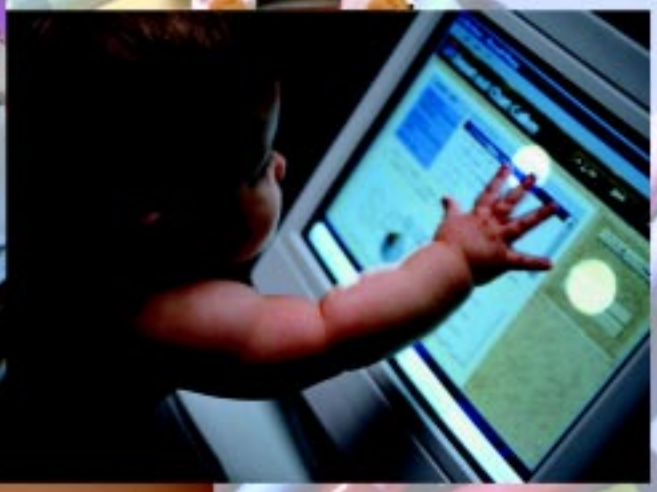
Will These Children Be Ready for School?



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August 1, 2000

Dear Friends,

What is Success?

Ralph Waldo Emerson's poem describes success as several things. " To laugh often and much…to win the respect of intelligent people…to leave the world a bit better whether by a healthy child, a garden patch, or a redeemed social condition." Success can be defined in many ways! Success in my professional life as a physician, teacher, and researcher means that I have improved the lives of patients, educated future health professionals, and advanced the field of child neurology. At home, success is defined differently and what matters is my family's well being and quality of life.

My wife Barbara and I had our first and only child in 1994. Alex arrived as a "premium" baby after 10 years of stressful and unexplained infertility. He has helped me be a more effective doctor in working with children that have difficult medical problems. He has given me a more complete appreciation of the complexities of brain development and application to school readiness. Because of his "success by six," I am more motivated than ever to leave the world a bit better for children. *Will these children be ready for school?* is written for parents, educators, health professionals, and policymakers. I am of the opinion that society should view Readiness for School as corporate America views Research and Development: necessary to sustain a long-term competitive advantage.

I wish to express my gratitude to my wife Barbara for the wonderful enclosed photographs of Alex at different developmental stages. As a family historian, she has consistently captured milestones in Alex's development. Moreover, United Way of Florida and Success by 6® deserve much credit for their strong advocacy for quality early education for all children.

Sincerely yours,
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Executive Summary

Children's activities in the first few years of life prepare them for a lifetime of learning. In fact, extraordinary changes take place in the child's brain well before kindergarten. Quality early education (home-based, nursery school, early intervention, pre-kindergarten) changes how the brain wires itself, and improves literacy and the ability to learn (Maria and Maria, 1998). In the long run, quality early education almost certainly decreases welfare, unemployment, and crimes against society. Because education in the first few years of life enhances the likelihood that our children will become productive members of society, the subject of school readiness has become a hot topic in Florida and the nation.

Children can enter kindergarten when they reach the chronological age of five or six years and they have met certain health requirements. The likelihood that they will be successful in this phase of "formal" schooling is increased when they have also reached certain milestones in physical development and in the following domains of function:

- social and emotional development;
- communication, language, and motor skills;
- cognition; and
- approaches toward learning.

Although there is general agreement on the domains of readiness, no systematic, uniform screening has ever been undertaken to assess the "readiness" of such a large and diverse population of children entering kindergarten. Florida, like many other states, is breaking new ground in this matter.

In 1999, the Legislature mandated the development of a uniform screening process for school readiness. To safeguard the appropriate use of such a screening process, it is important for parents, teachers, members of Florida's School Readiness Coalitions, legislators, and preschool caregivers to be well informed about key aspects of child development that affect school readiness.

This paper provides information that can assist in framing the question "*Will these children be ready for school?*" It presents the opinion that being ready for school results from the quality of a child's interactions with the environment and the significant adults in it. The paper can be viewed as a "technical assistance" resource for stakeholders in Florida's school readiness initiative as discussions proceed on how best to define school readiness. Ideally, it will contribute to motivating parents, caregivers and policy makers at all levels to take more responsibility for ensuring children are ready for a lifetime of learning and success.

