

There is a large body of evidence to suggest that a well-designed preschool or home intervention program can boost the later cognitive and social development of children raised in poverty or otherwise at-risk environments (Gilliam & Zigler, 2001; Lazar & Darlington, 1982; Magnusson, Ruhm, & Waldfogel, 2007; Nelson, Westhaus, & MacLeod, 2003). Long-term benefits generally exist for cognitive and social-emotional development more than for academic achievement (Gilliam & Zigler, 2001; Nelson et al., 2003).

Crucially, however, evidence from these preschool programmes is not evidence that it is important to teach early reading skill *per se* for two reasons. First, the main difference in day to day experiences between children in the pre-school programmes and those not there is often that they receive something approaching a normal kindergarten environment, with rich language interactions, security, and daily rhythms. Therefore, it is likely that the effective ingredient was simply taking them out of their otherwise underprivileged environments.

Second, if one examines the effect sizes for reading achievement as a function of whether children attended these preschool programmes that had some kind of formal reading instruction, then the advantages are not apparent for reading skills in primary schools (Suggate, in press) – the effects for reading appear to wash out. Thus, even children from social problem areas do not appear to benefit from early reading *per se*.

Evidence from entering school earlier versus later

A further set of studies actually manipulate the age at which children enter school (Elley, 1992; Suggate et al., 2010; Turnbull, 2006), which provides useful evidence because reading instruction usually begins with school entry. One approach to collecting this kind of data is to use international comparisons, capitalizing on the different school entry ages.

Two studies compared the reading achievement of children as a function of when they began school, while attempting to statistically control for country differences in educational and social indicators. Elley (1992) found that by age nine, there was little difference between the children that had been receiving formal reading for four years versus two years (starting at age 5 versus 7, respectively). Suggate (2009) confirmed that there was no difference attributable to school entrance age by age 15 using data from the PISA study collected across 54 countries. However, neither study was able to take account of orthographic differences in languages thought to make reading, particularly in English, more difficult (Seymour, Aro, Erskine, & COST Action Network, 2003).

Research comparing reading from schools adopting the state versus Waldorf curriculum in English-speaking countries provides evidence on whether an earlier SEA is particularly necessary in English to counter its complex orthography. Crucially, in New Zealand children enter school on the day of their fifth birthday and receive formal reading instruction from then onward, such that by age six, most are fairly fluent readers (McNaughton, Phillips, & MacDonald, 2000). In contrast, Steiner school pupils mostly enter school when aged six and a half. We, therefore, conducted a study across the first six years of both types of school, controlling for receptive vocabulary, home literacy environment, reading-self concept, parental education and income, community economic status, second language proficiency, and ethnicity (Suggate, Schaughency, & Reese, 2013). Outcome measures tapped pre-reading, reading fluency, and reading comprehension domains. Our analyses indicated that by age 11 the later starters had caught up and the later starters even showed a slight advantage in reading comprehension – which was replicated in a follow-up with a second sample of 12 year old children (Suggate et al., 2013).

In a life-long study of the long term effect of early reading on intellectually gifted children, Kern and Friedman (2009) investigated effects of school entry age on a host of factors, from educational achievement, midlife adjustment and mortality. Although early school entry and learning to read earlier was initially associated with positive factors (i.e., higher IQ and family income), early reading only resulted in short term educational success and long-term it was associated with lower educational achievement and worse teenage and adult adjustment. In addition to being linked with lower overall achievement and adjustment, earlier school entry (when the parents opted to send the child a year earlier than they could have) was linked to earlier death, even after controlling for a host of personality and developmental variables (Kern & Friedman, 2009).

Summary of empirical findings

Arguments based on correlational studies, early intervention research, and Matthew Effects, do not strongly support the need for early reading instruction. Moreover, across the reviewed research, evidence indicates that an earlier onset of reading instruction by one to two years, whether this occurs at age three or five, leads to no advantage in long-term reading achievement. This evidence is drawn from at-risk and normally achieving samples, from a variety of curricula, countries, and languages. If the research question were expressed in the terms of a null hypothesis—the starting point of positivistic research—the conclusion would be that there is no evidence to reject the null hypothesis. According to that scientific convention then, the null hypothesis that early reading had no long term effect, would be upheld.

