

## **Sylvia O. Richardson Symposium on Language and Literacy**

From the Pediatric Practice to the Classroom: Early Identification of  
Children at Risk of Literacy Problems

November 10, 2022

IDA Conference - San Antonio, Texas

### **Monograph**

Selected Papers of Sylvia O. Richardson, M.D.





# IDA Monograph

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Forward:

This monograph was created by Dr. Joyce S. Pickering, Dr. Elsa Cardenas-Hagen and Dr. Eric Tridas. In reviewing the many scholarly articles that Dr. Richardson wrote, a selection was made of papers that describe the Language Bases of Reading and Writing and the use of the Montessori Method as an early intervention.

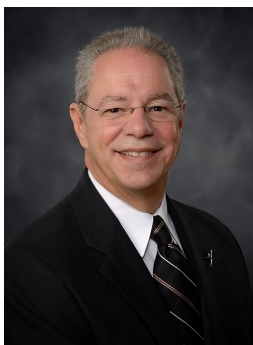
Dr. Richardson was a Speech-Language Pathologist, a pediatrician and a Montessori trained teacher. She recommended the Montessori method as an intervention for pre-school children at-risk for learning differences to Dr. Pickering, who has combined the Montessori method and Multisensory Structured Language Education (MSLE), approaches since 1970.



**Dr. Pickering**, is a Speech-Language Therapist, Qualified Instructor, Licensed Dyslexia Therapist and AMS Certified Early Childhood Montessori Teacher. She worked with Dr. Sylvia Richardson for forty-eight years. Sylvia guided Dr. Pickering to Montessori applied to children with learning differences.



**Dr. Cardenas**, a Speech Language Pathologist, an educator, author and researcher met Dr. Richardson through their work for International Dyslexia Association, (IDA). She has created a unique MSLE approach in Spanish.



**Dr. Tridas**, a developmental and behavioral pediatrician knew and worked with Dr. Richardson through the IDA and in their professional collaboration in Florida.



## SYLVIA O. RICHARDSON

Dr. Sylvia O. Richardson had degrees in both education and medicine, having received her B.A. from Stanford University, M.A. in Education of the Exceptional from Teachers College, Columbia University, and the M.D.C.M. from the Faculty of Medicine, McGill University. She received her training in Pediatrics from the Montreal Children's Hospital and from the Boston Children's Medical Center. In 1984 she was awarded the L.L.D. (Hon.) by Emerson College of Boston. She was also an ASHA certified Speech/Language Pathologist (CCC/Sp) and a Montessori primary teacher, certified by the American Montessori Society (AMS) and the Association Montessori Internationale (AMI).

In 1949 she established at Boston Children's Medical Center the first Speech-Language Clinic in any children's hospital in the United States. She was President of the American Speech-Language-Hearing Association (ASHA) in 1973-74. Chair of the Professional Advisory Board of the Learning Disabilities Association (LDA) for nine years, and President of the International Dyslexia Association (IDA) (formerly the Orton Dyslexia Society) from 1984-88. She was a member of the founding Board of Directors of the American Montessori Society in 1964. She was Chair of the National Joint Committee on Learning Disabilities from 1997-1999, and a member for 30 years. She was past President of the Multidisciplinary Academy of Clinical Education, and founding past President of the Florida Branch of the IDA. She came to Tampa from the University of Cincinnati, where she had been Associate Director of the Learning Disabilities Clinic at the Cincinnati Center for Developmental Disabilities. She was the public member of the International Multisensory Structured Language Education Council (IMSLEC) Board of Directors.

She was a pediatrician, known for her work in evaluation and management of children with language-based disorders. She was a well-known speaker and consultant, nationally and internationally. She contributed much to the literature of her field (over 100 publications), and her consultant appointments were at state, national, and international levels. She received many honors, including 1964 Oklahoma Woman of the Year, the Learning Disabilities Association (LDA) Learning Disability Award, the Honors of the American Speech-Language-Hearing Association, the Samuel T. Orton Award from the International Dyslexia Association, the Distinguished Alumna Award from Teachers College, Columbia University, the Rawson Lifetime Achievement Award from the International Dyslexia Association, the Arrowsmith Award from the New England Network for

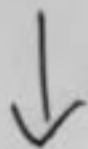
Learning Disabilities, the Pioneer Award from the Learning Disabilities Association, and the Pioneer Award from the International Dyslexia Association. She received the Luke Waites ALTA Award of Service, given to someone who has made a significant contribution to improve services received by dyslexic individuals.

Dr. Richardson was married for 45 years to William R. Richardson, M.D., Pediatric Surgeon. They had two sons and six grandchildren.

## **Introduction**

# Learning Disorder

dis. in process by  
which sensory info  
comes to have meaning



Lang. Disorder = (not related to  
perception)

Assoc. impairment of language  
cognitive learning + use

~~Defects~~ < Percept<sup>n</sup> independent of  
Lang. functions.

Dyslexia

Specific reading disability

Not mutually exclusive



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## Learning Disorder

Dysfunction in process by which  
sensory info comes to have meaning



## Language Disorder

→ (not related to  
perception)

Associative  
&  
Cognitive  
deficits



Perception independent  
of language functions

## Dyslexia

Specific reading disability

Not mutually exclusive

# 'First Lady' Of OU Center Resigns Post

By Mary Jane Schier  
(Medical Writer)

Oklahoma City's "first lady of child guidance" officially announced her resignation Friday as director of the Child Study Center.

Although cited near and far for her multiple accomplishments while heading the center, Dr. Sylvia Onesti Richardson insists she doesn't have any special secret for success.

"I just love children," she will tell you.

## Jobs Numerous

And that simple, sincere statement, in part, explains why Dr. Richardson has worked hard to intertwine and balance her careers — as a wife, mother of two pre-teenage sons, pediatrician, child problem diagnostician, parental counselor, professor, popular speaker and frequent author.

She is best-known for her efforts in developing the Child Study Center, established in 1958 by the University of Oklahoma Medical Center's pediatrics department.

## Pioneer Role

As director of the facility, Dr. Richardson has supervised pioneering efforts in providing community diagnostic and guidance services for mentally retarded children.

"These kids have become very dear to me and it certainly won't be easy to leave 'my' children," the slim, attractive brunette director admitted this week.

## Husband Transferring

Leaving will be necessary, however, in late June when her husband, Dr. William R. Richardson — "the better half" — of the Richardson medical team, will begin new assignments in Cincinnati, Ohio.

During the 7½ years the Richardsons have been in Oklahoma City, he has headed the pediatric surgery department at the OU medical center, having been the first pediatric surgeon at Children's Memorial Hospital.

## Cooking Next

In Cincinnati, he will practice surgery and teach his medical specialty at Children's and Good Samaritan Hospitals and his wife will be a clinical professor of pediatrics at the University of Cincinnati Medical School starting in the fall.

"Actually, I'll be semi-retired from professional activities until my husband and the boys get really settled . . . and I learn to use

properly," she noted.

The boys are Chip, 12, and Chris, 11, both of whom apparently take their mother's careers in stride, although Chip once told a friend that his father was "the real doctor" in the family.

But Chris, when informed that she would be home for awhile after the family moves, quickly assured her, "gosh, Mom, don't worry, somebody will give you a job."

## 50 Percent Retarded

In addition to directing the Child Study Center, Dr. Richardson has been assistant professor of pediatrics and psychiatry at the OU Medical Center, served as special consultant to five national and state agencies, held assorted posts with several professional organizations, given dozens of lectures and papers on aspects of special education, written articles for pamphlets, magazines and books and received various awards for her accomplishments.

Of the several hundred youngsters sent to the Child Study Center by private physicians and school personnel, more than 50 percent have been diagnosed as mentally retarded.

## Help Needed

"Yet diagnosing them is only the beginning. There is still so much more to be done to help the parents accept and adjust to our findings," Dr. Richardson observes.

Establishing an evaluation nursery at the center has meant Dr. Richardson and her professional team have been able to discover the mentally retarded and those with other disabilities much sooner.

The real key to improving diagnoses and securing earlier treatment, she points out, is continued realization that education must go hand-in-hand with medicine in seeking solutions to mental retardation problems.

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Dr. Sylvia Richardson . . . "I just love children."

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“The search for cause (diagnosis) is referred to as ‘differential diagnosis’. Whenever any one of several disorders might be the cause of a condition (delayed speech and language development in this case), the careful ruling out of all possible etiological alternatives is required.”

Sylvia Richardson



Students participating in and articulation an oral language development lesson.



## DIFFERENTIAL DIAGNOSIS IN DELAYED SPEECH AND LANGUAGE DEVELOPMENT

Sylvia O. Richardson, M.D.

### HISTORICAL OVERVIEW

In order to understand where we are it may be useful to describe briefly where we have been. Currently students of speech-language pathology in the U.S. utilize a frame of reference quite different from that of their predecessors. The concept of causality or the use of diagnostic terms such as etiology are no longer "in vogue" as they were in the 1940's and earlier. At that time we were taught that delay or disorders in speech and language must be traced to their causes.

The search for cause (diagnosis) is referred to as "differential diagnosis." Whenever any one of several disorders might be the cause of a condition (delayed speech and language development in this case), the careful ruling out of all possible etiological alternatives is required. To make a differential diagnosis it is necessary to gather ample case history information and to examine and assess signs and symptoms, or behavior, thoroughly. The final or correct diagnosis will delineate the cause of the condition. The information obtained during the course of determining the diagnosis can be helpful in the choice of treatment and in the determination of prognosis as well. For example, in the case of a child with delayed development of speech due to noxious environmental conditions, etiological factors extrinsic to the child, the treatment would be directed to those factors and would be different from that of a child with a neurological disorder such as dysarthria.

Unfortunately, there is an assumption among many professionals outside of medicine that to make a diagnosis is unrelated to intervention or treatment plans and, they fear the danger that labeling will be accompanied by

self-fulfilling prophecy. This argument has been prevalent especially since the advent of the behavioristic and linguistic emphasis in the field. It may be justified in the cases where clinicians, teachers and parents have assumed erroneously that a neurological impairment is a "hopeless case." However, as indicated earlier, the process of determining a diagnosis can lead to hypotheses about how the child might learn language, and the kind of help he will need. The point of the diagnosis is to enable the practitioner to prescribe appropriate therapy for the presenting conditions, including those which are non-organic or psychological.

Thirty or forty years ago speech therapy was directed more toward articulation and voice disorders than to language disorders. In those days we thought more about phonation, phonology, articulation, fluency, and group interaction than about linguistics, which is the nature and structure of human language.

In the fifties we spoke of the mean length of response (MLR), first described by Margaret Nice in 1925 in her article on "Length of Sentence as a Criterion of Children's Progress in Speech." This was more fully developed in the analysis of spontaneous language samples (McCarthy, 1930; Johnson, Darley & Spriestersbach, 1952). Norm-referenced analysis also included such indices as type-token ratios, or the percentage of occurrence of the various parts of speech and the number of different words in the speech sample (Templin, 1957).

We learned to look for a child's preferred sensory modality to determine whether an auditory, visual, tactile, or kinesthetic approach would be most useful in therapy. Backus and Beasley (1956), even at that time, taught some of us to provide intervention within communicative contexts.

However, our intent was primarily toward the establishment of a diagnosis. The differential diagnosis of delayed developmental speech and language included mental retardation, deafness, autism, childhood schizophrenia, and aphasia. The so-called functional causes, those extrinsic to the child, had to be ruled out also. Therefore, assessment included careful history taking and examination of hearing, the articulatory apparatus, the child's intellectual and emotional status, and the central neurological processes concerned with language.

In the 1960's the interests of the speech-language pathologists focused increasingly on standardized tests, measurement and quantification of deficits. The earlier informal observations and assessments gave way to standardized measures of syntax (Berry, 1966; Carrow, 1968; Foster, Giddan & Stark, 1969; Lee, 1970).

In special education, particularly due to the increasing awareness of children with learning disabilities, emphasis grew on "teaching to the child's strengths"--or weakness, depending upon which camp one chose to set up one's remedial tent. The notion of strengths and weaknesses took hold in the field of speech and hearing. Intervention goals were directed toward those abilities deemed necessary for language to develop and/or the actual language behaviors observed. We spoke of process dysfunction or we analyzed the phonological, syntactic and semantic aspects of the linguistic behavior.

Skinner (1957) and the behaviorists exerted a strong influence on the behavioral analysis base for research and intervention theories related to the process of language. Diagnosis became unimportant since the members of this school of thought believed that a diagnosis such as aphasia, for example, would not assist in prescribing appropriate treatment for a child.

They considered language in terms of its controlling factors that could be quantified--factors such as antecedent and consequential stimuli.

Learning theorists of the time focused their analyses of the learning process according to the explanation they wished to offer to account for changes in behavior. The new lexicon included such terms as: "appropriate response," evidence that learning has occurred; the "stimulus," that to which the organism responds as a result of "attention"; "motivation," the reason for the response; and "reinforcement," the feedback which was considered essential for learning to occur.

The behaviorists influenced the course of intervention strategies, and behavior modification techniques flourished. The educational programs for children with verbal language problems required planning for each child even though the children may be grouped together in a classroom for remediation (Bangs, 1968; Strauss and Lehtinen, 1947; Johnson and Myklebust, 1967; McGinnis, 1963; Bereiter and Engelmann, 1966). Unfortunately, the true behaviorist's technology led to task-analysis of the adult's perceptions of the language behaviors. How the child develops language was ignored.

At the opposite end of the pole, but in the same time frame, Chomsky (1957) and other linguists focused their attention on the syntactic structure of language and brought another lexicon to the field of communication disorders. They brought a new perspective on grammars and their use. They referred to the grammars they built as generative, the rules of which account for, or must be capable of, generating every conceivable sentence of a language that is considered by its native speakers to be grammatical, or well-formed. A generative grammar is the only type of grammar that describes the facts of language and also tries to explain them. It not

only describes and explains a speaker's linguistic "output," it tells us about that speaker's understanding of language. Essentially it attempts to describe part of human mentality.

Generative grammar contains necessary analytical rules to show how sentences are constructed, or generated. There are rules for phrase-structure, which account for the basic structures of English and for the main grammatical relationships such as subject-verb and verb-direct object. A second kind of rule to this grammar is the transformation, which applies to whole structures rather than units. Transformations may add to or subtract from structures, substitute or change the order of elements within a structure, or may combine two or more structures to create complex ones, etc.