This paper presents seven fundamental concepts that help define school readiness. The answer to the question, "*Will these children be ready for school?*" is rooted to a large extent in the degree of importance adults in the child's environment ascribe to each of the following:

1. The concept of school readiness should be considered a goal or set of expectations, not a standard. Screening results are only a snap shot when comparing abilities of different children at the same chronological age.

2. As the child's brain is directed by nature to wire itself for learning, a number of prenatal and perinatal factors, including nurturing, contribute to how the brain is formed and how well it functions.

3. The quality of caregiving in early childhood, a child's adaptational patterns, and environmental support between 12 and 42 months, influence school achievement well into adolescence.

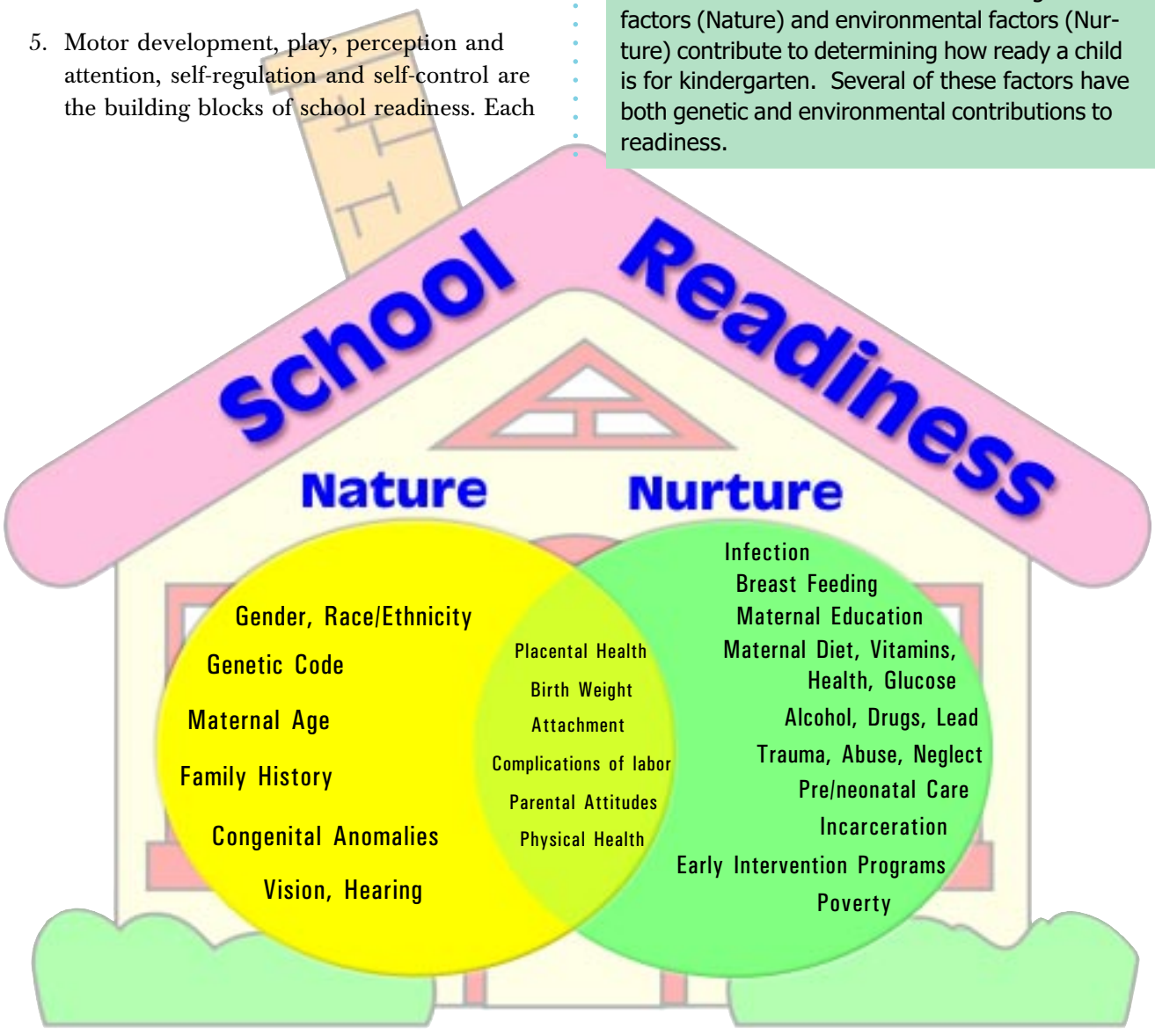
4. Research in child development indicates that secure attachment relationships provide a vital base from which to explore the world and maximize developmental progress.

5. Motor development, play, perception and attention, self-regulation and self-control are the building blocks of school readiness. Each is an essential part of the development of the whole child.

6. Children are natural scientists, constantly conducting research based on their internal drive to explore, question, and master the world around them.

7. Investing educational resources when the child's brain is most actively developing should yield the greatest long-term benefits to society by improving literacy, learning, and overall education.

Figure 1. Factors that have an impact on readiness for school. Note that a number of genetic factors (Nature) and environmental factors (Nurture) contribute to determining how ready a child is for kindergarten. Several of these factors have both genetic and environmental contributions to readiness.



Nature vs. Nurture: Prenatal and Perinatal Factors

The fewer the facts, the stronger the opinion. (Arnold H. Glasow)

More of the human genetic code is expressed in the brain than in any other organ, and nature has programmed extraordinary changes in the brain from conception to birth. At times before birth, up to 250,000 neurons are formed per minute from cell division. The neurons are genetically programmed to travel, or migrate, to specific layers and regions of the brain and make connections (synapses) with neighboring neurons. Although the precise mechanisms underlying the critical steps of cell division, migration, and synapse formation are still poorly understood at a basic level, neurons have made over 50 trillion synapses at birth. As the brain is directed by nature to wire itself for learning, a number of prenatal and perinatal factors, including nurturing, contribute to how the brain is formed and how well it functions (Figure 1). The developing brain of the fetus is vulnerable to various toxins such as alcohol and cigarette smoke. A deficiency in vitamins (e.g., folic acid) can result in malformations of the nervous system and learning disorders. Low birth weight and prematurity have the greatest impact on whether a child ultimately requires special education services. Conversely, quality prenatal and perinatal care may prevent birth complications and extreme prematurity and thus, best prepare the child for success in school.

A number of factors encountered after birth impact school readiness. A congenital defect in the lens of the eye (cataract) will affect development of the center for vision in the brain. Depriving the brain from sensory experiences, including vision and hearing, results in a decreased number of synapses in respective brain centers. From birth to age 3 years, there is normally a 20-fold increase in the number of synapses; by age 5 years, the brain has grown to 90% of adult size. Trauma, abuse, neglect, infection, and a number of other environmental factors are important determinants as to how the brain wires itself and, ultimately, how prepared the child is for kindergarten. It has long been suspected that sociodemographic factors are key to school readiness. New research has shown that poverty, male gender, low maternal education, single parenthood, and non-white race are factors that most significantly influence school readiness (Resnick et al, 1999). Clearly, there should continue to be strong support for programs such as Early Head Start and Even Start that target these populations of children at risk. Although quality early education has been shown to improve educational outcomes, it is important to recognize that a large number of factors impact readiness for school. In some instances, the deficits resulting from poor prenatal and perinatal care and poor nurturing may be difficult to overcome even with the best available quality early education. Often, quality early education experiences can ensure that a child is ready for school despite the liability of inadequate prenatal or perinatal care, and unfavorable sociodemographic factors.

From Knowing by Becoming to Becoming by Knowing

That first object he looked upon, that object he became. (Walt Whitman)

For the young child, the eternal questioning of the nature of the real is largely a wordless dialectic between the self and the world. (Edith Cobb)

Early knowledge acquisition is an awakening based on an acute sensory response to the world around children. The coincidence of knowing and being provide an exciting and joyous backdrop for early discovery. Even as adults, the full enjoyment of artistic representation often involves a deep personal identification with that art. Generally, however, we lose the ability to immerse ourselves into the objects and subjects of our perception. Early on we cease to learn by imagination and identification, and begin to define ourselves by what we have learned.

Figure 2. Playing Bubbles. Taking a simple activity such as blowing bubbles can tell us a great deal about maturation of the nervous system. Progressive and coordinated development of neural circuits in the occipital lobes (vision), frontal lobes and cerebelum (motor coordination), and limbic structures (social and emotional development) account for behaviors shown in Figure 2A (5 months), 2B (24 months), and 2C (60 months).

Children during the preschool period do more than learn new facts and acquire new skills (Figure 2). They undergo qualitative transformations in how they think and act (Sroufe, 1992). Preschoolers learn to have greater capacity for mental representation, using and manipulating symbols, utilizing expressive and receptive language skills, developing peer relationships, and identifying with parents. A child's self-esteem and ability to form relationships with others are key factors in the learning process.

It's Only Natural

Although the primary task of the oldest part of our brain, the brainstem, is survival, an essential element of survival is the thing for which the rest of our brain is best suited: learning. From birth, and in some domains before birth, our brains receive input from the environment and adapt development accordingly to maximize the likelihood of survival. Nearly all children, with the exception of the most severely impaired, are constantly learning. Beginning at birth, they acquire a sense of the world around them and learn to interpret the environment and communicate their needs. They learn the language of the people around them and the rules, mores, and customs of the society in which they live.

Age-appropriate preschool curricula focus on skill acquisition and on helping children develop the context for learning. Human development is an adaptive process of organization and reorganization of behavior through successive adjustments to the environment, based on changing physical and psychological demands. Future developmental success is built upon prior adaptational success (Bowlby, 1980; Sroufe, 1979; Teo, Carlson, Matheiu, Egeland and Sroufe, 1996; Carlson et al, 1999).

Then, why do some children have such difficulty learning in the school setting? We humans, like many other animals, actively participate in teaching our young. However, children depend on adults for much longer periods of child-rearing than in other species. It is only recently, however, that we as a

species have formalized the acquisition of culturally valued knowledge into an organized educational system. We now have assigned a wide array of knowledge and information to our children. Moreover, the method of sharing knowledge has changed significantly as we have evolved. We now have children in structured environments in which we ask them to learn by vicarious, rather than personal, experience. This may be the only way we can effectively pass on the vast amount of information necessary to succeed in today's world to so many children. However, because the method goes beyond our basic biological make-up, we must prepare children for this new culture, this new learning environment. How do we do this? What must we provide them to best help them be ready to learn in school?

Research in child development indicates that secure attachment relationships provide a vital base from which to explore the world and maximize developmental progress. In early development, children learn skills and values that may later be personally and academically generalized to different contexts and situations, through their relationships with significant adults in their lives.

We must acknowledge that, unless basic health care and economic needs are met, children will remain at risk for academic failure. Some issues will not be resolved until our society successfully addresses over-arching socioeconomic problems. One area in particular that demands attention is the home environment. Although provision of conditions that will ameliorate negative home environments, such as health, nutrition, housing, and employment, is beyond the purview of this paper, it is possible to provide parenting information that can improve the prospects for many children.

There's No Place Like Home

Parenting research suggests that secure attachment between parent and child provides the child with a fundamental base for exploring and learning about the world and has important long-term effects. Securely attached children have social, personal, and academic advantages compared with insecurely attached children. The quality of caregiving in early childhood, a child's adaptational patterns, and environmental support between 12 and 42 months, have been shown to influence school achievement well into adolescence.

In transition periods, such as infancy, toddlerhood, and during the preschool years, security of attachment facilitates individual development, including exploratory behavior, individuation and self-regulation (Baumrind, 1991). Once children leave infancy, parents begin to combine responding to a child's needs with demands for appropriate behavior. Children are trained to put away toys, say please and thank-you, use the toilet, and wait for mealtime to eat, among a host of other behaviors. The ways parents interact with children around issues of demanding and responsive parenting have been described as parenting styles:

- Demanding: the claims parents make on children to become integrated into the family whole by their maturity demands, supervision, disciplinary efforts, and willingness to confront the child who disobeys.

- Responsive: the extent to which parents intentionally foster individuality, self-regulation, and self-assertion by being attuned, supportive, and acquiescent to children's special needs and demands (Baumrind, 1991).

Dianne Baumrind described four parenting styles: authoritative, authoritarian, indulgent, and neglectful (Baumrind, 1971):

- Authoritative parents are highly demanding and highly responsive. They provide their children with clear standards for conduct, and monitor to see that those standards are followed. They are assertive but not intrusive or restrictive. Discipline is exercised, but methods are directive and supportive rather than punishing.

- Authoritarian parents are highly demanding but not responsive. In these homes, an orderly environment is provided and obedience and status are stressed. Children are provided with clear regulations and their behaviors are closely monitored to ensure that those standards are followed. These parents expect orders followed without question.

- Permissive/indulgent parents are more responsive than demanding. They tend to be lenient, don't demand mature behavior, and avoid confrontation.

- Neglectful/rejecting parents are neither demanding nor responsive. They do not provide structured environments, do not monitor their children's behavior, and are not supportive of their children. In some cases, they overtly reject their children and may neglect parental responsibilities.

Studies have shown a consistent outcome picture for these four parenting styles from early childhood through adolescence and into undergraduate postsecondary education (Baumrind, 1971; Steinberg et al, 1994; Dornbusch et al, 1987; Weiss et al, 1996; Glasgow et al, 1997; Leung et al, 1998). Children of authoritative parents achieve more positive outcomes in areas of psychosocial competence, academic achievement, lack of internalized distress, and problem behaviors. These children and adolescents have been found to have good self-regulation, high self-esteem, and an internal locus of control. Children raised in homes where parents are authoritarian, permissive, or neglectful experience fewer positive outcomes. They are less likely to be autonomous, self-reliant, and socially competent. Research indicates that, across ethnic groups, an authoritative style was associated with higher, and authoritarian and permissive styles associated with lower, grades (Dornbusch et al, 1987). Children of neglectful parents also demonstrated poor performance on standardized achievement tests (Baumrind, 1991).

More Than Meets the Eye

What aspects of development should be considered essential to school readiness? How should we consider development of mind and body? How can we consider development of the whole child?

Motor Development – Sound Mind – Sound Body

Although intellectual ability is generally understood as having to do with the mind, perceptual-motor development and play are related to later cognitive development. Movement is the primary medium of discovery during early development, and motor and sensory functions are closely related. Motor activity and play are not just ways to blow off steam, they are the forerunners of future intellectual and cognitive development (Wade, 1992). The development of motor skills enables children to increase sensory information and to learn about their environment. Fine motor development (small-muscle development, hand-eye coordination, ability to hold the writing tool, and the ability to make basic strokes) is the basis for later mastery of handwriting skills (Lamme, 1979). Motor development demands fundamental movement skills, physical fitness, and perceptual motor development (Poest et al, 1990). Motor development supports concept development, perceptual development, and representational competence, with the critical period for fundamental motor skill development from toddlerhood until age 6 or 7 (Charlesworth, 1996). Gross motor skills (activities using large muscles such as throwing, running, jumping, and pulling) precede fine motor skills (activities involving small muscles, such as stringing beads, construction building toys, drawing, and clay modeling) (Charlesworth, 1996). Motor development is also crucial to social development: A child who has mastered age-appropriate motor skills is more likely to participate in games and sports with other children.

Play – The Work of Early Childhood

Among animals, play develops and exercises physical skills that will later be valuable in adult life. Play also has social implications among animals. It teaches acceptable behavior and establishes social position. Among children,

practice play helps develop and exercise physical skills. Imaginative play more directly involves cognitive activity, such as symbolizing, anticipating, imitating, and problem solving. It also helps children develop their creativity and ability to think beyond the present and concrete. Social play helps children develop social skills, cooperative behavior, friendship, and conflict resolution. And, of course, play is fun, and children should have fun.

Perception and Attention

Until about age 5, children may become distracted or lose their train of thought when presented very arousing or conflicting stimuli. Their exploration is unsystematic and not detail-oriented. One critical aspect of perception is attention. Attention demands the ability to ignore less relevant information. Initially, infants attend to novel elements in the environment. Later, they develop the ability to choose or select objects of attention and avoid distracting or conflicting information. One of the problems inherent in attention deficits is the lack of ability to focus and inhibit the influence of distracting stimuli.

Self-regulation and self-control

One very important development in the preschool period is the ability to monitor and control behavior. This in part stems from the developing ability to self-regulate. These skills depend on ability to inhibit physical action, delay gratification, tolerate frustration, and adjust behavior according to situational demands (Sroufe et al, 1992). According to psychologist Eleanor Maccoby (1980), by the time children transition from preschool to kindergarten they should be better able to:

- Weigh future consequences when deciding action or behavior.
- Delay gratification.
- Stop and think of ways around obstacles to pursue a goal.
- Better control emotions and tantrums when goal-directed activity is blocked.
- Do more than one (simple, compatible) thing at a time.
- Better concentrate and block out irrelevant thoughts, sights, and sounds, and focus on means to a desired objective.

Infants and toddlers learn naturally from their parents and they absorb their environment. A child's motivation to learn or master new things benefits from encouragement. Children naturally respond well to success, and respond poorly to failure or inappropriate criticism. They learn through experience, constructing knowledge by interacting with the environment. They learn through manipulation and handling of concrete objects rather than through passive listening or use of workbooks (Charlesworth, 1996).

A Touch of Class

How can adults help children learn? Learning theorists include well-known figures in psychology, including Piaget, Vygotsky, Erikson, Freud, Rogers, Maslow, Gesell, Bandura, Sears, and Skinner. All approaches stress some degree of freedom and choice. Although views differ regarding the role of adults, something can be learned from each. Adults should:

- Give active encouragement by adult-developed, age-appropriate learning experiences.
- Provide support by direction and interaction.
- Provide emotional support, interpreting feelings, motives, and actions, and help the child understand and solve social problems.
- Guide the child through stages of growth, particularly during difficult times, by being understanding, tolerant, and calm.
- Provide rewards and reinforcements, and manage observable behavior.
- Serve as models of appropriate behavior.
- Set age-appropriate limits.
- Provide a safe but demanding environment in which children learn to develop boundaries between themselves and others.

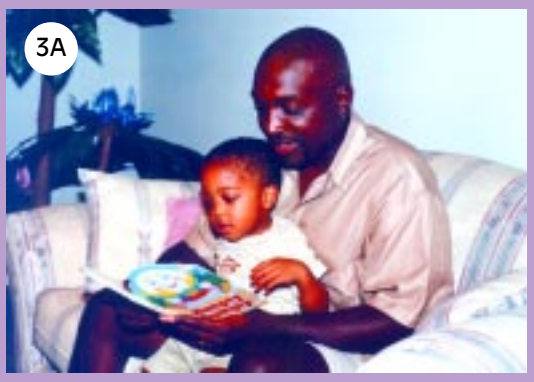


Figure 3. What you see is what you get. Early interest in books (Figure 3A; 14 months) is a key marker for later school readiness. Story reading sessions at home (Figure 3B; 24 months) increase the child's interest in printed materials and love of learning (Figure 3C; 60 months) in preparation for school.

- Encourage independence and initiative, experimentation, and exploration.

Children are natural scientists, constantly conducting research based on their internal drive to explore and question and master the world around them. Encouragement of exploration and experimentation emphasizes the development of critical thinking and problem-solving skills. Rather than focus on memorization, focus on thinking skills. Follow the "What is" question with "What else" to associate new and previously learned material. Encourage understanding of cause and effect with "What" and "Why," then imagination with "What if?" (Campbell and Arnold, 1988). Children also can be encouraged to work together in small groups to brainstorm and identify and try alternative solutions.

What You See is What You Get

Children from print-rich homes have the advantage of coming to school recognizing print, knowing how to handle books, recognizing the alphabet, being able to write their names, and knowing the use and format of letters, notes, lists, and other printed material. They also have had story-reading sessions at home, allowing them comfort and familiarity with the format and attaching a positive bias toward reading (Charlesworth, 1996). Children benefit from a variety of experiences with printed language (Figure 3). To encourage literacy, parents, caregivers, and early childhood educators can:

- Point out what they are doing while writing down children's dictation.
- Read, and have children read, their own dictation.
- Explain the use of printed materials, such as phone books, shopping lists, menus, greeting cards, books, and magazines. Have children use these materials in dramatic play.
- Model reading behavior by reading a book or magazine during the child's reading period.

- Have children read signs on outings on trips.
- Encourage the child to write and draw and label what has been produced.
- Point out letters in context, when writing a child's name, labeling a picture, or writing a letter.
- Provide various writing instruments and materials.
- Encourage children to write and accept what they produce regardless of its conventional quality.
- Provide props and printed materials to stimulate role-playing and story acting.
- Provide movable letters and encourage experimentation.
- Encourage children to write personally important words, such as their names or names of friends, pets, and family members.
- Let children write letters and greeting cards, make lists and labels, and write stories.
- Point out the print in familiar stories while reading.
- Write positive messages to children and leave for them to find.
- Encourage questions and discussions during story reading and relate the story content to the child's own experiences.
- Develop a parent education program to provide parents with tools to enhance learning at home.
- Encourage pretend reading by the child with familiar stories or books.
- Provide the child with many different kinds of reading materials.

(Modified from McGee et al, 1986)

A Place for Assessment and Testing

The nature of child development and learning is such that the creation of valid and reliable tests of ability is extremely difficult. Preschool children mature at different rates and come from a variety of cultural backgrounds. Their early experiences and the degree to which they have been exposed to testing sessions with adults they do not know vary considerably. Achievement tests have good predictive validity for children with mental retardation and for children who are gifted. However, intellectual tests for young children generally show a marked decline in predictive accuracy after two years (Peterson, 1987; Meisels, 1985). Although screening may be useful for identifying children in need of more comprehensive assessment, there are no measures reliable or valid enough to justify denial of entry to education or assignment to a special class, both of which may have far-reaching adverse consequences. Consequently, determination of school entry must be based on reaching the chronological age for school entry (NAEYC, 1990). As such, the concept of school readiness should be considered a goal or set of expectations rather than a standard. Screening can be considered a snap shot when comparing abilities of different children at the same chronological age.

Conclusions

As work progresses to develop uniform screening procedures applied when children enter kindergarten or first grade (i.e., entering public school for first time), including the screening of children with disabilities, active teamwork among parents, caregivers, and early childhood educators is the first step to preparing children for success in school. This team must ensure that children:

- Have *physical health* (immunizations, vision, hearing, and physical development) and *social behavior* (paying attention to stories, interacting with peers and adults, expressing needs, complying with rules);
- Love to *play and work* (expressive and receptive verbal skills, coping with challenges, using self-help and problem-solving

skills, performing tasks with curiosity, persistence, and exploratory behavior);

- Love to *learn* (participation in art and music activities, interest in printed materials, ability to identify colors, geometric shapes, letters of the alphabet, numbers, spatial and temporal relationships).

It is clear that investing educational resources when the child's brain is most actively developing should yield the greatest long-term benefits to society by improving literacy, learning, and overall education. In a system where multiple constituencies with important needs compete for limited resources, the ultimate question is what our societal commitment is to future generations. It will take vision and strong leadership to motivate caregivers, educators, and policymakers to invest time, effort, and money now in programs designed to improve the future standard of living and quality of life for our children.

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