References

- Aram, D., & Biron, S. (2004). Joint storybook reading and joint writing interventions among low SES preschoolers: Differential contributions to early literacy. *Early Childhood Research Quarterly, 19*, 588–610.
- Bast, J., & Reitsma, P. (1998). Analyzing the development of individual differences in terms of Matthew Effects in reading: Results from a Dutch longitudinal study. *Developmental Psychology, 34*, 1373–1399.
- Blatchford, P., & Plewis, I. (1990). Pre-school reading-related skills and later reading achievement: further evidence. *British Educational Research Journal, 16*, 425–428.
- Bus, A. G., & van Ijzendoorn, M. H. (1999). Phonological awareness and early reading: A meta-analysis of experimental training studies. *Journal of Educational Psychology, 91*, 403–414.
- Coyne, M. D., & Harn, B. A. (2006). Promoting beginning reading success through meaningful assessment of early literacy skills. *Psychology in the Schools, 43*, 33–43.
- Ehri, L. C., Nunes, S. R., Stahl, S. A., & Willows, D. M. (2001a). Systematic phonics instruction helps students learn to read: Evidence from the National Reading Panel's meta-analysis. *Review of Educational Research, 71*, 393–447.
- Ehri, L. C., Nunes, S. R., Willows, D. M., Schuster, B. V., Yaghouh-Zadeh, Z., & Shanahan, T. (2001b). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36*, 250–287.
- Elley, W. B. (1992). *How in the world do students read? IEA study of reading literacy*. The Hague, Netherlands: International Association for the Evaluation of Educational Achievement.
- Gilliam, W. S., & Zigler, E. F. (2001). A critical meta-analysis of all evaluations of state-funded preschool from 1977 to 1998: Implications for policy, service delivery and program evaluation. *Early Childhood Research Quarterly, 15*, 441–473.
- Good, R. H., Gruba, J., & Kaminski, R. A. (2002). Best practices in using Dynamic Indicators of Basic Early Literacy Skills (DIBELS) in an outcomes-driven model. In A. Thomas & J. Grimes (Eds.), *Best Practices in School Psychology* (pp. 721–735). Bethesda, MD: National Association of School Psychologists.
- Hintze, J. M., Ryan, A. L., & Stoner, G. (2003). Concurrent validity and diagnostic accuracy of the Dynamic Indicators of Basic Early Literacy Skills and the Comprehensive Test of Phonological Processing. *School Psychology Review, 32*, 541–556.
- House, R. (2005). Childhood endangered: The government's curriculum guidance for the foundation stage - commentary and critique. In R. House (Ed.), *The trouble with education: Stress, surveillance and modernity*. Montreal: Ur Publications.
- Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology, 80*, 437–447.
- Kern, M. L., & Friedman, H. S. (2009). Early educational milestones as predictors of lifelong academic achievement, midlife adjustment, and longevity. *Journal of Applied Developmental Psychology, 30*(4), 419–430. doi:10.1016/j.appdev.2008.12.025
- Lazar, I., & Darlington, R. (1982). Lasting effects of early education: A report from the consortium for longitudinal studies. *Monographs of the Society of Research in Child Development, 47*(2-3), 1–151.
- Lonigan, C. J., Schatschneider, C., Westberg, L., & The National Early Literacy Panel. (2008). *Identification of children's skills and abilities linked to later outcomes in reading, writing, and spelling* (Developing early literacy: A scientific synthesis of early literacy development and implications for intervention). Jessups, MD.
- Lundberg, I. (2006). Early language development as related to the acquisition of reading. *European Review, 14*, 65–79.