The structures in a transformational grammar may be "deep" or "surface," the first representing basic meaning and the second being responsible for the sound of the sentence, such as stress or intonation. Thus, a generative grammar with transformational rules provides a model of what every native speaker knows. However, neither the behavioral approach nor the transformational grammar approach tells us how the child learns his language, neither addresses the cognitive and social bases for language learning, neither provides a clinician with a picture of a human child.

The sixties were difficult years for many clinicians, but they stimulated research. The predominant and polarized theories of language during that period reflected a limited view of both language and children, satisfying perhaps to the researcher but frustrating for the child-oriented clinician. The transformational grammar base, which underlies much treatment and research, considered language only in terms of its structural

grammar rules. The behavioral analysis base for research and treatment techniques considered language only in terms of its quantifiable stimulus-response rules. In order to work with children, the clinician usually prefers to start from the child's vantage point.

Menyuk (1964) fortunately did focus on the child and language-impaired children. Bloom (1967) made the next step forward by stressing the need to consider context and content, the semantic aspects of language--essentially what the child means when he talks and what he understands when he listens.

The 1970's have been characterized by consideration of the context and content of the child's language, why and how he uses it. As a result, we now look at pragmatic and semantic aspects--content, form and use (Bloom & Lahey, 1978; Lucas, 1980). New measures of expressive language were developed. Individual tests now include receptive and expressive tasks in vocabulary, phonology, syntax and semantics. The emerging cognitive/semantic position appeals to clinicians because it relates to an older developmental philosophy that language develops as the child interacts with his environment. This also indicates a more developmental approach to intervention than behavior modification. Assessment has become more child-oriented with the clinical focus on pre-linguistic behaviors. A sequence of Piagetian tasks, for example, can be used in a variety of standardized ways to assess cognitive development in the sensory motor period (Uzgiris & Hunt, 1975; Mehrabian & Williams, 1971).

Nelson (1974) has developed a conceptual model for language acquisition that holds great promise. She puts forth the notion that language is a direct reflection of the child's cognitive processes. In other words, children talk the way they do because that's the way they think.

Language acquisition is approached according to a transactional model by the McLeans (1978). This model consists of three major interacting components--cognitive, social and linguistic. They suggest that the child acquires language through interactions with his environment and that from these interactions he derives cognitive and social bases which underlie his mastery of the linguistic code.

There have been many changes in the way we have looked at children with speech and language problems over the past forty years. Most of the current literature addresses the form, content and use of language, well-larded with the terms phonology, syntax, semantics and the pragmatics of language. Studies of language acquisition have increased in number. Differential diagnosis of language delay and disorders is no longer a search for etiologies but rather standardized testing of linguistic forms and non-language behaviors in order to plan intervention. Language intervention or training programs have multiplied almost logarithmically and they reflect a large number of disparate theories which have sprung from representatives of many different disciplines: linguistics, psycholinguistics, psychology, neuropsychology, education, special education, speech-language pathology and audiology.

Yet, withal, the parents of a child with delayed language development demand to know "Why can't he talk? What caused this?" The physician, who is usually the first specialist to see the child will be expected to make a diagnosis and recommendations for treatment and/or further evaluation. The public schools require a diagnostic label in order to place a child in a specialized program. Therefore, we will proceed to a discussion of the current status of differential diagnosis.



## CURRENT STATUS OF DIFFERENTIAL DIAGNOSIS

The differential diagnosis of delayed speech and language development today is essentially the same as forty years ago, although certainly our knowledge of language and its development has grown a great deal. One looks first at what a child needs in order to develop his language: (1) intact hearing; (2) intellectual adequacy; (3) emotional stability and a desire to interact and communicate with others; (4) integrity of the central nervous system; and (5) adequate exposure to good language. Interference with any one or more of these factors can cause an impediment to the appropriate development of language.

### Hearing Loss

Speech and language delay due to hearing loss is related to the type of hearing loss, the time of onset, and the degree of severity. When a profound hearing loss is present at birth or before a child would normally develop speech, the child would have much more difficulty in acquiring speech than would a child whose hearing loss occurred after language was acquired. The child with hearing loss may also have difficulty with articulation and intelligibility. Deafness from birth, or at a prelingual stage, has three major consequences for a child: differences in preverbal experiences from those of a hearing child, lack of development of verbal language as a means of communication, and resulting modification in personal, social and emotional development (Wolfson, Aghamohamadi & Berman, 1980).

Every child with speech and language delay must have a thorough audiological evaluation conducted by a certified audiologist. This must include assessment of auditory sensitivity, speech discrimination and middle ear function.



In the United States many states are conducting routine hearing screening for all "high risk" infants. The Joint Committee of the American Academy of Pediatrics, the American Academy of Ophthalmology and Otolaryngology, and the American Speech-Language-Hearing Association (Pediatrics, 1982) lists the "high risk" factors as: history of hereditary childhood hearing impairment; rubella, or other non-bacterial intrauterine fetal infection (e.g., cytomegalovirus or herpes infection); defects of ears, nose or throat, including cleft lip or palate, or any residual abnormality of the otorhinolaryngeal system; birth weight below 1500 grams, and serum bilirubin greater than 20 mg/100 ml. Infants having any one of these findings should be referred for in-depth audiological evaluations during their first two months of life and, even if hearing appears normal, they should receive regular hearing evaluations thereafter. Careful prospective studies of these infants could yield valuable data on language development.

In recent years, a number of research studies have reported the existence of communication problems in children who have experienced repeated bouts of recurrent otitis media (middle ear infections). There has been a growing concern that this condition, often accompanied by intermittent conductive hearing loss, may have long-term effects on children's language/learning abilities.

Paradise (1980) in an excellent review article on otitis media in infants and children, points out that moderate hearing impairment, if persistent throughout much or all of early childhood, probably can result in impaired cognitive and language function and in disturbances in psychosocial adjustment. However, he points out the inconsistency of research focus from one study to another, depending upon the professional expertise

of the experimentors. This is most marked in the various studies which attempt to establish the existence of learning problems in children with recurrent otitis media.

Paradise states that "in view of the uncertainty that any causal relationship exists between early, transient hearing impairment and later developmental status, it seems particularly regrettable that uncritical statements averring such relationships have been widely disseminated by the lay press (Newsweek, June 14, 1976, p. 47; New York Times, December 26, 1978, p. C2). Nonetheless, it does seem possible that in early life, critical or sensitive periods exist during which both auditory stimuli and auditory perception must be at optimal levels if there is to be full realization of the potential for later language, intellectual, and emotional development. The issue remains a crucial one for investigation."

### Mental Retardation

The American Association on Mental Deficiency (AAMD) classifies individuals as profoundly, severely, moderately or mildly retarded, a system based on the normal distribution of intelligence. In general, the more severe diagnoses of mental retardation are related to biological defects associated with central nervous system abnormalities and multiple handicaps. Mild to moderate diagnoses of mental retardation are usually associated with a myriad of factors such as heredity, noxious environments and/or psycho-social deprivation.

Assessment of motor, language, adaptive and social development may demonstrate significant delay in all areas. Delay in speech and language is rarely seen as an isolated disorder in the mentally retarded child. The cognitive deficit presented here is the cause of the communicative disorders,

which may include difficulty in articulation, intelligibility, comprehension and the use of language (Lassman, et. al., 1980).

### Infantile Autism and Childhood Schizophrenia

The two syndromes in the area of childhood psychosis that have stood the test of time are Kanner's (1943) early infantile autism and Potter's (1933) childhood schizophrenia. There is a current state of transition with regard to diagnosis, as seen in the third edition of the Diagnostic Statistical Manual of Mental Disorders (DSM III, 1980). The diagnostic criteria have been updated in the light of recent research and psychotic disorders of childhood are now classified as "pervasive developmental disorders." This change seems to reflect a shift in emphasis from psychogenic to biological variables as etiological factors.

The 1977 DSM II did not include autism as a separate diagnosis but included "childhood schizophrenia with autistic features." The DSM III does include infantile autism as a diagnostic category and has made changes in childhood schizophrenia. The DSM III criteria for infantile autism are:

1. Onset prior to three months.
2. Pervasive lack of responsiveness to other human beings, evidenced in infancy by failure to cuddle, by lack of eye contact and facial responsiveness, and by indifference or aversion to affection and physical contact. Some or all of the above may persist throughout childhood.
3. Gross deficits in language development, including mutism in some children and, in others, immature grammatical structure, immediate or delayed echolalia, pronominal reversals, nominal aphasia, the inability to use abstract terms, and abnormal speech melody. Non-verbal means of communication, such as appropriate facial expressions and gestures, are lacking.

4. Bizarre responses to various aspects of the environment, such as resistance to changes in the environment, attachment to odd objects, ritualistic behavior, or fascination with movement, music, or specific objects.
5. Associated features, which may include labile mood; under-responsiveness or over-responsiveness to light, sound, or pain stimuli; lack of appreciation of real dangers; stereotyped, repetitive behavior; or self-injurious behavior.

Although these criteria express the essential features of autism most likely to be agreed upon by researchers and clinicians, they rely on clinical judgement rather than on objective data to define each feature. Each criterion allows a wide variety of behaviors to qualify as examples. However, this may be a more useful list of features than described in earlier editions.

Evidently, childhood schizophrenia will not be considered as a nosological entity in the future. The term does not appear in the DSM III. Schizophrenic disorders occurring in children from the age of 12 years onward will be classified in the future with adult schizophrenia. Younger children who would have been called schizophrenic now come under the rubric of "childhood onset pervasive developmental disorder." The DSM III criteria for this condition are the following:

1. Onset after three months and before 12 years.
2. Gross and sustained impairments in emotional relationships, e.g., lack of appropriate affective interaction, inappropriate clinging, asociality, and lack of empathy.
3. At least three of the following conditions:
  - a. Acute, excessive and seemingly illogical anxiety.
  - b. Diminution, rigidity, distortion, and peculiarity of affect.
  - c. Sustained resistance to change in the environment.
  - d. Alterations of behavior consisting of peculiar motility disturbances, including hyperactivity and hypoactivity, peculiar posturing and peculiar hand or finger movements.
  - e. Speech abnormalities such as question-like melody or monotonous voice.

- f. Abnormal sensory and perceptual experiences seen in over-sensitivity or under-sensitivity to sensory stimuli.
  - g. Self-mutilation such as biting, hitting, severe head-banging.
4. Associated features, which may include bizarre beliefs, ideas, and fantasies without insight; preoccupation with morbid thoughts or interests; or bizarre use of objects.

This diagnosis presupposes a period of normal development and assumes the absence of static or degenerative neurological conditions. It is therefore important to determine, through careful history and evaluation, that language, social and play behaviors actually did occur at age-appropriate levels before onset of "childhood schizophrenia."

Language abnormalities of autistic children are noticeable at an early age. As infants they may not babble and they may fail to imitate. They will show receptive and expressive deficits, and inability to follow simple demands unless they are accompanied by gestures and occur in familiar situations. The deficit is both semantic and syntactic. There is impoverished use of gesture and inflection. Approximately fifty percent of autistic children never gain useful speech. Those who do learn to speak may demonstrate immediate echolalia or something heard hours or days before, as in delayed echolalia. Autistic children are usually poor in talking about things outside of the immediate environment and often exhibit immature grammatical forms. The more verbal children tend to attach idiosyncratic meanings to words and can create unusual metaphors (Rutter, 1965 & 1978).

"Schizophrenic" children frequently can be identified by their unusual language. They tend to deviate significantly from normal speakers in phonation, rhythm and articulation. They utilize stereotyped speech and a

great deal of repetition. In general, the language of "schizophrenic" children is characterized by poverty of speech, lack of questions and informative statements, idiosyncratic word meaning, limited comprehension, and inadequate use of gesture.

Both "childhood schizophrenia" and autism, especially because of the timing and the higher incidence of the latter, must be considered seriously in the diagnosis of language delay, since the diagnosis will indicate the necessity of psychiatric therapy as well as language intervention.

#### Developmental Disorders of Children

In the DSM III, delayed language acquisition is coded as one of several diagnostic options among developmental disorders of children. The 1980 edition of the DSM is the most current medical statement relative to differential diagnosis of speech and language delay, and it presents the following diagnostic options for developmental disorders in children:

1. Attention deficit disorder.
  - a. With hyperactivity.
  - b. Without hyperactivity.
  - c. Residual types.
2. Developmental reading disorder.
3. Developmental arithmetic disorder.
4. Developmental language disorder.
  - a. Expressive type.
  - b. Receptive type.
5. Developmental articulation disorder.
6. Mixed specific developmental disorder.
7. Atypical specific developmental disorder.

It is evident that the above conditions are not mutually exclusive and that within each category there is need for further differentiation and description of signs (behaviors) to assist our understanding.

### Developmental Language Disorders

The DSM III recognizes three types of language disorders: (1) failure to acquire any language, which is said to be rare and virtually always a result of profound mental retardation; (2) acquired language disorders, which are said to be usually the result of trauma or neurological disorder; and (3) delayed language acquisition or developmental language disorder, which is said to be the most common type of language disorder involving difficulty in comprehending oral language (receptive type) or in expressing verbal language (expressive type). The DSM does not include disorder of inner language, or what has been called central or global aphasia.

The DSM III (p. 95) states: "these conditions have each been referred to as developmental aphasia, but this is technically not correct, since aphasia means loss of language that has already been acquired." This reasoning has been put forth for as long as I can remember in the fields of speech-language pathology and medicine. However, the same argument may well apply to the use of the terms alexia and agraphia. Hence, there are many who refer to these conditions in children as developmental dysphasia, dyslexia and dysgraphia, disorders of verbal and written language.

The descriptive characteristics of expressive developmental language disorder include failure to develop vocal expression of language while understanding or decoding skills remain relatively intact; generally immature articulation; severe restriction of vocabulary; and inability to generate more than short phrases. Associated features indicate that learning may be impaired, particularly in tasks involving perceptual skills or skills in recognizing or reproducing symbols in the proper sequence.



In children with developmental articulation disorders, expressive language (vocabulary and grammar) is within normal limits. General impairment of intellectual functioning occurs with mental retardation, whereas the child with expressive language disorder has intelligence within normal limits. With a hearing impairment, a child does not have a normal audiogram and does not respond normally to sounds, whereas audiogram and response to sounds are normal in the child with expressive language disorder. In infantile autism and childhood schizophrenia there is no inner language, imaginary play, the use of gestures, or warm social relationships, whereas these are all present in children with expressive language disorder.

The descriptive characteristics of receptive developmental language disorder are failure to develop comprehension (decoding) and vocal expression (encoding) of language; deficits in auditory sensory perception (recognition of auditory symbols or visual symbols); integration (ability to relate or manipulate auditory or visual symbols); storage recall (ability to reproduce the sequence of auditory or visual stimuli some time after they have been presented); and sequencing (ability to recognize or reproduce sequences of symbols). Associated features may include a partial hearing defect for pure tones, resistance to auditory arousal, and inability to localize sound sources. Seizures and all of the specific developmental disorders, especially dyslexia, are apparently more common among family members of individuals with receptive language disorder than in the general population.

The differential diagnostic features are similar to those for expressive language disorders, only in this case language comprehension is below age level and for the child with expressive language disorder the



child's comprehension of language is within normal limits for age. The rest of the differential diagnosis would include points that were brought out above. However, in infantile autism, childhood schizophrenia and receptive language disorder there may be short auditory memory span, auditory discrimination problems and anomalies of pitch and intonation. The child with a receptive language disorder presents a more difficult diagnostic problem than the child with an expressive language disorder.

#### Developmental Dysarthria and Dyspraxia (Developmental articulation disorders)

Developmental dysarthria and dyspraxia are disorders of articulation which can cause delayed speech and language development. Developmental dysarthria occurs when there is difficulty in the movement and coordination of the muscles used for articulation, phonation, and/or respiration. The outstanding feature is that of inadequate movement due to abnormal muscle tone, with inadequate control and coordination of the muscle groups used during speech, even though the child demonstrates little or no difficulty knowing what he should do in order to imitate the sounds he hears. He may be able to articulate at slow speed but will have varying degrees of difficulty, especially during conversational speech. In this condition there will be other obvious signs of interference with movement and coordination of various muscle groups which indicate the presence of cerebral damage, such as cerebral palsy. Developmental dysarthria is rarely seen in isolation without any other signs of cerebral damage.

The child with developmental dyspraxia will have no apparent difficulty in spontaneous movements of the articulatory muscles but will have varying degrees of difficulty in directing them for voluntary imitation of movement, despite ~~of~~ having normal hearing and comprehension of what he

should do. It is felt that the disturbance of function probably originates at a higher level in the nervous system. It is felt by some that this represents a disorder in articulatory encoding. The dyspraxic child may be able to carry out the necessary movements for articulation but may have acquired only a limited number of consonant sounds and probably has insufficient audio-kinesthetic control to reproduce such sounds accurately when they occur in spontaneous speech. It is not uncommon for the child with articulatory dyspraxia to demonstrate an associated mild limb dyspraxia. These children can be generally clumsy and have specific difficulties coordinating the small muscles of the hands for activities such as buttoning and unbuttoning, tying and untying, zipping, using a crayon or a pencil.

Developmental dysarthria and developmental dyspraxia can coexist and later in childhood there may also be a developmental dyslexia.

#### Developmental Dyslexia (Developmental reading disorders)

By developmental dyslexia I refer to that group of disorders described by Hinshelwood (1917), Orton (1937), Hermann (1959), and Critchley (1981) among many others. If we look at the marked variability of the kinds of language problems demonstrated among dysphasic children, it would appear reasonable that these children would also have difficulty with written language. There is ample evidence in the clinical history of dyslexic children that the majority were delayed in the acquisition and use of spoken language. Exceptions would be those children who have visual perceptual problems (Shankweiler & Liberman, 1972). However, Orton (1937), who clearly stated the relationship between delayed development of spoken language and dyslexia, laid the groundwork for what Geschwind (1982) calls "the important concept that dyslexia appears on a foundation of delay in the development of the entire system devoted to language" (italics mine).

Current research and theory in dyslexia has burgeoned with the search for sub-groups. As aphasia consists of many types of spoken language problems, so must we consider dyslexia as a group of disorders of written language. The relationship between spoken and written language has been described by Jansky and deHirsh (1972), Liberman (1979), Ellis and Miles (1981), and others. One may wonder, if different types of aphasia correlate with brain anatomy would it not be possible that this could be true for different types of dyslexia?

At present, there are many proposed classifications of dyslexia. Some differentiate between disabilities which reflect primarily visual-spatial or audio-phonological difficulties (Johnson and Myklebust, 1967; Boder, (1971); Ingram, Mason & Blackburn (1970). Mattis, French and Rapin (1975) described three syndromes: language disorder syndrome (aphasic dyslexia); articulatory and grapho-motor dyscoordination syndrome (dyspraxic dyslexia); and visual-perceptual disorders. The majority of investigators have found that the individuals with "the language disorder syndrome" or Boder's dysphonetic group (1971) seem to be the larger proportion among the total dyslexic population.

Marshall and Newcombe (1973), in their studies of individuals with acquired dyslexia, described three types of dyslexia which were related to different sites of brain lesions: "visual dyslexia" in a patient with a lesion in the left occipital lobe; "surface dyslexia," where the major difficulty was in grapheme-phoneme association, in a patient with a left temporal-parietal lesion; and "semantic dyslexia," which showed several aphasic features, in a patient with lesions in the left temporal-parietal and occipito-parietal regions.

Neuropsychology has been persistent in its occupation with language disorders. Clinical neuropsychology has espoused the notion that the linguistic system is independent of other cognitive systems. However, there has been growing recognition of the relationships between language, perception and cognition. The evolving theory of cerebral hemispheric specialization has introduced a novel view of the relationship of language to thought.

Eran Zaidel (1979) has written a thoughtful review of the relationships of current language theories on specific developmental language disabilities and hemispheric functions. He offers a model of the limits of linguistic competence in each hemisphere as a basis for further research with language disabled children. The most important linguistic aspects of this model, he states, consist in demonstrating that the following subsystems are pair-wise neurologically and are functionally independent to a large degree: speech and auditory language comprehension, phonetic and acoustic lexical analysis, syntax and semantics, syntactic and Piagetian operations.

With regard to right hemisphere language, this is summarized by the following characteristics based on studies of split-brain patients:

- (1) comprehension of spoken nouns, verbs, short sentences and phrases;
- (2) comprehension of written nouns and verbs; (3) written naming by placing letters with the left hand to name objects presented only to the right hemisphere; (4) difficulties with speech phonology and production; (5) difficulties with syntactic analysis and production; (6) poor understanding of function words; (7) poor performance on phonetic analysis and recognition of consonant/vowel syllables; and (8) restrictions in short-term memory (Ludlow, 1980).

The idea of differential left and right cognitive modes is still under challenge. Many continue to feel that the right hemisphere specialities are primarily praxic or "manipulo-spatial" and that higher cognition and self awareness are associated mainly with language in the left hemisphere. However, Roger Sperry (1982) tested the right hemisphere more specifically for the presence of self-recognition and related forms of self and social awareness. In his Nobel Lecture he states that "the relatively inaccessible inner world of the non-speaking hemisphere was found to be surprisingly well-developed." Sperry found that the non-vocal hemisphere seems to have a normal and well-developed sense of self and personal relations along with a surprising knowledgeability in general. Of particular significance was Sperry's finding that, in his tests for selfconsciousness and social awareness, even subtle shades of emotion or semantic connotations generated in the right hemisphere would help the left hemisphere guess the stimulus that only the right hemisphere knew. Since the affective component appears to be an eminently conscious property, states Sperry, the fact that it crosses at lower brainstem levels is of interest in reference to the structural basis of consciousness.

#### SUMMARY

It seems that views are beginning to converge amongst all our disciplines. There has been a switch from earlier non-causal, parallelist views to a new interactionist interpretation that ascribes to inner experience an integral causal control role in brain function and behavior.

We have come a long way. We still have far to go. Clearly, the study of child language and its disorders must be an interdisciplinary endeavor.

The different views regarding the nature of man are reflected in the ways in which we approach his most unique capacity--language. These differences are also reflected in the varieties of research methods, reporting and interpretations of the phenomena. Although the genetic aspects of the language disorders have not been included in this presentation, current research in this field is exciting and promising.

I have attempted briefly to trace the various tracks made by the speech-language pathologists, remedial educators, linguists and psycholinguists, psychologists and neuropsychologists, psychiatrists and neurologists in their attempts to explain the vexing phenomena of language disorders.

There appears to have been a gradual change in what science has long stood for during the materialist-behaviorist era (Sperry, 1981). The world of inner experience, of the humanities, seems to be gaining recognition and acceptance within the domain of science.

Most of us have spent a lifetime communicating with other people through the verbal and the written word. How did we learn to do it? I have absorbed as much of the world as I could comprehend and the greatest minds have given me the gift of their thoughts through their speech and writing. The history of man's thought and deeds has been written in many languages, many codes, some of the most magnificent of which have been written on the musical staff. How the small child masters the codes, learns to put his feelings and thoughts into the stream of human consciousness and from it to extract the feelings and thoughts of others is, to me, a miracle surpassed only by the miracles of love and of life itself.

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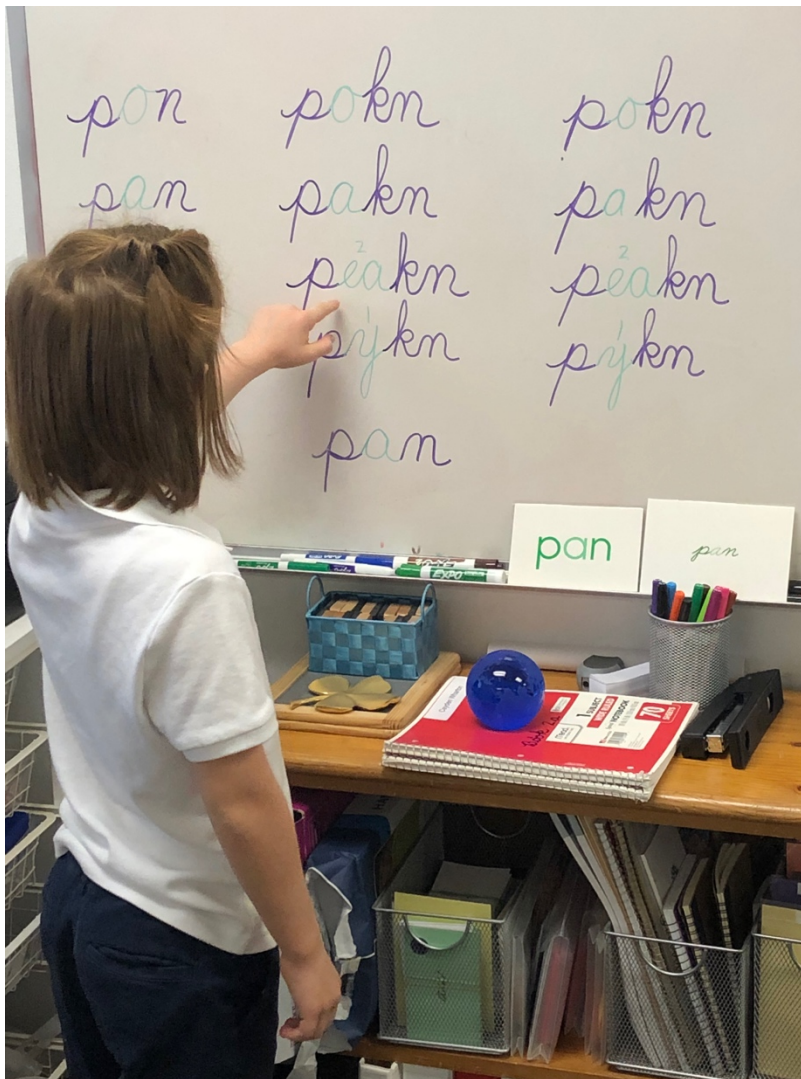
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“Since the early 19<sup>th</sup> century, neurologists have described different types of aphasia, having specific areas of localization. Penfield and Roberts (1959) described some of the most frequent variants of aphasia.”

Sylvia Richardson



DuBard Association Method lesson written specifically for children with oral language disorders.



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# Historical Perspectives on Dyslexia

Sylvia O. Richardson

*This article begins with an historical overview of the neurological aspects of dyslexia, which was originally seen as a member of the family of aphasia. That overview is followed by a brief review of familial and genetic factors in developmental dyslexia. The article then presents psycholinguistic models of dyslexia as they relate to the neurological concepts. Finally, the author reviews briefly the evolution of methods that have been successful in the remediation of dyslexia.*

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**T**he historical aspects of dyslexia presented in this article are concerned primarily with the contributions of neurology and psycholinguistics to the field, and to the contributions of physicians who influenced the development of some remedial methods.

Dyslexia means a specific language disorder that specifically involves reading and often an associated difficulty with the spoken word and/or writing. The word *dyslexia* is derived from both the Latin and Greek. The Latin origin is *dys* (dis=difficult)+*legere* (to read); or Latin *dys*+Greek *lexis* (speech). Thus, dyslexia would mean difficulty with reading and speaking.

For over 100 years physicians have been engaged in the study of language in all of its forms. Much that educators and speech-language pathologists have "discovered" in the past 20 years could have been found in the medical literature 100 years ago, when dyslexia was seen as one of the family of language disorders classified under the umbrella of aphasia. Aphasia is a coined word that, by derivation, means the loss of speech. However, in the medical literature the meaning was expanded to cover not only loss of

the ability to speak and comprehend spoken language, but also all losses in the use of language, including reading and writing.

This brief historical review will begin with a description of the aphasia and the subsequent development of our knowledge of dyslexia, which was first called "word blindness." Because physicians developed remedial methods that are among the standard approaches for treating dyslexia today, a short review of those approaches will be included.

## Aphasia

Since the early 19th century, neurologists have described different types of aphasia, having specific areas of localization. Penfield and Roberts (1959) described some of the most frequent variants of aphasia:

When there was particular difficulty in understanding spoken language, the patient was said to be suffering from (1) *sensory aphasia*. On the other hand, if his major difficulty lay in finding words to express his thoughts, it was called (2) *motor aphasia*; or difficulty in reading,

(3) *alexia*; or writing, (4) *agraphia*. . . . In our own experience, careful testing shows that there are no really pure forms of defect. The patient who has moderate or severe aphasia may be worse in one department [*sic*] of speech. But if he is to be called an aphasic he is rarely, if ever, quite perfect in any department. The differences in the distribution of the defect are important, however, and should, in the end, throw considerable light on the details of function in the speech mechanism. (pp. 220-222)

Acquired alexia, or dyslexia, then, was considered to be one of the aphasia in a general sense.

At the beginning of the 19th century, there was considerable argument between those who believed that the two cerebral hemispheres functioned as a whole and those who contended that there was specific localization of function in the brain. In approximately 1810, neuroanatomist Franz Gall advocated the notion of localization of function. However, his work was discredited when he promoted his school of phrenology, the study of the mind and traits of character by examination of the bumps on a person's head.

In 1861, French surgeon and neuroanatomist Pierre Paul Broca reported a patient who lost the ability to speak and who, at autopsy, showed a lesion in the posterior part of the third frontal convolution in the left hemisphere of the brain. This area has become known as *Broca's area* and the expressive aphasia he described was called *Broca's aphasia*. Broca's report was the

first paper on aphasia attempting to localize a particular function (that of expressive speech) in a rather restricted area of the brain (Richardson, 1989).

In 1874, the German neurologist Carl Wernicke located the auditory speech area in the superior temporal convolution on the left. Wernicke believed that the anterior half of the brain was concerned with the concept of movement and the posterior, including the temporal lobe, dealt with sensory impressions. He separated the general auditory area from the auditory speech area. A lesion in the latter would produce loss of understanding of speech. He stated that there would also be difficulty in naming and speaking, because without the ability to understand, one would be unable to correct mistakes. In addition, the patient might lose the ability to read and write. Thus began the numerous studies of (1) expressive (Broca's), (2) receptive (Wernicke's), and (3) mixed aphasia, and the many attempts to classify these disorders of language, both spoken and written.

John Hughlings Jackson made monumental contributions to the understanding of aphasia. He coined the word *verbalizing* to include all the ways in which words serve. He said, "I would assert that both halves of the brain are alike in that each serves in verbalizing. That the left half does is evident, because damage of it makes a man speechless. That the right half does is inferable, because the speechless man understands all I say to him in ordinary matters" (cited in Taylor, 1931, p. 132). Our knowledge that the left hemisphere of the brain has major control of the propositional aspects of language is mainly due to Jackson (1874).

Freud (1891, 1953), in his classic monograph *On Aphasia*, was one of the earliest to subject the theory of localization of brain function to systematic critical analysis. He made Jackson's (1874) basic doctrine of the evolution and dissolution of function his own. Freud wrote,

This means that under all circumstances an arrangement of associations which, having been acquired later, belongs to a higher level of functioning, will be lost, while an earlier and simpler one will be preserved. From this view a great number of aphasic phenomena can be explained. (p. 87)

Gradually the emphasis on strict localization of function gave way to a recognition of the interdependence and interplay of various parts of the brain, especially as related to spoken and written language. However, it is recognized that certain areas of the cortex may indeed play a major role in understanding and expressing language, and that damage or morphological difference in such areas of the dominant hemisphere will disturb a particular function of the language process much more than that of associated functions.

Many great physicians have contributed to our knowledge of the aphasia, yet none of the theories of the various types of aphasia have been universally accepted. In spite of a century of study, the mechanisms of speech and language disorders, especially in children, remain challenging problems (Richardson, 1989).

## Word Blindness and Dyslexia

Serious study of alexia, or dyslexia, dates from around 1872, when Sir William Broadbent described patients who were unable to read, but who also demonstrated "some verbal aphasia or amnesia in a greater or lesser degree" (p. 150). However, when Kussmaul (1877) pointed out that blindness for words can be found clinically as an isolated condition, he stated that word blindness represents the "pathological condition of a special faculty" (p. 593) and that "a complete text blindness may exist although the power of sight, the intellect, and the powers of speech are intact" (p. 595). The term *dyslexia* was introduced in 1887 by German ophthalmologist Berlin, to describe a

group of patients who had great difficulty in reading due to cerebral disease; thus, *dyslexia* was originally used by Berlin to describe an acquired condition, and he saw dyslexia as a member of the general family of the aphasia.

Geschwind (1962) reported that Dejerine presented a clinical description of an individual who had a persistent loss of the ability to read and write (alexia with agraphia) after an acute cerebro-vascular accident, which caused destruction of the angular gyrus in the dominant hemisphere. Subsequently, Dejerine (1892), in describing the autopsy findings of a patient who had lost the ability to read but who retained the ability to write (alexia without agraphia), found that the patient's problem was due to disconnection of the right visual cortex from the left angular gyrus. Dejerine established an anatomical location for "pure word blindness," which has been repeatedly confirmed. It is remarkable that these cases described by Dejerine were relatively unknown to most investigators until they were discovered and reported by Geschwind, who was the first to clarify the distinction between acquired and developmental dyslexia.

The first article in the medical literature on word blindness in children was by an English school physician, Morgan (1896). The communication was brief; he attributed the cause of the word blindness to defective development of the left angular gyrus.

## James Hinshelwood

In his seminal monograph, *Congenital Word-Blindness*, Hinshelwood (1917), a Scottish ophthalmologist, discussed Morgan's paper. He stated that "this first recorded case is thus a typical example of congenital word-blindness possessing the two essential characteristics of genuine cases, viz, gravity of the defect and purity of the symptoms" (p. 42). Hinshelwood wrote that he had reported two cases of congenital word blindness in *The Lancet* in 1900, the first in the medical

literature that attempted to analyze and explain the symptom of word blindness, to establish the diagnosis on a scientific basis, and to show that the difficulties in teaching children with this condition could be overcome by patient, persistent training.

Hinshelwood (1917) noted that there were often several cases in one family and that the symptoms were closely parallel to those that appeared in adults who had lost the capacity to read due to brain injury. He was convinced that underdevelopment of, or injury to, the lower parietal lobe, including the supra-marginal and angular gyri, on the left side of the brain in a right-handed person could cause failure in reading. He thought that such abnormality might be due to disease, birth injury, or "defective development occurring in the early stages of embryonic growth" (p. 72).

Hinshelwood was concerned about precision of nomenclature. Even then there was marked confusion with regard to terminology and definition. Educators in the early 1900s confused individuals with word blindness with "the mentally defective." The following quotation from Hinshelwood (1917) might sound familiar today:

When I see it stated that congenital word-blindness may be combined with any amount of other mental defects from mere dullness to low-grade mental defects, imbecility or idiocy, I can understand how confusion has arisen from the loose application of the term congenital word-blindness to all conditions in which there is defective development of the visual memory center, quite independently of any consideration as to whether it is a strictly local defect or only a symptom of a general cerebral degeneration. It is a great injustice to the children affected with the pure type of congenital word-blindness, a strictly local affection [sic], to be placed in the same category as others suffering from generalized cerebral defects, as the former can be successfully dealt with, while the latter are practically irremediable. (pp. 93-94)

Hinshelwood (1917) was the first physician to advocate a specific instructional approach for written language disorders in children. He stated: "It is thus in their failure to acquire the art of reading by sight alone and without appeal to any other cerebral centers than the visual that this defect becomes conspicuously manifest" (p. 57). He advocated one-on-one teaching, utilizing what he called the *alphabetic method* in a multisensory approach: "the method of simultaneous appeal to as many cerebral centers as possible" (p. 106).

### Samuel Torrey Orton

In 1925, an article appeared in the *Archives of Neurology and Psychiatry*, "'Word-blindness' in School Children," by neuropathologist Samuel T. Orton. This was the first report in the American medical literature on individuals with word blindness. He showed agreement with Hinshelwood in his report, in that the preliminary study of individuals with dyslexia led him

to believe that the reading disability forms a graded series in severity, that it is not generically related to general mental retardation; that it is explainable as a variant in the establishment of the physiologic lead in the hemispheres rather than as a pathological condition and, as a corollary of the latter view, that proper methods of retraining, if started early enough, may be expected to overcome the difficulty. (p. 602)

Orton (1937) preferred to use the term *developmental* rather than *congenital*, because he thought the former could include both the hereditary tendency and environmental factors. He described five syndromes of delay or disorder in the acquisition of language: (1) developmental alexia (word blindness), (2) developmental word deafness (auditory aphasia), (3) special difficulty in writing (dysgraphia), (4) motor speech delay, and (5) stuttering. Thus, Orton was the first medical

scientist to stress the unity of the language system and its sensory-motor connections. Listening, speaking, reading, and writing are all interrelated functions of the system of communication that we call language (Richardson, 1989).

The work of Geschwind and Levitsky (1968) and, more recently, Galaburda (1985), which clearly shows the existence of physical, structural alteration rather than acquired damage in the brains of some individuals with dyslexia, supports Orton's (1937) vision as articulated when he said, "These disorders in language development may rest on a basis largely physiological in nature and not dependent upon defect or destruction of any part of the cortex" (p. 69).

Like his predecessor, Hinshelwood, Orton (1937) recognized that the treatment for dyslexia must be educational. He pointed out "the one factor which is common to the entire group [of language disorders] and that is a difficulty in re-picturing or re-building in the order of presentation, sequences of letters, of sounds, or units of movement" (p. 148). His recommended training procedures aided the establishment of phoneme-grapheme association and emphasized the appropriate sequencing of written and auditory symbols. He advocated establishing associations that involve the simplest possible units and the use of various reinforcement techniques in order to establish firm association links. Like Hinshelwood, he advocated the use of all sensory pathways to reinforce weak memory patterns.

Geschwind (1982) recognized Orton's ability to select the major clinical features of dyslexia and also to set a biological framework in which dyslexia could be studied. "In his original observations [Orton] pointed out the frequency of delay in the acquisition of speech in dyslexic children, thus laying the groundwork for the important concept that *dyslexia appears on a foundation of delay in the development of the entire system devoted to language*" [italics added] (p. 17).



Geschwind (1982) has documented other observations made by Orton in the 1920s, such as a higher frequency of concomitant left-handedness, normal visual perception, clumsiness, and stuttering; a history of delay in the acquisition and use of spoken language; and that dyslexia tends to be familial. He concurs with Orton, who pointed out that these characteristics may coexist with dyslexia, but they are not causal; more likely, they are the results of processes that underlie the dyslexia.

### Neuroanatomical Bases of Dyslexia

There has been a marked resurgence of interest in dyslexia since Geschwind's (1962) reintroduction of an anatomical basis for reading disorders. Although gross hemispheric asymmetry has been recognized for 100 years, Geschwind and Levitsky (1968) demonstrated conclusively that the left planum temporale, a triangular area behind the auditory gyrus of Heschl (a part of the auditory association cortex), is usually larger than the right. Other asymmetries also were documented.

Geschwind (1982) pointed out that Orton's "neurological analysis of the disorder in the brain places it in the exact site in which his great neurological predecessors in the latter part of the nineteenth and the beginning of the twentieth century had localized the major area for reading ability" (p. 15). Geschwind further pointed out that, using modern cytoarchitectonic techniques in his laboratory, he had found brain changes in the same locations.

Galaburda and Kemper (1979), in the first architectonic analysis of the brain of a 20-year-old, left-handed male with dyslexia, found that the white matter of the left hemisphere was larger than the right and contained islands of ectopic neurons; there were also numerous heterotopias within the cortex, especially in the perisylvian areas. The left planum temporale was equal in size to the right, with absence of the asymmetry usually found there. Since

that first study, similar findings have been observed in the brains of nine individuals with dyslexia. Such changes have not been found in the brains of nondyslexic individuals. It is believed that these distortions of cortical architecture probably date back to the period of neuronal migration occurring between the 16th and 24th week of gestation.

### Right Cerebral Hemispheric Functions

It is clear that the left cerebral hemisphere is specialized for verbal learning. However, the right hemisphere is not mute, although it is specialized for nonverbal learning. Normally, the hemispheres communicate with each other so that verbal and nonverbal learning occur simultaneously, with information being processed both ways through the corpus callosum. Each hemisphere has its primary responsibilities, but the two are always in communication with each other. Both hemispheres are necessary in all aspects of language, and this is particularly noteworthy in the earliest language learning experiences (Richardson, 1983).

Right-hemisphere language is summarized by the following characteristics, based on studies of split-brain patients: (a) recognition of the prosodic features of speech, the intonational patterns that comprise the melody of a language; (b) recognition of unfamiliar shapes and figures, such as letters and word forms; (c) comprehension of spoken nouns, verbs, short sentences, and phrases; and (d) comprehension of written nouns and verbs. Ludlow (1980) pointed out that the right hemisphere also has certain linguistic limitations: (1) difficulties with syntactic analysis and production, (2) poor understanding of function words, (3) poor performance on phonetic analysis and recognition of consonants/vowels syllables, (4) restrictions in short-term memory, and (5) difficulties with speech phonology and production.

The right hemisphere has important functions in the recognition of melody, including the prosodic features or inflectional patterns and nuances of spoken language. Infants must learn the melody of their native language before recognition of actual words and sounds can occur. At a later age, as they begin to learn to read and to develop a sight vocabulary, youngsters will use other right-hemisphere strategies in the identification of unfamiliar shapes and forms. Thus we see that, although it is the primary channel for communication, the left hemisphere requires and receives assistance from the right. The right hemisphere is considered by some to be the more creative and imaginative of the two because of its superior correlative skills. Regardless of conjecture, people do best with both hemispheres and an intact corpus callosum to keep them working together.

### Familial and Genetic Factors

It has long been recognized that dyslexia tends to run in families and that males are more often affected than females. The extent of familial risk was reported by Hallgren (1950), who found that the risk to first-degree relatives was 41%. Vogler, DeFries, and Decker (1985) found that the risk to a son of having an affected father is 40% and of having an affected mother is 35%.

There are data to support genetic heterogeneity in the transmission of dyslexia (Pennington, 1989). Linkage studies that have been conducted for about 10 years also report significant linkage between dyslexia and chromosome 15 heteromorphisms in a minority of families with apparent autosomal dominant transmission (Smith, Kimberling, Pennington, & Lubs, 1983). Pennington (1989) is currently testing for a possible second locus on chromosome 6. Of particular interest in these genetic analyses of behavior is evidence that "the underlying neuropsychological deficit in dyslexia appears to

be a problem in phonemic segmentation or phoneme awareness skills which causes the primary symptom in dyslexia, a deficit in the phonological coding of written language" (Pennington, 1989, p. 90).

### Psycholinguistic Models of Dyslexia

Several psycholinguistic models of dyslexia have emerged that represent an information-processing approach (e.g., Newcombe & Marshall, 1981; Morton & Patterson, 1980; Warrington & Shallice, 1980). The subcomponents of word recognition and production skills proposed by such information-processing frameworks are valuable for analysis of the state of language skills at any particular point in development (Richardson, 1983).

Ellis and Miles (1977) interpreted the information-processing ability of children with dyslexia as a lexical encoding deficiency across input and output modalities. They stated that the largest and most consistent impairment can be seen in the lexical encoding of visual events. They also indicated that the basic problem could be the slow rate of access to phonological information stored in long-term memory.

The psycholinguistic concepts show some kinship to the neurological concept of aphasia. It has been found that anomia (the loss of the ability to find lexical labels or names) is a chief characteristic of all types of the aphasia, regardless of the specific locus of damage (Goodglass, 1980; Schuell, Jenkins, & Jimenez-Pabon, 1964). That various forms of naming breakdown correspond to almost all varieties of language disturbances suggests that the act of naming is a complex and sensitive process, incorporating a large range of linguistic subprocesses. However, the factor most characteristic of children clinically referred for reading problems is a deficit in naming, or *dipnomia*. Naming problems are now known to be present in many children with developmental dyslexia (Denkla

& Rudel, 1976). Wolf (1984) stated that the accumulating research of the past 10 years provides "compelling evidence that the naming methodology can be as important in the study of the dyslexias as it has proven to be in the adult aphasia" (p. 113).

It has been suggested that signs of the varieties of acquired dyslexia can be identified in children with developmental dyslexia, and that the information processing model is sufficient to explain the underlying defects. On the other hand, it may be necessary to consider a developmental framework in relation to developmental disorders.

### Developmental Model

Frith (1986) suggested a developmental framework for the normal development of literacy. This framework comprises three phases, corresponding to the acquisition of logographic, alphabetic, and orthographic skills. The acquisition of literacy is gradual, with each new strategy building on top of an already existing one.

Frith (1986) defined *logographic* as meaning instant word recognition on the basis of salient graphic features. By *alphabetic* she means letter-sound by letter-sound analysis, a strictly sequential putting together of sounds to create a word. By *orthographic* she means instant recognition of morphemic parts of words, taking into account letter order but not letter-sound; if sound is taken into account, it is only that of morphemes or of whole words.

At each phase a new skill is introduced with either reading (input process) or writing (output process) acting as pace-maker. This step-wise progress is driven by a certain opposition between reading and writing processes. At any of the critical points where a new step has to be taken, breakdown can occur. This will result in different types of literacy disorder. However, the disorder will not only be characterized by the deficiency in a particular skill, but also by compensa-

tory skills which will inevitably develop. (p. 69)

Frith presents a significant model by which one can understand language or literacy disorder as a disorder of development.

### Phonological Processing and Dyslexia

Currently, a large body of research suggests a causal link between phonological processing deficits and the problems in reading and writing among individuals with developmental dyslexia (Catts, 1989). Liberman (1973) pointed out that beginning readers and illiterate adults usually lack phonological awareness. Since 1973, research has shown that developmental dyslexia is a specific language disorder that can be characterized by deficits in phonological processing (Kamhi & Catts, 1989; Wagner & Torgesen, 1987). Catts proposed defining dyslexia as "a specific deficit(s) in the processing of phonological information" (p. 58).

Hopefully, this sketchy historical narrative can serve as a stimulus for rediscovering the contributions of neurology and neurolinguistics to our knowledge of dyslexia. It would be foolish, however, to consider only the brain-based explanations of dyslexia without considering the cultural and educational context, or vice versa. Therefore, it may be useful to recall the pertinent historical background of the approaches to the suggested remedial methods for dyslexia.

### History of Remediation for Dyslexia

The methods of teaching reading essentially fall into four groups: (1) visual approaches, such as the alphabet method and the word method; (2) auditory approaches, as in the

phonic method; (3) kinesthetic-tactile approaches; and (4) combined approaches. Remedial reading methods have grown out of these approaches, are used by specially trained personnel for individuals with severe reading disorders or dyslexia, and generally feature multisensory, or combined, approaches (Richardson, 1991a).

### Visual Approaches

The earliest form of written communication was pictographic—a visual, essentially “look-say” approach. It was not until the Phoenicians created the alphabet in the 13th century B.C. that the beginning reader could use an auditory approach. The printing press was invented in Germany around A.D. 1437, and the first dated book was issued in 1457.

The first books published for teaching reading followed the alphabet method. One of the first ABC books was published in Germany by Schulte, in 1512. In America, one of the earliest reading books was the *New England Primer*, privately printed in the 1680s and based on the principle that learning the alphabet was the basis of reading instruction.

The word method consists of learning whole words visually, by configuration, as the basis of learning to read, rather than isolated letters or letter combinations. The first children's elementary textbook containing pictures, each with a single line of text, was the *Orbis Pictus*, published by Comenius, a Moravian bishop, circa 1657.

In America, the first “look and say” book was *The Mother's Primer* (1835), published by Gallaudet, the foremost educator of individuals who were deaf in the United States at that time. Because deaf children cannot hear the sounds of the language, Gallaudet reasoned that it would be difficult for them to make sound-symbol correspondence. So, he presented pictures with words and sentences under them for the children to learn as wholes. The first lines in *The Mother's Primer* read: “Frank had a dog. The dog's name

was Spot.” The name Frank is more visible and easier to lip-read than the name Dick. The primer was successful in teaching deaf children to read, and Gallaudet also used it successfully to teach children with normal hearing. At that time, Horace Mann was the Secretary of the Massachusetts Board of Education. Mann was impressed by the success of the primer and introduced it in the schools of Boston (Richardson, 1991a).

The Gallaudet primer was used in the Boston public school system and achieved some popularity with the teachers. It was also the method of choice for instructing teachers in the first state-owned and state-operated teacher training institution in Massachusetts, cofounded by Mann and James Carter. Shortly after Gallaudet's book was published, others, similar in style, began to appear. Thus began one of the major controversies in all of education, the battle between the proponents of phonics and those of the look-say method. Metaphorically, it could be the battle for dominance between the left and right hemispheres.

### Auditory Approaches

The phonic method has been in existence from almost the beginning of reading instruction. However, at the turn of the century, phonics fell into disrepute.

By 1920, there was such a reaction against the phonic approach or any method of teaching specific words that no reputable school would dare promote such techniques. . . . These trends gave way to unstructured developmental reading programs which engendered a storm of protest from parents and teachers that the children were not learning how to read. (Mills, 1964, p. 10)

As a result of parent protests, phonics was again added to the curriculum by the 1930s, and some phonic instruction has continued to be a part of most approaches to reading and remedial reading techniques ever since.

### Kinesthetic-Tactile Approaches

The kinesthetic method has been described since antiquity. In “Protagoras,” Plato described the early stages of learning to write by having the student trace the teacher's script. It is interesting that more emphasis was placed by the Greeks and Romans and earlier cultures on writing and speaking than on reading (Richardson, 1989).

Quintillian (cited in Haarhoff, 1920), around A.D. 90, stated that:

it is a mistake to teach children to repeat the alphabet before they know the form of the letters. . . . As soon as the letters are recognized, they ought to be written. Following with a pen the form of letters engraved on ivory tablets is a good thing. After letters syllables must be learnt, all the possible syllables in both languages (Latin and Greek). After the syllables come words, and after the words sentences. . . . As soon as the child has begun to know the shapes of the various letters, it would be no bad thing to have them copy as accurately as possible upon a board so that the pen may be guided along the grooves. (p. 135)

Quintillian sounds quite modern in saying that good teachers will ascertain the disposition and abilities of their pupils so as to adapt their methods to each individual.

In most instances, those who advocated the kinesthetic approach used it as part of a combined system. Combined approaches are essentially multisensory, utilizing all sensory avenues and approaches.

### Combined Approaches

Fernald (1988) used for remediation the combined multisensory approach that is now called V-A-K-T (Visual-Auditory-Kinesthetic-Tactile), in analytic breakdown. Fernald used a four-stage system for teaching reading, which begins by having children trace words with their finger, saying each syllable or word as it is traced; the children write the words they speak before



reading them. This is sometimes called "look-say-do." After children write a story, it is typed for them and they read it in print. In the kinesthetic exercise, Fernald pointed out that finger contact is important in tracing and that the children should write the word without looking at the model. She also stated that the word should be written as a unit and always be used in context, so the children would know the meaning of all words that they learn.

Another multisensory approach is that of Gillingham, an educational psychologist, and Stillman, an educator, who worked with Orton to develop the Gillingham-Stillman approach, which uses the multisensory V-A-K in a synthetic process. Gillingham and Stillman (1965) based their method on Orton's neurological theories. They stated that, "before the child is asked to write there must be whatever practice is necessary in tracing, copying, and writing from memory to dictation, this last being sometimes carried out with the child's eyes averted" (p. 53). In all instances, the child says the name of the letter as he or she writes it. This is usually referred to as "SOS" (simultaneous oral spelling). The method is now called the Orton-Gillingham approach (Richardson, 1989).

The *Writing Road to Reading*, offered by Spalding and Spalding (1957), is another multisensory approach influenced strongly by Orton. Spalding uses the Orton-Gillingham phonogram cards and a restructured V-A-K-T approach, incorporating the tactile sense, as Fernald did. Like Montessori (1912), Spalding does not teach the names of the letters, only the sounds, nor does she use key words for teaching the phonemes. Writing precedes reading, as with the methods of Montessori and Fernald (Richardson, 1991a). Spalding states: "Having been trained first in the written spelling of words from the teacher's dictation and having acquired a knowledge of phonics and rules of spelling, a class is able to begin its reading with well written books which interest and educate and de-

velop a love for reading as a taste for good writing" (p. 8).

Successful adaptations of the Orton-Gillingham multisensory approach include Slingerland (1971, 1976), Alphabetic-Phonics (Cox, 1986), Project READ (Enfield, 1988), and many others. All of the multisensory, or combined, approaches emphasize the direct, structured instruction of decoding, which is necessary before meaning can be apprehended (Richardson, 1991b).

There is evidence that the multisensory, or combined, approaches to remediation for the majority of individuals with dyslexia have been successful over time (Richardson, 1991a). There is also a history of much dispute between the advocates of "look-say," the word method, and the phonemic approach. As mentioned earlier in this paper, both Orton and Hinshelwood emphasized the importance of the method of simultaneous appeal to as many cerebral centers as possible. On the other hand, Hinshelwood (1917) pointed out that even in the beginning of the century there were differences of opinion with regard to "best method," and he also conceded that "no amount of argument can decide the question as to the best method of instruction in these cases" (p. 107).

## Summary

Dyslexia was originally considered to be a manifestation of aphasia. Historically, the first reading disorders to have been investigated were acquired as the result of brain injury. However, the distinction between acquired disorders and congenital or developmental dyslexia has been clarified. Much in our medical and psycholinguistic history substantiates the proposition that developmental dyslexia is a specific developmental language disorder involving some phonological processing deficits.

There is neuroanatomical evidence of structural or morphologic differences in the brains of individuals with

developmental dyslexia. These differences may be under genetic influence. Faulty underlying processes that contribute to the language disorder include difficulties in phonological awareness, sequencing, segmentation, and naming. Because competency in reading builds on and interacts with existing proficiencies in spoken language, remedial assistance for individuals with dyslexia should deal with the entire system and be devoted to all aspects of language. Remediation has been most successful when all avenues of approach are fully utilized, as in the combined multisensory approaches, which address speaking as well as reading and writing. It is incumbent on the educational system to recognize dyslexia and to provide the appropriate alternative instructional approaches to beginning reading for children with developmental dyslexia.

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## Specific Developmental Dyslexia: Retrospective And Prospective Views

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Ask any educator to name the key issues he confronts today. Along with such headline problems as drugs, violence, and teen pregnancies, the thoughtful educator will cite the difficulty of defining the various kinds of learning disabilities and identifying to whom those definitions apply. This difficulty is caused, at least in part, by the diverse names, types, and descriptions with which the field abounds. We seem to be hopelessly embedded in semantic difficulties because emotionally charged people have either enthusiastically or angrily placed diverse educational programs and experiments under the general banner of learning disabilities or dyslexia. is that which recognizes his strengths, weaknesses, his "learning style" -- that is true for all children, but it is critically important for the child with learning disabilities. His or her instruction must be based on identified learning differences. Thus, the confusion in nomenclature has created equal or greater confusion in teaching, in administration of school programs, and especially in the training of school personnel.

My purpose is not to discuss learning disabilities but to highlight the historical events in medicine and education which I believe have contributed to the confusion in relation to specific learning disabilities and dyslexia. Contrary to popular belief, especially among those in academia, the world was not created yesterday. Our professional literature is considered "out-dated" if it uses references earlier than five to ten years ago. We often ignore our intellectual heritage, looking askance at the work of pioneers as though it was all irrelevant. In order to know where we are, however, we need to know where we have been and how we got here.

A review of the history of specific learning disabilities may help us to gain a clearer picture of the field and the various disciplines involved.

Medical investigators, especially neurologists and ophthalmologists, first described the conditions which now fall under the rubric of specific learning disabilities: (1) disorders of spoken language (aphasia); (2) disorders of written language (dyslexia); and (3) perceptual-motor disorders. The physicians were followed by a variety of professionals in the related fields of speech-language pathology, psychology, and education, who worked to remedy the learning problems created by the different disorders. I shall review the contributions of some of the key figures from medicine and education in the history of learning disabilities as they relate to these three strands.

## Disorders Of Spoken Language - Aphasia

As long ago as 400 years before Christ, Hippocrates (1952) knew that the brain is the organ with which man thinks. He also pointed out that injury to one hemisphere of the brain might produce paralysis of the limbs on the other side. This indicates that he had some degree of knowledge of localization of function. However, there was no real consideration of specific functional areas within the brain for about 2,000 years. Then, in the early 1800s, the neuroanatomist, Franz Gall, re-introduced the notion of localization of function within the brain. He also founded the science of phrenology, the study of the mind and traits of character by examination of the bumps on a person's head. The phrenologists were considered "quacks" by the more orthodox physicians of the day who refused to give credence to any notion of functional localization.

In 1861, the French surgeon and neuroanatomist, Paul Broca, reported a patient who lost the power of speech without other serious defects and who, at autopsy, showed a lesion in the foot of the third frontal convolution in the left hemisphere of the brain. This was an observation of great importance in the field of neurology, and localization of function in the brain became a major concern of neurologists through the end of the nineteenth century.

In 1874, the German neurologist, Carl Wernicke, located the auditory speech area in the superior temporal convolution on the left. A lesion here produces various degrees of difficulty or loss of understanding of speech. Thus began the many studies of expressive (Broca's), receptive (Wernicke's), and mixed aphasia, and the many attempts to classify the aphasias.

Kussmaul (1877) divided the receptive speech disorders into "word deafness" and "word blindness." The former was described as a condition in which the patient hears normally but is unable to recognize words, and the latter was considered a similar condition in which the patient has normal sight but cannot recognize written words.

Dejerine, in 1892, stated that word-blindness was due to a lesion in the angular gyrus, and later added that such a lesion produced word-blindness, agraphia, and paraphasia. At the same time, Exner identified the second frontal gyrus as the writing center.

Freud (1891), in his classic monograph, *On Aphasia*, was one of the earliest to subject the theory of localization to systematic critical analysis. In so doing, he espoused Hughlings Jackson's basic doctrine of the evolution and dissolution of function. Later Kurt Goldstein (1948) went back to Jackson and Freud in evolving the most consistent and fruitful concept of aphasia. He postulated that cortical damage would affect many areas of performance rather than a specific behavior. In this he had a great influence on Alfred Strauss, whom we will meet later.

Many great neurologists have contributed to our knowledge of the aphasias, yet none of the theories of the various types of aphasia has had general acceptance. In spite of a century of study, the mechanisms of speech and language disorders remain as challenging problems.

It must be remembered that the early studies of aphasia were of individuals who had acquired brain damage. The concept of developmental aphasia, or childhood aphasia, was not studied extensively until well after the development of the field of speech-language pathology in the 1920s, to which I will now turn.

## Speech-Language Therapy

Historically, speech-language pathologists have been concerned with disorders of spoken language: disorders of articulation, dysfluency (stuttering), voice disorders, and disorder or delay in the acquisition and use of language.

The treatment for aphasia in adults and children became the work of the speech therapists,

many of whom were also concerned with research in this field. The training of speech therapists in the early days of the profession through the 1940s was neurologically based and students were taught the various classifications of the aphasia as well as the principles of treatment. Although 19th century neurologists treated dyslexia as one of the group of aphasia in a general sense, speech-language pathologists have been more restrictive in their consideration of the aphasia as receptive and/or expressive disorders of oral communication.

Among the speech-language pathologists who have had the strongest influence on therapy for aphasic children are Jon Eisensen (1968), Mildred McGuinness (1963), Hortense Barry (1961), Doris Johnson and Helmer Myklebust (1967). The neurological basis of the condition was implicit in the diagnosis and treatment of childhood aphasia in the years prior to the 1960s. However, the various classifications of aphasia seemed inadequate in describing the language disabilities seen in children. Speech-language pathologists saw the aphasia as resulting from brain damage acquired by adults. A descriptive terminology, more suited to a developmental framework, was considered preferable. As a result, the term "language disorders" has superseded aphasia in reference to children. Unfortunately, the speech-language pathologists failed to indicate that their concerns were limited to disorders of spoken language.

In the 1960s, speech pathologists began to focus on quantification of speech and/or spoken language deficits by means of standardized tests and measurements. Then the behaviorists exerted a strong influence on research and intervention theories related to the language processes. Behavior modification techniques became the vogue in intervention strategies. In the same time frame (1960s) but at the opposite pole, Chomsky and other linguists focused our attention on the syntactic structure of language and brought still another lexicon to the field of oral communication disorders.

Due to the influence of psycholinguists such as Menyuk (1964), and Bloom and Lahey (1978), the major concerns of speech-language pathologists shifted toward language content and context. Studies by Menyuk (1964), and others have shown that stages of language development can be identified and that syntactic growth can be described by a generative grammar analysis of the language performance of children at different age levels.

Thus, there have been many changes in the way we have looked at and listened to children with disorders of oral communication over the past 40 years. Current literature addresses the phonology, syntax, semantics and pragmatics of spoken language. Differential diagnosis of language delay and disorders is no longer a search for etiologies but rather standardized testing of linguistic forms and nonlanguage behaviors in order to plan intervention. Intervention programs reflect a large number of disparate theories which have sprung from representatives of many different disciplines: linguistics, psycholinguistics, psychology, neuropsychology, education, special education, speech/language pathology, and audiology (Richardson, 1983).

This over-simplified, brief review of the history of the neurological and therapeutic aspects of disorders of spoken language describes the first of the three components or strands which comprise the field of learning disabilities. As indicated earlier, the second strand consists of disorders of written language.

### Disorders Of Written Language (Dyslexia)

Dyslexia is a term introduced in 1887 by the German ophthalmologist, Berlin, to describe a special group of patients who experienced great difficulty in reading because of cerebral disease -- in other words, dyslexia was originally used by Berlin to describe an acquired condition. He saw dyslexia as a member of the general family of the aphasia.

Sir William Broadbent (1872) had earlier described patients who were unable to read, but who also demonstrated "some verbal aphasia or amnesia in a greater or lesser degree." However,

Kussmaul (1877) pointed out that blindness for words can be found clinically as an isolated condition. He stated that word-blindness represents the "pathological condition of a special faculty" and that "a complete text blindness may exist although the power of sight, the intellect, and the powers of speech are intact."

The first child with this problem was reported to have "congenital word-blindness" by an English school physician, W. Pringle Morgan (1896). This was the first communication to be found in medical literature on word-blindness in children.

In his seminal monograph, *Congenital Word Blindness*, (1917), Hinshelwood, a Scottish ophthalmologist, emphasized the importance of two observations: there were often several cases in one family, and their symptoms were closely parallel to those which appeared in adults who had lost the capacity to read

because of injury to the brain. Hinshelwood was convinced, on the basis of post-mortem examinations, that underdevelopment of or injury to the angular gyrus on the left side of the brain in a right-handed person might cause failure in reading (see Dejerine, 1892). He felt that such abnormality might be due to disease, birth injury, or faulty development. He also stated that, "all the cases recorded in this book are marked by two important conditions: first, gravity of the defect, and second, purity of the symptoms."

Hinshelwood was the first physician to advocate a specific instructional approach for written language disorder in children. He stated, "It is thus in their failure to acquire the art of reading by sight alone and without appeal to any other cerebral centers than the visual that this defect becomes conspicuously manifest." He therefore advocated one-on-one teaching and the "old-fashioned" method of teaching reading to these children rather than the "look and say" method. Hinshelwood believed in what he called the Alphabetic Method and in a multisensory approach: "the method of simultaneous appeal to as many cerebral centers as possible".

In 1924 the neuropathologist, Samuel T. Orton, reported a patient, MP, who he thought was suffering from the condition that had been described in Hinshelwood's monograph. This experience resulted in an article, "'Word-blindness' in School Children" (1925). In 1928 he wrote an article for the *Journal of the American Medical Association* on "Specific Reading Disability -- Strophosymbolia." This term means twisted symbols, which Dr. Orton felt would be a good way to describe the problem of reversals in dyslexia. However, the newly coined word never became popular.

Orton postulated that visual impressions were received by both sides of the brain but as mirror images, and concluded that confusion was the result of poorly established dominance. He postulated further that until the dominant role of one hemisphere was firmly established, there would be uncertainty as to which of the two mirror images would be followed.

The work of Geschwind (1985) and more recently, Galaburda (1985), which clearly shows the existence of physical, structural alteration in some dyslexic brains, demonstrates Orton's vision when he said, "...these disorders in language development may...rest on a basis largely physiological in nature and not dependent upon defect or destruction of any part of the cortex."

Geschwind (1982) recognized Orton's remarkable ability to select the major clinical features of dyslexia and also to set the biological framework in which it could be studied. He stated that "in his original observations he [Orton] pointed out the frequency of delay in the acquisition of speech in dyslexic children, thus laying the groundwork for the important concept that dyslexia appears on a foundation of delay in the development of the entire system devoted to language." (italics mine).

Orton presented a review of ten years of his research in *Reading, Writing and Speech Problems in Children*, (1936). He discussed two points of particular importance for purposes of this presentation: (1) his preference for the use of the term developmental over congenital because he felt that the term developmental "may be said to include both the hereditary tendency and the



environmental forces which are brought to play on the individual"; and (2) he described five syndromes of delay or disorder in the acquisition of language: developmental alexia, special disability in writing, developmental word deafness, motor speech delay, and stuttering. Thus, Orton was the first medical scientist who stressed the unitary nature of the language system and its sensory-motor connections. Disorders in this system cannot be split into either disorders of spoken language or disorders of written language. Listening, speaking, reading, writing, and spelling are all functions of the system of communication that we call language.

Orton, like his predecessor Hinshelwood, recognized that dyslexia may be neurologically based, but that its treatment must be educational. His recommended training procedures emphasize the establishment of phoneme-grapheme association and the appropriate sequencing of written and auditory symbols, i.e., the conversion of a spatial display into a temporal sequence. He pointed out "the one factor which is common to the entire group (of language disorders) and that is a difficulty in re-picturing or re-building in the order of presentation, sequences of letters, of sounds, or of units of movement." Orton emphasized that in teaching, one should establish associations involving the simplest possible units and should use various reinforcement techniques in order to establish firm association links.

Although the demand for universal literacy has had a brief history (coinciding in most western countries with the onset of the Industrial Revolution) there has been great interest throughout history in selecting the most effective methods for teaching reading, to which we will now turn our attention.

### Remediation For Dyslexia

The methods of teaching reading essentially fall into four groups: (1) Visual approaches, such as the Alphabet Method and the Word Method; (2) Auditory approaches as in the Phonic Method; (3) Kinesthetic-tactile approaches; and (4) Combined approaches. Remedial reading methods have grown out of developmental approaches, are used by specially trained personnel for individuals with severe reading disorders, and generally feature the combined approaches.

The alphabet and various combinations of vowels and consonants form the basis of the Alphabet Method. It was also combined with the Word Method as in the famous Hornbooks, made in England around 1450. These consisted of sheets of paper containing the letters of the alphabet and sample words, fastened to wooden paddles and covered by transparent horn for protection.

One of the first ABC books was published in Germany by Schulte in 1532. *The New England Primer*, probably printed in the 1680s, rested on the principle that learning the alphabet was the basis of reading instruction. This approach was also favored by Hinshelwood for remediation of word blindness.

The Word Method consists of learning whole words by configuration as the basis of learning to read, rather than isolated letters or letter combinations. The Moravian bishop, Comenius, in 1657, published the *Orbus Pictus*, the first children's book which contained pictures with the words underneath them which the children were to learn as wholes. This approach was also promoted by the Swiss educator, Pestalozzi, who believed that learning should be presented visually, using charts and graphs as much as possible.

In 1835, Thomas Gallaudet published *The Mother's Primer*. Gallaudet, the primary educator of the deaf in the United States in the 19th century, for whom Gallaudet College was named, searched for methods to teach deaf children to read. He wondered how the children could make sound-symbol correspondence if they were unable to hear the sounds. *The Mother's Primer*, was the first look-say children's reader. Its first line reads: "Frank had a dog. The dog's name was Spot." Obviously, the name, Frank, was more visible and easier to lip read than the name, Dick. Gallaudet's Primer was successful in teaching deaf children to read and also produced good

results when used to teach children with normal hearing. Horace Mann, a lawyer who became Secretary of the Massachusetts Board of Education in 1837, disliked the Alphabet and Phonic approaches then in use. He was impressed with the success of Gallaudet's Primer and endorsed its introduction in the Boston public schools. In 1840, Josiah Bumstead published *My Little Primer* and this marked the beginning of the publications battle between proponents of "look-say" and phonics.

Although the Phonic Method has been used since early Greek and Roman schools, the most complete phonic approach to reading was not published until the late 19th Century, *Pollard's Synthetic Method, A Complete Manual* (1889). But phonics fell into disrepute. Mills (1964) said, "by 1920, there was such a reaction against the phonic approach or any method of teaching specific words that no reputable school would dare promote such techniques....These trends gave way to unstructured developmental reading programs which engendered a storm of protest from parents and teachers that the children were not learning how to read." As a result of parental protests, phonics was again added to the curriculum by the 1930s, but it was only one of the different approaches to teaching reading. Phonic instruction has remained a part of almost all total approaches to reading and of remedial reading techniques ever since.

From the earliest times we find descriptions of various forms of the Kinesthetic Method. Plato (427-347 BC) in his "Protagoras" describes the early stages of learning to write: "where the boy is not yet clever in writing, the masters first draw lines, and then give him the tablet and make him write as the lines direct." Horace (65 BC) suggested that children learn letters by using pieces of pastry made in the shape of letters. Seneca (3 BC to AD 65) suggested that the teacher guide the child's fingers as they trace the letters written on a page.

Marcus Fabius Quintillian, (in Haarhoff, 1920), around AD 35-100, disapproved of the idea of delaying teaching until a child was seven years old and stated, "much can very profitably be done by play long before that. On the other hand, he reminded teachers of the waste that follows from trying to pour water too fast into a narrow-necked vessel when he cautioned against undue haste and adult pressure in the teaching process. He stated, "It is a mistake to teach children to repeat the Alphabet before they know the form of the letters. These they may learn from tablets and blocks. As soon as the letters are recognized they ought to be written. Following with a pen the form of letters engraved on ivory tablets is a good thing. After letters syllables must be learnt, all the possible syllables in both languages (Latin and Greek). After the syllables come words, and after the words sentences....As soon as the child has begun to know the shapes of the various letters, it will be no bad thing to have them cut as accurately as possible upon a board so that the pen may be guided along the grooves. Thus, mistakes such as occur with wax tablets will be rendered impossible, for the pen will be confined between the edges of the letters and will be prevented from going astray." He also suggested learning the sound and the form of the letter simultaneously. Quintillian had taught the Roman soldiers to write using a stylus and wax tablets with the letters grooved in them. These were changed to ivory tablets because the heat in Rome was considerable and the wax tended to melt, thus causing the mistakes that he noted. He sounds so modern in saying that a good teacher "will ascertain the dispositions and abilities of his pupils so as to adapt his methods to each individual."

Probably the most successful approaches, to beginning reading as well as in remediation, have been the Combination approaches. McGuffey (1879) in the preface to his *Eclectic Primer* stated, "the plan of the book enables the teacher to pursue the Phonic Method, the Word Method, the Alphabet Method, or any combination of these methods."

Although the concepts of teaching via sensory and motor routes were not new, in 1912, with the publication of the American version of her book, The Montessori Method, Maria Montessori established the basis for a combination of visual, auditory, kinesthetic, and tactile teaching approaches. She was influenced chiefly by Seguin (1768-1835) and Itard (1775-1838).

They, in turn, reflected the thinking of John Locke (1632-1704), Jean Jacques Rousseau (1712-1778), and Johann Pestalozzi (1746-1827). Pestalozzi believed that sense perceptions are vitally important in the development of a child's mind. To help a child develop his sense of touch, sight, and sound, Pestalozzi designed an entire series of object lessons as instructional aids for mastering the fundamentals of language, number, and form. He advocated proceeding from the concrete to the abstract and from the particular to the general, using everyday objects like animals, plants, and tools.

Pestalozzi had an influence on elementary education which has lasted to this day. He studied and taught with Froebel, who gave us the kindergarten, "a garden where children grow". His influence on Itard, Sequin, and Montessori and all elementary education was tremendous.

Dr. Montessori stressed the importance of both the tactile and kinesthetic senses in teaching young children to write and subsequently to read. She introduced the sandpaper letters for children to trace as they voiced the sounds of the letters. In many cases, those who advocated the kinesthetic or tactile-kinesthetic approaches found that children tended to write before they read. In fact, Freud (1891) said that "we are able to write directly from discerned images with the aid of kinesthetic impressions without depending on the visual element." He also pointed out that the skill of writing is less vulnerable than is that of reading.

In 1943, Grace Fernald, published her *Remedial Techniques in Basic School Subjects*. For remediation she used the multisensory approach which we now call V-A-K-T (visual-auditory-kinesthetic-tactile) in analytical breakdown. Fernald uses a four-stage system for teaching reading, which begins by having the child trace words with his finger, saying each syllable or word as it is traced; the child writes the words he speaks before reading them. This is sometimes called "look-say-do." Fernald's book is the account of over twenty years of her work with individuals who had reading disability.

Anna Gillingham, an educational psychologist, and Bessie Stillman, educator, worked with Dr. Orton to develop the Gillingham-Stillman Approach, which uses the multisensory VAK in a synthetic method. Gillingham and Stillman (1965) based their method on the neurological theories of Dr. Orton. They stated that "before the child is asked to write there must be whatever practice is necessary in tracing, copying, and writing from memory to dictation, this last being sometimes carried out with the child's eyes averted...." In all instances the child says the name of the letter as he writes it. This is called "S.O.S." (Simultaneous Oral Spelling).

Orton recommended that language training should start with small units the pupil can handle easily and then proceed by orderly steps from the simple to the more complex. He advocated the use of all sensory pathways to reinforce weak memory patterns and to strengthen one another. Orton also stated, "It cannot be too strongly emphasized that simply teaching the child to be able to give the sounds for each letter of the alphabet and for the phonograms, etc., is hopelessly inadequate for his needs....The next and most cardinal step (is) that of teaching the blending of the letter sounds in the exact sequence in which they occur in the word." He stressed the process of synthesizing the word as a spoken unit from its component sounds as one of the most difficult tasks for the dyslexic child and one of the most important steps in teaching.

Orton influenced Romalda Spalding (1957, 1969), whose method, the *Writing Road to Reading*, was the result of his instructions to her when she tutored a few nonreaders. At the time, Spalding was a classroom teacher in the Bronxville Elementary School, New York. Spalding uses the Orton-Gillingham phonogram cards and the structured VAK Approach. She also incorporates the tactile sense, as did Fernald.

However, Spalding does not teach the names of the letters, only the sounds, nor does she use key words for teaching the phonemes. Hers is also an approach to learning the phonemic base of the language through listening, speaking, seeing, writing, spelling, and reading. Writing precedes reading, as with Montessori and Fernald.



Spalding writes, "Having been trained first in the written spelling of words from the teacher's dictation and having acquired a knowledge of phonics and rules of spelling, a class is able to begin its reading with well-written books which interest and educate and develop a love for reading and a taste for good writing." Also, "The core of the method is teaching the saying with the writing of the sounds used in spoken English. Soon the child learns to combine these sounds into words he knows. Conversely he learns to pronounce a written or printed word. Meaning is well taught with the writing by using new words in the writing of original sentences." As Spalding states, "My contribution has been chiefly to develop Dr. Orton's training into a method for classroom teaching." Aukerman (1971) reviews the Spalding Method extensively and includes some significant data that shows the success that many schools enjoyed with this method.

Beth Slingerland (1971, 1976) adapted the multisensory, synthetic, VAK approach now known as the Orton-Gillingham Method, for use in the classroom. She has also developed excellent screening procedures for identifying children at risk for reading disability. The successful Slingerland Approach has strong adherents, especially on the West coast of the United States.

Alphabetic-Phonics (Cox, 1986) is a 1980's organization and extension of the Orton-Gillingham multisensory teaching of the structure of English. It has been used tutorially and has also been successful with both dyslexic and non-dyslexic children in regular classrooms in the primary grades.

Project READ was originally designed by Mary Lee Enfield and Victoria Greene (1976, 1981) to provide an alternative approach to beginning reading which can be used by teachers in regular classroom for the small group of children who would comprise the bottom twenty-five percent of the class. They have expanded Project READ to provide an excellent program in reading comprehension.

Other multisensory approaches to beginning reading which have proven successful over the years include: the *Edith Norrie Letter Case Approach* (Norrie, 1960), derived from the Danish neurologist Knud Hermann's theories and which is similar to Gillingham-Stillman; the *Hickey Method* (Hickey, 1977), a derivative of Fernald's approach; *Alpha to Omega* (Hornsby and Shear, 1975), a modification of the Gillingham-Stillman Method; *Recipe for Reading* (Nina Traub, 1973); the *Herman Method* (Renee Herman, 1975); and the *Colour Phonics System* (Bannatyne, 1967).

These are all examples of principles and techniques that have been demonstrated to work. They emphasize the direct, structured instruction of decoding via phonics. The teaching proceeds slowly in small steps, is sequential, provides immediate feedback, and is multisensory in its presentation. In each case there is much practice and review until the skills become automatic, thus freeing the student to concentrate on understanding.

Having reviewed the disorders of language, spoken and written, which are the two major strands comprising the field of learning disabilities, we now come to the third strand, perceptual-motor disorders.

### Disorders Of Perceptual-Motor Processes

Not until the late 1930s did we become concerned with the influence of perceptual dysfunction on learning, especially the basic skills. The work of the neurologist and child psychiatrist, Alfred Strauss, had a revolutionary effect on special education. In *The Psychopathology and Education of the Brain-Injured Child* (1947), Strauss and Laura Lehtinen-Rogan, an educator, described the perceptual and thinking disorders, perseveration, hyperactivity, distractibility, and lack of inhibition characteristic of brain-injured children. Until the publication of this book, the concept of the "minimally brain-injured child" was unrecognized in education.



However, children who couldn't learn to read and who showed any of these characteristics now began to draw a great deal of attention.

The parents of children with learning disabilities began to demand more appropriate education for their children. Parents and teachers of children with the "Strauss Syndrome" were most vocal in this regard, which is not surprising since adults tend to react vigorously to the children who disturb them the most. Language disorders are invisible. Hyperactivity and disorders of attention are both visible and audible.

Following publication of Strauss and Lehtinen's book, and that of *The Other Child* by Lewis (1951), parents of these youngsters began to organize. New York and New Jersey each formed an Association for Brain-Injured Children, and Chicago organized the Fund for Perceptually Handicapped Children. At a conference sponsored by the Fund, Samuel Kirk (1963) introduced the term "learning disabilities" to describe: "a group of children who have disorders in development in skills needed for social interaction." He excluded children with sensory handicaps "because we have methods of management and training the deaf and the blind," and excluded children with "generalized mental retardation." On the same evening following his speech, the convention voted to form the Association for Children with Learning Disabilities (A.C.L.D.). Dr. Kirk gave the field its name!

The A.C.L.D. selected a national Professional Advisory Board representing a cross-section of individuals concerned with spoken and written language disorders as well as perceptual-motor disorders. As a result of the "Parent Power" of the A.C.L.D., this seemingly new condition of learning disabilities got the attention of the public, state and national legislators, and educators.

It is interesting that the smallest percentage of children with learning disabilities, those who we now call children with attention deficit disorder (ADD), ultimately had the strongest influence on educational change, which I will address next.

### Special Educational Approaches

The clinical and psychological findings of Strauss were the bases for the development of Laura Lehtinen-Rogan's methods of educational treatment for brain-injured children. Major concerns were the effects of brain dysfunction on attention, perception, and behavior. Lehtinen-Rogan believed that hyperactivity is the result of the child's inability to deal with incoming stimuli. Both she and Strauss emphasized the importance of training or treating the perceptual-motor processes. Representatives of several different disciplines concerned with learning disabilities were strongly influenced by Strauss and his work with Lehtinen-Rogan.

N. Getman, optometrist, worked with Gesell at Yale in the 40s on the development of vision in the infant and child (1949). Getman was a strong proponent for the importance of vision in learning (1962) and is known for his developmental approach to perceptual-motor disorders.

Newell C. Kephart, psychologist and co-author with Strauss of Vol. 2 of *The Psychopathology and Education of Brain-Injured Child*, (1955) is best known for his strong emphasis on the sensory-motor basis of learning, and for his book, *The Slow Learner in the Classroom* (1960).

The remarkable educator, Marianne Frostig, (1964) was known chiefly for her work in visual perception. However, her writing was prolific and included much on the treatment of language, cognitive, and auditory perceptual disorders in learning disabilities. She believed that perceptual adequacy is fundamental to academic achievement.

William M. Cruickshank, who studied with Strauss and Werner, has been the most influential educator in the area of instruction for children with brain-injury (1961). Cruickshank modified Strauss and Lehtinen-Rogan's approach to the education of brain-injured children and stressed four principles: (1) reduction of unessential visual and auditory stimuli; (2) reduction of

environmental space; (3) a highly structured daily program; and (4) use of multisensory instructional materials. Of particular note, cursive writing is taught in a developmental kinesthetic approach, and may proceed the teaching of reading.

### Discussion

Disorders of spoken and written language, and perceptual-motor disorders clearly are the central issues, the core of the concept of learning disabilities. Those who have contributed to our knowledge of this concept and who have developed a variety of educational approaches include physicians, speech-language pathologists, educators, linguists and psycholinguists, optometrists, psychologists and neuropsychologists. No one discipline, medical or educational, and no single technique or method of remediation has yet or will by itself solve the broad problem of learning disabilities.

The speech-language pathologist focuses on disorders of spoken language; the educational or academic therapist focuses on disorders of reading, writing and spelling; and other learning disabilities specialists focus on the behavioral and perceptual-motor disorders they see. Each reflects the particular school of thought in which he or she was trained.

I believe that we must seek to understand the source(s) of our individual biases with regard to etiology and therapy. I could revive the analogy of the ten blind men examining an elephant but prefer to quote Kurt Goldstein (1948): "The different views regarding the nature of man reflect themselves in the discussions of man's outstanding capacity: language. From this stem many differences in methodology of investigation, reporting and interpreting the phenomena. Depending upon his theoretic preconception, a particular investigator will tend to emphasize different parts of the findings." (italics mine)

The remedial strategies each chooses will depend in kind on the theoretical base subscribed to by the therapist. Many of us tend to think in terms of either-or in relation to both diagnosis and treatment; e.g., it is either a language disorder or a perceptual-motor disorder; one must use either this method or that for therapy. Yet children don't fit into neat little boxes. A child will usually demonstrate problems across several domains. A child with a history of developmental delay in the acquisition and use of spoken language will frequently demonstrate academic difficulties in learning to read, write and/or spell. He may also demonstrate disorder in the functions of attention, perception, and/or poor coordination. And the problems will change in severity and in kind over the individual's lifespan.

The three strands we have discussed are inseparable and interdependent. Sensory-motor and perceptual-motor development in the very young child prepares the way and is part of all learning, especially language learning (spoken and written). And the learning disability with which we here are most concerned is in the area of written language -- also a concern of the nation in its intermittent struggle against illiteracy.

To address the many problems which exist in the broad spectrum of learning disabilities is a formidable task, which defeats every attempt at solution. However, we can address dyslexia, or specific language disability, or specific reading disability, however you want to call it, wherein the major task is to teach dyslexic individuals to read and write our language. We can address illiteracy, regardless of its causes. Reading has been and is being taught successfully in many classrooms in public and private schools. Why not in every classroom? Why must we spin our wheels waiting for "controlled studies" to prove what we can see, if we just observe the classrooms where children are learning?

Literacy has once again become a topic of interest in our country. In 1986 the Census Bureau released results of a literacy test that showed that at least thirteen percent of adults could not read well enough to answer simple multiple choice and fill-in-the-blank questions. As a result, a

massive literacy program ensued and a national campaign was spearheaded by Public Television and the American Broadcasting System. As you know, Project Literacy U.S. (PLUS) was launched.

Educators soon began to criticize the literacy programs that resulted from the Census test and the PLUS campaign. They concluded that literacy wasn't really a serious problem because such a small percentage of people signed up for the programs and stuck with them! Of course, the programs were run by volunteers who were not expert in any of the corrective or remedial reading techniques. In response to this, Thomas G. Sticht, Ford Foundation and US Army reading researcher, made the comment "what they need are some genuine education and training programs, not a simple-minded crusade."

The three techniques most commonly used today in remedial reading education are: the basal reader or experience approach using just visual and auditory techniques; the Fernald approach and its variations using VAKT in analytical breakdown; and the Orton-Gillingham approach and its variations using VAK in a synthetic method (See Schiffman, 1962). It seems to me that, if the country really wants to tackle the problem of illiteracy, we need to provide many remedial programs rather than the "simple-minded crusade".

Our history tells us that, regardless of profession -- whether medical or educational -- there has been some agreement that disorders of language and/or perceptual-motor processes can interfere with learning the basic academic skills as well as the living, or social, skills. These disorders are not mutually exclusive.

There also appears to be some agreement among educational and language specialists on the principles of remediation for those with severe disability in learning basic skills. The remedial approaches are drawn from regular education and are based on sound psychological principles of learning.

Our language is based on phoneme-grapheme correspondence (Hanna, 1966). Jeanne Chall (1967) concluded that the best results are achieved in teaching reading by way of a code-emphasis method. To try to learn to read without understanding the phonemically regular relationships in our language is to place a tremendous burden on the learner.

Psychologists teach us that learning proceeds from the concrete to the abstract. Many others have taught us that too through our history. The child who is just beginning to learn needs some concrete rules for pronunciation and spelling as a frame of reference. The object of reading is to get information from the printed page. However, the individual first must be able to attend and to decode the graphic symbols easily and with some degree of automaticity. Even in 1891 Freud said, "...understanding becomes impossible once reading itself has become difficult." More recently, Rawson (1988) said, "Decoding, properly taught, is the way to the reception of the printed verbal message; we cannot read without it. The other side of the coin, the apprehension of meaning, which is the reason for reading, is the business of education."

Many of the beginning approaches to reading as well as remedial reading methods developed a century (or more) ago include listening, speaking, writing, spelling and reading activities as part of a total language arts approach. This is in accord with the psychological principle of reinforcement of learning through the several sensory pathways to the brain; i.e., a multisensory approach.

It seems to me that all who ascribe to good teaching should pull together in advocacy for these principles -- not for one particular procedure, especially when most of the teaching methods are related to each other through their common origins. There are many excellent in-service training programs for teachers of the basic skills, reading in particular. One of the longest-standing is at the Reading Center in Rochester, Minnesota. This is co-directed by Paula Rome, niece of Dr. Paul Dozier, who was Orton's close associate for many years, and Jean Osman. They provide instruction and practicum in the Orton-Gillingham approach from basic to advanced language.



Other excellent training programs are provided by Enfield and Greene in Project READ; by the Slingerland Institute; the Spalding Institute; the Alphabetic-Phonic Program by the Child Study Center at Teachers' College, Columbia University and in Texas by the Aylett Royal Cox Institute; by Renee Herman; and by the followers of Traub, Fernald, Frostig, etc.

Some Colleges of Education have first-rate researchers studying language, memory, and learning, yet the graduating teachers from those same colleges may not know more than one approach to beginning reading and special education graduates may not even know one method of remediation. Much worse, to my way of thinking, they are usually unaware that good teaching practices have been described in the literature for at least two centuries. How many of them even recognize the names I have cited today? I believe it was Santayana who said that those who fail to understand their history are doomed to repeat it. Fernald believed that "most cases of reading disability are due to blocking of the learning process by the use of limited, uniform methods of teaching. These methods, although they have been used successfully with the majority of children, make it impossible for certain children to learn because they (the methods) interfere with the functioning of certain abilities that these children possess."

Further, as deHirsch (1984) has stated: "Our present-day knowledge is sufficient to clear the way for preventive work. We are undoubtedly able to pick out those youngsters in kindergarten who are liable to turn into dyslexic children. Exposing these particular youngsters to a different educational approach would eliminate much of the later-developing frustrations and disabilities."

Montessori has shown that the sensorimotor exercises with geometric forms, sandpaper letters and the moveable alphabet, as well as a variety of practical life exercises for indirect "preparation of the hand," can be used successfully in preschool to ready the child for writing and reading. She believed that the major preparation for reading was speaking and writing. This is also true of Spalding, who emphasizes that prevention is the most important feature of the multisensory approach and that most children can begin to learn to say and write the phonograms in kindergarten or earlier. There is ample evidence that good methods exist for helping children to learn the basic skills. Good methods also exist for identifying children who are at risk and for preparing them for reading in the preschool period. We have this information and have had it at hand for a long time. We should begin to use what we know in ways that are most productive for the children.

We have seen the terrible pain and ego disintegration that occurs when a child is unable to learn what we want him to learn, in the time we give him to learn it, and in the way we teach it to him. We know that learning is an interactive process. In this case, failure to learn to read can be considered either as the result of something being wrong with the learner or something wrong with the teaching or with both. Instruction must be provided in educational environments which accommodate to the individual differences of the learners by providing alternative educational strategies which relate to those differences. If the first steps to success in school are by way of language -- speaking, reading, and writing -- then it is up to the teachers to find the ways to teach language to all children -- without pain and with love.

Language is man's greatest achievement. As Ellis (1988) stated, "If language and education are intertwined, then colleges must, it seems to me, perceive the love affair with language as pedagogically sound and important." In order to teach children how to read and write and spell, how to express themselves in written language as well as in spoken language, educators and remedial specialists from all fields must themselves have an intimacy with language. Literacy gives us the keys to knowledge and wisdom -- the Keys to the Kingdom. Isn't it time now for us all to put our heads together, to work together to see to it that those keys are given to every child?

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“Children with dyslexia are reportedly the majority of individuals with learning disabilities. Most researchers have reached consensus that dyslexia originates with specific impairment of language processing.”

Sylvia Richardson



Sound symbol correspondence drill for students with dyslexia.



# **Coping with Dyslexia in the Regular Classroom: Inclusion or Exclusion**

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*The article begins with an historical review of the many attempts to cope with learning disabled and other handicapped children in schools, especially in regular classrooms. Children with dyslexia are reportedly the majority of individuals with learning disabilities. Most researchers have reached consensus that dyslexia originates with specific impairment of language processing. Although it would seem necessary for educators, especially those who teach the primary grades, to understand the structure of the English language and the alphabetic writing system, there is evidence that teachers are not required to have such command of language and how to teach it. The need for establishment of a comprehensive, interdisciplinary teacher education and training program will be discussed. This would include a core body of knowledge, relevant skills, and an understanding of methods, attitudes and values of participating disciplines. Without appropriate changes in teacher preparation it is doubtful that inclusion in regular classrooms will provide much educational benefit for the dyslexic population in our schools.*

The dictionary defines coping as contending (striving) with difficulties and acting to overcome them. We have tried to contend with the "difficulties" encountered by handicapped children in the regular classroom for the past 30 years, at least.

Current literature abounds with articles for and against "inclusion" (see Houck and Rogers 1994), most stressing the need to maintain it within a continuum of services for children with learning disabilities. Some stress the need for team teaching or collaboration among special educators, classroom teachers, and administrators; others seem to fear that to promote inclusion is to exclude special education (Lerner 1987). Many articles give the impression that inclusion is a new concept, a new battle to be fought. However, this is hardly the case. In this paper, I will review the circuitous path toward better accommodating all children in regular classrooms, and share some lessons learned. It is my contention that inclusion can be successful only if the colleges of education redesign teacher education.

## HISTORICAL PERSPECTIVES

In 1966, Ed Martin first began working with Congress to help create the Bureau of Education for the Handicapped (BEH), hoping to provide a catalyst for local and state efforts. In response, the Federal Government funded personnel training that helped establish and strengthen Departments of Special Education in colleges across the country. However, the focus of the BEH was on preparation of teachers to provide a continuum of special services for the handicapped, not inclusion of the handicapped in a regular classroom (Deno 1975). Programs for early childhood education also were established that built a new field of services and a whole new discipline, pushed forward because of emphasis on programs like Headstart and the BEH's model programs. It was finally acknowledged that children who got off to a good start could be helped.

The BEH, assisted by then Commissioner of Education Sidney Marland, continued to work diligently to advance their concept of the "right to education by 1980" for the handicapped. However, a national goal could not be established because, at that time, the administration believed that education of the handicapped was the responsibility of the states. The federal government funded training, research, and model program development, but not basic support services.

Serious consideration of mainstreaming (inclusion) surfaced in 1972 when the state of Massachusetts passed Chapter 766. This provided funding for inservice teacher training intended to help regular and special educators work together with handicapped children in the regular classroom.

The BEH continued to work with the Education Commission of the States, the Council for Exceptional Children, and state legislatures, as well as behind the scenes with parents (ACLD/LDA) and with lawyers who dealt with cases establishing rights to equal opportunity, until the stage was set for the entrance of Public Law 94-142.

Of particular note, between 1969 and 1974 the BEH worked with the Bureau of Personnel Development (BEPD) to establish the Exceptional Child Program in order to encourage training institutions to modify existing preparation programs so that regular teachers and other educational personnel would be capable of working with handicapped children in the regular classroom. The BEH trained special educators and the BEPD trained regular educators to work together in the classroom. As the BEPD was phased out, it established the Teachers Corps, headed by Marie Barry. The Teachers Corps was a reform program designed to improve the education of disadvantaged children through improved teacher education. The original legislation was also intended to encourage colleges and universities to broaden their programs of teacher education. The Corps was authorized to train college graduates and advanced undergraduates to serve in teams under experienced teachers; to attract volunteers to serve as part-time tutors or full-time instructional assistants; to teach educational personnel to provide specialized training for youth offenders, juvenile delinquents, and adult criminal offenders; and to support demonstration projects for retraining experienced teachers and teacher aides serving local education agencies. This was a wonderful program as far as it went, but funding ran out after 1977. The Leadership Training Institute was also established by the Teachers Corps.

Finally, Congress enacted PL 94-142 in 1975, the Education for All Handicapped Children Act, now known as the Individuals with Disabilities Education Act (IDEA). Unlike other federal education laws, this law has no expiration date—it is regarded as permanent.

Actually, 94-142 (IDEA) does provide for mainstreaming, or inclusion, in the regular school program to the extent that it meets a child's needs, as determined by a multidisciplinary evaluation and a cooperatively formulated individual education plan. It provides a continuum of services, which includes individualized instruction in special resource rooms for part of the day, consultation for regular classroom teachers, and appropriate accommodations within the regular classroom to help the student meet instructional goals. Ideally, teachers are to be pro-

vided with support services that will enable them to meet the needs of all students within the classroom.

By 1976 many questions had arisen: Were classroom teachers adequately prepared? Were student teachers being adequately prepared to meet the needs of the handicapped? At that time, many feared that mainstreaming would result in deteriorated education for the handicapped and less effective education for all students.

After PL94-142 was passed, the National Education Association (NEA) expressed concern that the "ideal" form of mainstreaming would be discarded in favor of all but the most severely handicapped children in regular classrooms without adequately considering the impact on the classroom or the teacher and without providing additional support services. They expressed fear that, in the context of shrinking local and state resources, local education agencies would force mainstreaming by laying off special educators who are most able to provide essential support services. Reinforcing their fear, they cited an AFT Crisis Report on conditions in the New York City schools:

Some of the cuts in teaching personnel are producing "mainstreaming" even though there may have been no plans or preparation for such organizational adaptation which places handicapped and special children into regular classrooms. Such hasty reorganization results in poor quality teaching and learning, and many teachers resist mainstreaming, not because they dislike the handicapped but because they feel ill prepared to work with students who require extra and special attention because of their physical, emotional, or mental handicaps (Jan. 1976).

In light of these concerns, the Representative Assembly of the NEA approved the following statement:

*The NEA will support mainstreaming of handicapped children only when:*

- a. It provides a favorable learning experience both for handicapped and regular students.
- b. Regular and special teachers and administrators share equally in its planning and implementation.
- c. *Regular and special teachers are prepared for these roles.*
- d. Appropriate instructional materials, supportive services, and pupil personnel services are provided for the teacher and the handicapped student.

- e. Modifications are made in class size, scheduling, and curriculum design to accommodate the shifting demands that mainstreaming creates.
- f. There is systematic evaluation and reporting of program developments.
- g. Adequate additional funding and resources are provided for mainstreaming and are used exclusively for that purpose (NEA Infopak #9, 1976).

Partially as a result of this strong statement, *comprehensive personnel development* under PL 94-142 became a major concern. However, as noted earlier, by 1977 funding for the Teachers Corps had evaporated, in spite of its success. This may have prompted the BEH, in 1977, to fund approximately 60 projects in colleges and universities with grants to help underwrite the developmental costs of making teacher education more responsive to the needs of handicapped children. These were the "Dean's Project Grants," intended to go to academic officers who could renegotiate arrangements between regular and special education to adapt school instructional settings for handicapped students, and also integrate these new arrangements in the training programs. Although the Deans' Project Grants had the potential to exert a powerful effect on redesigning teacher education, this did not prove to be the case.

In 1986, the Office of Special Education and Rehabilitation Services (OSERS) became concerned about the issue of inclusion. Madeleine Will (Will 1986) proposed the Regular Education/Special Education Initiative, urging the partnership of the two groups to adapt the regular classroom for children with special needs (see Martin 1987 and Byrnes 1990). Was this old music with new lyrics? Remember Chapter 766 enacted by the Massachusetts legislature in 1972? (14 years earlier!)

More recently, in 1992, in spite of cut-backs in education funding and unresolved problems, the National Association of State Boards of Education (NASBE), in their publication, *Winners All: A Call for Inclusive Schools*, have called for FULL inclusion, "all means ALL." They believe that all students should attend their home school with their age and grade peers and state that "to the maximum extent possible, included students receive their in-school educational services in the general education classroom with appropriate in-class support" (p. 12). The report states further that "Students do not move through the traditional lock-step, age grade progression, but are rather grouped heterogeneously based on the particular lesson." . . . and that

teachers would be "empowered to deal with diversity in their classrooms with the support of teams consisting of administrators, special educators, classroom teachers, and someone from related services (a nurse, guidance counselor, or Chapter 1 teacher)" (p. 20) (see Council for Learning Disabilities 1993).

## CURRENT STATUS OF INCLUSION

Actually, successful collaborative teaching approaches and excellent in-class support services have been developed, and regular class environments do seem more sensitive today than ever before. But this is not universal and many problems remain unresolved. Many classroom and special education teachers are shackled by lack of administrative understanding and support. Too little planning time is provided. Too many teachers are handicapped by lack of materials and are unaware of alternative approaches and methods for meeting the needs of special children.

Although we have had a Federal law for twenty years ensuring the rights of handicapped children to an appropriate education in the least restrictive environment, it sometimes seems that the major focus is more on the location of that education than on content or methods of teaching. There seems to have been relatively little attention paid to defining what is considered to be "appropriate."

We have circled around from "mainstreaming if possible" to "full inclusion to the maximum extent possible." