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The process of becoming literate unfolds gradually and idiosyncratically. Some children revel in written symbols, while others remain perplexed well into the elementary school years. Parents and the surrounding community are crucially influential in shaping the path through which literacy emerges. That influence includes overt efforts to nurture letter or word recognition, along with less tangible ingredients such as parental reading habits.

For the past two decades, family and community involvement in literacy training has been supplemented and often supplanted by educational television for preschoolers. The centerpiece of this effort has been "Sesame Street." Over the years, the program not only has generated a wealth of auxiliary teaching materials but also has spawned other educational programming, from "The Letter People" to "Reading Rainbow" and Bill Cosby's "Picture Pages." How does literacy emerge?

Children of all ages relish discovering needles in haystacks. Some of these buried objects dwell only in our minds - animal shapes in clouds, mythological figures in celestial constellations, an old man's profile in the rock face of a mountainside. Other objects actually exist - a camouflaged snake in the woods, a curious little fellow on a page in *Where's Waldo?* This search for hidden visual treasure drives imagination, artistic creation, and even the early stages of literacy.

The groundwork for literacy is laid in households before children utter their first word. Crib blankets, wall hangings, baby clothing, and toys are as likely to be decorated with letters or numbers as with bunnies or teddy bears. This initial visual

familiarity (heavily reinforced in the years ahead) gradually leads to recognition and eventually mastery, much as the early sounds and sentences directed at infants and toddlers slowly begin to make sense.

Sometime between first words and first grade, children typically learn the letters of the alphabet or kana, and the rudiments of counting. Unlike the natural enveloping presence of spoken language, the extent to which toddlers and preschoolers encounter writing depends overwhelmingly on conscious external nurturing. The stages and ages by which children connect sounds with squiggles are largely shaped by overt efforts from literate members of the child's immediate world.

Children's differing experiences with the familiar "ABC Song" illustrate how strongly the surrounding community influences children's mastery of the alphabet - the foundation of literacy in English. When I was growing up, few adults assumed children should learn to read before entering first grade. Kindergarten was optional, nursery school was the exception, and television broadcasting was mainly for adult audiences.

Today's children live in a world with much stronger early literacy expectations. As a result, they develop a markedly different relationship with the alphabet, or kana. Although teaching reading is still normally a first-grade activity, most first graders arrive with the rudiments of text decipherment already under their belt. Daylong nursery school and kindergarten programs have become commonplace, and ubiquitous television programming provides a ready medium for early instruction. Likely as not, today's middle-class 3-year-olds can recognize all letters of the alphabet and count to 15 or 20.

How do children come to know letters and numbers as individual entities? The growing torrent of alphabet books prods young book "viewers" to take the alphabet one letter at a time. Parents have a vast world of everyday print in which

to unearth letters and numbers. When my son Gene was young, I read out, character by character, the letters and numbers displayed on the back of buses. Some children spontaneously look for meaningful shapes in everyday objects. Children immersed in a world of letters and numbers easily discover symbols in everyday objects.

Recognizing letters and numbers as symbols requires two steps: paring sounds with squiggles, and then understanding what the squiggles stand for. For both letters and numbers, children generally connect up sounds with shapes before understanding what the symbols mean.

The second phase (attributing meaning) is conceptually simpler for numbers than for letters. "Number literacy" entails learning only one meaning principle, while "letter literacy" requires learning more sets of correspondences. With numbers, children need to recognize that any number symbol can represent a distinct number of objects. The only difference between "2" and "3" is the number of objects at issue.

In the case of letters, the symbol-meaning correspondence is far more complex. In fact, connecting up letters with sounds presents three distinct challenges for young learners. The first challenge is to learn that the name of a letter is not pronounced the same way as the sound the letter stands for. The symbol "E" is pronounced "ee," but the sound that "E" represents is "eh." Compare the situation with numbers. Number symbols (e.g., "7") have names and stand for objects in the real world, while letter symbols (which also have names) stand for disembodied sounds.

The second challenge with letter symbols comes in learning a different symbol/ sound pairing for each letter. While "E" is called "ee" - but represents the sound "eh" (as in pet) - the letter "I" is called "aee" and stands for the sound "i" (as in pit).

As if this were not crazy enough, children eventually need to learn that sound/symbol pairings are themselves elusive. The same symbol may represent more than one sound (e.g., \underline{a} pple and w \underline{a} s) and the same sound may be represented by more than one symbol (e.g., \underline{s} elf- \underline{c} entered). No wonder children have trouble learning to read English.

How can parents or preschool teachers help children bridge the gap between letter names and sounds? A vast array of teaching strategies has been developed for kindergarten and first grade. But now that preschoolers are increasingly introduced to the rudiments of literacy long before their fifth birthday, which of these strategies make sense for younger children? In contemporary times, the most effective guides are often not people, but puppets.

Television and Modern Literacy: The "Sesame Street" Generation

In the mid-1960s, television pioneer Joan Ganz Cooney and puppeteer Jim Henson forged a new kind of quality educational programming. The result of their efforts was "Sesame Street," a program originally designed for disadvantaged 3- to 5 -year-olds. Now more than forty years later, "Sesame Street" is a staple in middle-class homes across America and around the world.

The designers of "Sesame Street" set explicit educational goals: teaching about the physical and social environment, fostering a variety of cognitive skills, and perhaps fundamentally, building an understanding of symbolic representation. Eight goals were defined for teaching letters:

- * Given a set of symbols, either all letters or numbers, the child knows whether those symbols are used in reading or in counting.
- * Given a printed letter, the child can select the identical letter from a set of printed letters.
- * Given a printed letter, the child can select its other case version from a set of printed letters.

- * Given a verbal label for certain letters, the child can select the appropriate letter from a set of printed letters.
- * Given a printed letter, the child can provide the verbal label.
- * Given a series of words presented orally, all beginning with the same letter, the child can make up another word or pick another word starting with the same letter.
- * Given a spoken letter, the child can select a set of pictures or objects beginning with that letter.
- * The child can recite the alphabet.

"Sesame Street" has done more to redefine literacy goals for young children than any other single force since education became compulsory in America. Goals designed for 5-year-olds are frequently reached by 3- and even 2-year-olds. Viewers as young as 12 months may spend several hours daily watching intently, thanks to repeat programming, multiple Public Broadcasting channels, and recordable media. Such intense viewing from an early age can significantly accelerate the beginning stages of literacy.

Our son, Gene, was an early viewer, watching up to three hours of "Sesame Street" in a single day during his second year of life. Around age 18 months, Gene began counting to 10 and saying the alphabet by himself. He missed some numbers and letters (and many of the letters sounded the same, e.g., "S" and "X"). But as his phonology improved, so did his counting and alphabet. By 24 months, he had mastered most letters, and his counting skills were edging towards 20.

So was Gene exceptional? Not really. A study of children who began reading before age 4 (which Gene did not) reports that typically "the child had learned to read independently, largely as a result of watching 'Sesame Street'." A number of these children were regular viewers by age 1, and many watched the program up to two or three hours a day.

"Sesame Street" aims to teach preschoolers letters and numbers, not to teach them to read. With the exception of a handful of word vignettes (like a charming sequence on the word *exit*), the show concentrates on single letters (and sounds), sometimes presented individually, other times in words. While "Sesame Street" provides young viewers an early boost toward actual reading, we need to look elsewhere to understand the process by which children learn to decipher written words

Decoding the Written Word

In 1955, a freelance writer named Rudolf Flesch declared that American children were failing educationally because they weren't being taught to read properly. Instead of relying upon the whole-word approach (whereby children sight-read memorized words without decomposing them into parts), we should (Flesch argued) instill the phonic approach, through which children learn to sound out each letter in the word.

In the ensuing decades, the great literacy debate has raged over the relative merits of the whole-word versus the phonic approach. Depending upon whom you read, one side or the other comes out the clear winner. Nearly all the arguments have centered on appropriate pedagogies for children of elementary school age. But what about preschoolers? Should 4-year-olds be taught to sound out words? Does a 3-year-old "reading" each word in Dr. Seuss' *Green Eggs and Ham,* a book she has memorized, have any skills relevant to literacy?

Unlike orienteering with sound, meaning, grammar, and conversation (where strategies are primarily created by the children themselves), preschoolers' orienteering with written words typically reflects adult maneuvering (e.g., parents pointing to each word as they read a book, sounding out individual words slowly, asking the child to find a particular word on the page). Combining individuality with adult influence, children develop distinctive styles for coping with print before

actual reading begins.

Which strategy best fosters eventual reading: whole word, memorized text, or early decoding? The question itself is wrong-headed, for it presupposes exclusivity, homogeneity, and learning out of context. Most children draw from all three approaches although in different proportions. As children get older, their needs and interests change, and an orienteering strategy well suited to a 3-year-old often yields to a strategy more appropriate for a 5- or 6-year-old, especially if parents and teachers help nurture the transition.

Even as seasoned readers, adults do not rely on an exclusive reading strategy. We often need to absorb words quickly without analyzing them - making out highway signs as we zip by, scanning dictionaries. While as saturated readers we rely on decomposition skills to make sense of new words, whole word recognition enables us to handle the wealth of text that assaults us daily. The particular route by which children learn to read turns out to be less relevant than many specialists once thought. What about the *age* at which literacy begins?

The Doman Legacy: Does Age Matter?

Nearly sixty years ago, Glenn Doman, a physical therapist, wrote *How to Teach Your Baby to Read*. The book, which became a long-running staple in the parenting literature, argued that children as young as 2 or 3 have the capacity and motivation to begin learning reading, if only parents will help guide the process.

Doman's ideas about early literacy derived not from a desire to press children ahead academically, but from his professional wonderment why children's natural curiosity and ability were not being fostered. A member of a research team working with brain-damaged children, Doman found that severely brain-damaged children as young as 3 years old could learn to read. Doman logically reasoned that if brain-damaged preschoolers could be taught to read, surely neurologically intact preschoolers could as well.

In the years that have followed, early reading in children has become a family status marker among the upwardly mobile. Middle-class parents - and aspirants - have sought to teach their preschoolers to read. At the same time, with the crescendoing success of "Sesame Street," parents and educators have realized that nearly all preschoolers can understand a great deal more about letters, sounds, and numbers than previous generations of mainstream educators believed.

Does it matter at what age a child learns to read? Generally no. Intelligent children vary enormously in the age at which they are ready to encounter printed language seriously. Becoming literate requires a whole collection of skills: visual ability to distinguish easily between letters like b, d, and p; cognitive ability to relate the shape of a letter to its name and to the sound it stands for; patience to work through the linear decoding process. Learning to read also requires motivation. Preschoolers who know the alphabet, can identify the main sound associated with each letter, and can even recognize several dozen words may feel little drive to read on their own, especially if they enjoy being read to by adults.

Considering the range in normal speech development-with first steps in grammar coming anywhere between 15 and 30 months - it is hardly surprising that children vary widely in the age at which they start to read. Differences may reflect variation in physiological development, amount of home nurturing, or personality.

Should children be allowed to determine the age at which they are taught to read? While a number of preschoolers spontaneously begin deciphering words by age 3 or 4, other children do not settle comfortably into reading until age 7 or 8. Understandably, parents with children at the later end of the spectrum are prone to worry. When difficulties do arise, they are reported more often in boys than in girls. Problems in spoken language development (especially stuttering - again, a problem plaguing more boys than girls) often portend problems with early reading.

Is early reading a sign of inherent intelligence? Probably, but not necessarily.

Children who are early talkers do not inevitably score well on IQ tests. On the flip side, a significant (but indeterminate) amount of intelligence as measured by early speech or reading is itself a response to active nurturing by parents.

Does early reading, in turn, foster cognitive development? Of course. The printed word reveals boundless information about the world. Early readers cannot help but benefit from this head start. However, since the time interval between an early reader (age 4), and average reader (age 6), and a late reader (age 7 or 8) is only a few years, what matters most is not the age at which a child begins to decode text but the positive experience s/he has in encountering the written word. Learning to decipher someone else's words is a gradual process, reflecting both adult input and the individual child's personality. What about children learning to write their own words?

Like reading, children's writing is built up in several layers. The first is understanding that thoughts can be represented in a durable medium by creating marks on a page. The next level-far more complex-is grasping how that representation must be done.

This second level has both mental and manual dimensions. Cognitively, children must learn that letters (which sand for sounds) are the standard means for expressing words (which, in turn, represent ideas). Scribbles or even pictures cannot convey the same information or precision. Many preschoolers understand in principle that letters and words are the accepted currency for written language and demand that adults produce the same, even though the child is still at the scribbling stage.

Why scribbling for writing? The problem is largely motor control. Children below age 5 or 6 often lack the fine motor skills needed to form letters with any degree of ease. Many children learn to "write" (or, more accurately, "draw") their names by age 4 but find the process so difficult that they do not begin writing other

words for another year. Much of the story of how children learn to write is really an account of how they overcome obstacles of mechanical production.

Preschoolers learning to form letters typically pass through a series of stages that begin as drawing and end in language. Stage one-learning that marks on a page can represent objects (events, feelings) in the world (or imagination)- is part of the broader development of representational art.

Pictures that look like the things they stand for begin to appear somewhere between age 3 and 4. Younger children produce scribbles and lines, blobs and dots, which, to the adult eye, are flights of imagination, not pictures intended as representations. In the process, parents teach their children that marks on paper have specific meanings, just as many adults "teach" children their first spoken words by lending meaning to spoken babble.

A second stage in learning to write is recognizing that visual representation can convey not simply an idea but a linear narrative. Such narratives can tell stories or provide sequential instruction. A "backseat driver" since age 3, our son Gene was fond of giving directions to his parents as they set out in the car:

"You go down here. Then you turn that way. Then you go along that road. Turn right, and you're there."

By the time he was 3; 9, Gene began offering his directions "in writing." What looked like a maze of tangled lines was always accompanied by an articulate explanation of where his house was on the map, what sequence of roads to follow, and where the destination lay. For Gene, these maps (created before he had sufficient motor control to produce many letters) provided a natural transition from "snapshot" art (portraying a single scene at a time) to representation telling a story of how to move from one place to another.

In stage three, children actively form letters, but the forms are created as individual pieces of art, more like the initial letter in an illuminated manuscript than

a character of type. Gene's final transition to basic writing typifies this stage. Although he could identify all 26 letters by age 3, he did not begin crafting letters himself until a year later, just a month before he undertook representational drawing. The coincidence of the two activities reflects the growing development of fine motor control that underlies both skills. Not surprisingly, the first four letters Gene learned to form were "G," "E," "N," and "E."

Watching Gene produce these letters, what you saw was a young artist, not a young writer, at work. Gene's challenge was to produce four letters, each different, collectively presenting a myriad of straight lines and curves. Watching over Gene's shoulder during the initial months when he began attempting to construct his name, we get a sense of the artistic roots of writing. This "artistic" phase in writing is a direct response to the enormous effort children must exert in creating individual letters. But times are changing. Given modern technology - the first typewriters and now computers - letters can be produced with the flick of a finger, even a child's finger. How does the proliferation of contemporary writing technology alter the very process by which children learn to write and, derivatively, to read?

In simplifying the formation of individual letters, typewriters and computers enable children to forge a vital link between two otherwise out-of-phase language components: the rich spoken language skills they already possess and the still formidable system of writing that enables people to record what they have to say and to decode the written thoughts of others.

For centuries, the standard sequence for literacy instruction has been to begin by deciphering someone else's individual letters and words and only later learning to produce letters and words yourself. Throughout modern European and American history, many "literate" people knew only how to read, not how to write. Parchment (or paper) was very expensive, and the average person had no need to

produce written documents. Being able to read the Bible and to sign your name (on a will, a deed, or a marriage certificate) usually sufficed.

In modern pedagogy, the tradition of "read first, write later" has continued to be followed, although the two skills are usually introduced in tandem. First-grade classes have long focused on "deciphering" (reading) stories written by others - be they from McGuffey's Reader, the Dick and Jane series, or other artificially constructed text. First graders have also learned to form individual letters and words and even short sentences but have not been expected to produce extended written discourse.

The problem with this educational approach is how to motivate a child to read someone else's prose, especially prose far less sophisticated than the average 6-year-olds spoken language. The standard printed fare offered to contemporary American elementary school children is *basal readers*, books specially designed to introduce a controlled vocabulary and grammar, each year becoming progressively more sophisticated. Critics such as Bruno Bettelheim have lambasted basal readers for stifling young readers. Since the spoken vocabulary of the average first grader includes many thousands of words, how can you expect him to be interested in a book containing no more than 200 or 300 different words? And beyond the issue of constrained vocabulary and syntax, how do you motivate a child to decode someone else's story?

For several decades now, a growing number of educators, vexed by these dilemmas, have argued for reversing the order in literacy training. They suggest first recording a child's own stories and inviting her to read her own text. Leading the child to decode the stories of others comes later. Instead of beginning with reading and then turning to writing, children "write first, read later."

Since the average 5- or 6-year-old lacks sufficient manual facility to pen much continuous prose, how do we handle the initial transcription problem? One

obvious technique is to let an adult (or an older child) serve as scribe while the younger child tells her tale. In many classrooms (from first grade reaching down through kindergarten and even into preschool), teachers transcribe children's sentences and stories and then, especially with older groups, teach children to decode their own compositions.

With the proliferation of computers, children now come to "write first, read later" by recording their own stories themselves. Given the case with which a 4-, 5-, or 6-year-old can strike letters at a keyboard, young learners can record their personal tales up to two or three years earlier than their parents did when they learned to write. Commercial programs have enabled tens of thousands of kindergarten and first-grade children across the country to narrow the gap between speech and writing.

Do "write first, read later" programs work? Do they motivate children to write more and to read earlier than traditional approaches to literacy? "Writing to Read" has generally received excellent reviews, and teachers who use similar programs have reported good results as well.

A curriculum that encourages children to write early - whether on a computer, on a typewriter, or by hand - must assume a laissez-faire posture toward spelling. Learning to spell words correctly takes many years and constrains the amount of writing young children can turn out. (Just as many toddlers will not attempt to pronounce a word if they cannot say it correctly, normative spelling is one of the biggest impediments to young writers.) Although debates still range over the benefits or dangers of not stressing correct orthography from the start, the jury is leaning towards the verdict that stimulating early interest in producing and decoding written words is far more critical than inculcating early spelling habits. Once they are hooked on print, children make the transition to correct spelling fairly easily.

The past several decades have revolutionized possibilities for introducing

children to literacy. Television has brought "Sesame Street" to millions of children, fundamentally altering their relationship with letters, numbers, and sounds. Typewriters then computers have provided children with simple alternatives to laborious letter production, and in the process, many 5- and 6-year-olds have written extended text they then learn to decipher.

IDEAS AND ALERTS: HOW YOU CAN HELP.

Make reading to your child a dialogue, not a monologue.

Reading aloud to a child is as much an opportunity for conversation and exploration as for storytelling and exposure to the written word. Research suggest that when parents who are reading to their children pause to ask open-ended questions, to respond to children's questions, and to comment on the story, children become more advanced in their own spoken language.

Prepare to sacrifice some books to toddlers and young preschoolers.

When children initially get involved with books, torn pages and broken spines are commonplace. To chastise a 2- or 3-year-old for damage risks undermining the positive bond you are attempting to build between your child and books.

Play language games that facilitate reading and writing.

The possibilities for games that encourage word and letter decipherment are endless. Hundreds of ideas appear in "reading-readiness" workbooks and "better baby books", not to mention the techniques you concoct yourself. The best games are the ones your child likes to play.

Provide materials enabling children to form letters and words. Some children like paint or crayons on paper. Others initially prefer pre-formed letters (magnetic letters placed on a board, letter stencils, letters produced with a typewriter or a computer). Dictation games (either your child dictating words or letters to you or you dictating letters to your child) work well with many children.

Encourage but don't press your child to decipher and to write letters and words.

Just because children know the letters of the alphabet (and what sounds they make) hardly ensures they will decode letters in words on command. Similarly, though children may know how to write all 26 letters, they may not want to do so. Your child will be reading and writing for decades to come. Waiting another six to twelve months will do no harm.

Let preschoolers select at least some of their own books, at both the bookstore and the library.

The more involvement children have in selecting reading materials, the more likely they will become involved in the text, often memorizing the story and then decoding memorized words.

Model the reading and writing habits you want your child to develop.

Adults who genuinely enjoy reading (which is not the same as parents who read for a living or as an escape) cannot help but transmit their enthusiasm to their children. Many preschoolers have taught themselves to read upside down as they sit across from their mothers or older siblings who are reading.

COMMON PARENTAL CONCERNS.

My child seems to have difficulty learning to read. Is he dyslexic?

Dyslexia is a catch-all label for difficulties in learning to read and in reading fluency. As with specific language impairment, dyslexia is often the diagnosis given when other possible causes for reading disability have been eliminated. And again, as with specific language impairment, the occurrence of dyslexia is unrelated to intelligence. Prominent figures commonly cited as being dyslexic include Thomas Edison, Albert Einstein, Winston Churchill, and Woodrow Wilson.

It is estimated that between 5 and 15 percent of the population has some degree of dyslexia. Although particular symptoms (and their severity) may differ from one person to the next, dyslexics have general difficulty deciphering letters and

words. Dyslexics report that letters seem to move across the page and transpose themselves. Other symptoms can include "mirror writing" (that is, writing backwards), the inability to break words into their component sounds or to pronounce unfamiliar words, omission of syllables, or difficulty keeping track of your place when reading. Not surprisingly, dyslexics rarely become good spellers. Dyslexia is sometimes associated with delayed or disordered speech development, problems in motor development, and deficits in visual perception or temporal sequencing.

Dyslexia is a dysfunction of the central nervous system, probably caused by abnormal prenatal brain development. In normal language users, the left hemisphere of the brain becomes specialized for language, and he language area of the left side becomes larger than its counterpart on the right. In dyslexia, the language area in the right hemisphere grows as large as the one in the left and contains a greater number of brain cells than normal. Among the theories of how this abnormality arises are that an excess of testosterone is present during prenatal development or that the fetus suffers some kind of brain injury. Evidence of these brain abnormalities can now be seen using PET (positron emission tomography) scans, which reveal different patterns of electrical activity when dyslexics (versus non-dyslexics) are performing mental tasks.

Dyslexia may have a genetic root as well. Dyslexia often runs in families and has a higher occurrence in identical than in fraternal twins. For many years, dyslexia has been reported far more frequently in males than in females (a ratio of at least three-to-one), although recent studies suggest that reading difficulties in girls are actually equally prevalent.

Early signs of dyslexia typically surface when children are beginning to learn to read. The sooner the problem is diagnosed, the earlier intervention can be initiated and the better are the chances over overall success in school. By tracking eye

movement, we can now identify dyslexia in children as young as age 6. Such diagnostics can predict reading problems two years later with 90 percent accuracy.

One caveat: Do not be overly hasty in labeling a child dyslexic. Many of the traits typically associated with dyslexia-including letter reversals (e.g., confusing p for b), difficulty pronouncing unfamiliar words, and even mirror writing - are common in children learning to read or write, and some (such as letter reversal) frequently occur among normal adults. Before seeking outside help, consider whether the "problems" you notice are simply normal stages in becoming literate.

If a child has been delayed or has had difficulties in learning to speak, is he likely to have problems learning to read?

Between 5 and 10 percent of children suffer from some kind of developmental spoken language problem, and between 5 and 15 percent of children have difficulty learning to read. Many of these are the same children.

A variety of studies have reported that young children with speech and language problems are more prone to have trouble learning to read than their normal counterparts - up to six times more trouble. Several researchers have specifically linked problems with phonological development or with metalinguistic awareness regarding sound (e. g., being aware of rhymes, being able to break words down into syllables) to slow progress in reading. Other studies have found significant correlations between reading delays and slower attainment of such lexical and grammatical milestones as the age at which a child uses 4 to 6 words, uses 50 words, and combines two words together.

Since delays in spoken language development can arise from an abundance of sources (from prematurity to twinning, retardation, or specific language impairment), delayed speech does not necessarily portend difficulty in learning to read. However, if by age 4 or 5 a child's spoken language is not developing well, the possibility of a potential reading deficit is obviously greater.

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