- Lyon, G. R., & Chhabra, V. (1996). The current state of science and the future of reading disability. *Mental Retardation and Developmental Disabilities Research Reviews*, 2, 2–9.
- Magnusson, K. A., Ruhm, C., & Waldfogel, J. (2007). Does kindergarten improve school preparation and performance? *Economics of Education Review*, 26, 33–51.
- McNaughton, S., Phillips, G., & MacDonald, S. (2000). Curriculum channels and literacy development over the first year of instruction. *New Zealand Journal of Educational Studies*, 35, 49–59.
- Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly*, 19, 304–330.
- Nelson, G., Westhaus, A., & MacLeod, J. (2003). A meta-analysis of longitudinal research on preschool prevention programs for children. *Prevention & Treatment*, 6, Article 31.
- Parrila, R., Aunola, K., Leskinen, E., Nurmi, J., & Kirby, J. R. (2005). Development of individual differences in reading: Results from longitudinal studies in English and Finnish. *Journal of Educational Psychology*, 97, 299–319.
- Schatschneider, C., Fletcher, J. M., Francis, D. J., Carlson, C. D., & Foorman, B. R. (2004). Kindergarten prediction of reading skills: a longitudinal comparative analysis. *Journal of Educational Psychology*, 96, 265–282.
- Sénéchal, M., LeFevre, J., & Smith-Chant, B. (2001). On refining theoretical models of emergent literacy: The role of empirical evidence. *Journal of School Psychology*, 39, 439–460.
- Seymour, P. H. K., Aro, M., Erskine, J. M., & COST Action Network. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, 94, 143–174.
- Shaywitz, B. A., Holford, T. R., Holahan, J. M., Fletcher, J. M., Stuebing, K. K., Francis, D. J., & Shaywitz, S. E. (1995). A Matthew Effect for IQ but not for reading: Results from a longitudinal study. *Reading Research Quarterly*, 30, 894–906.
- Shinn, M. R., Shinn, M. M., Hamilton, C., & Clarke, B. (2002). Using curriculum-based measurement in general education classrooms to promote reading success. In M. R. Shinn, H. M. Walker, & G. Stoner (Eds.), *Interventions for academic and behavior problems II: Preventive and remedial approaches* (pp. 113–142). Washington, DC: National Association of School Psychologists.
- Stanovich, K. E. (1986). Matthew Effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360–407.
- Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*, 38, 934–947.
- Suggate, S. P. (2009). School entry age and reading achievement in the 2006 Programme for International Student Assessment (PISA). *International Journal of Educational Research*, 48, 151–161.
- Suggate, S. P. (2010). Why “what” we teach depends on “when”: Grade and reading intervention modality moderate effect size. *Developmental Psychology*, 46, 1556–1579. doi:10.1037/a0020612
- Suggate, S. P. (2011). Viewing the long-term effects of early reading with an open eye. In R. House (Ed.), *Too much, too soon? Early learning and the erosion of childhood*. (pp. 236–246). Gloucestershire, UK: Hawthorne Press.
- Suggate, S. P. (2012). Watering the garden before a rainstorm: The case of early reading. In S. P. Suggate & E. Reese (Eds.), *Contemporary debates in child development and education* (pp. 181–190). London: Routledge, Taylor & Francis.
- Suggate, S. P. (in press). The Parable of the Sower and the long-term effects of early reading. *European Early Childhood Education Research Journal*.

- Suggate, S. P., Lenhard, W., Neudecker, E., & Schneider, W. (in press). Incidental vocabulary acquisition from stories: Second and fourth graders learn more from listening than reading. *First Language*.
- Suggate, S. P., Reese, E., Lenhard, W., & Schneider, W. (2012, September 7). Language and literacy development as a function of whether children attend play-oriented kindergartens or formal school. Poster presented at the *Narrative, Intervention, and Literacy* conference, Paris.
- Suggate, S. P., Schaughency, E. A., & Reese, E. (2011). The contribution of age and formal schooling to oral narrative and pre-reading skills. *First Language*, *31*, 379–404. doi:10.1177/0142723710395165
- Suggate, S. P., Schaughency, E. A., & Reese, E. (2013). Children who learn to read later catch up to children who learn to read early. *Early Childhood Research Quarterly*, *23*, 33–48. doi:10.1016/j.ecresq.2012.04.004
- Vellutino, F. R., Tunmer, W. E., Jaccard, J. J., & Chen, R. (2007). Components of reading ability: Multivariate evidence for a convergent skills model of reading development. *Scientific Studies of Reading*, *11*, 3–32.
- Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development*, *69*, 848–872.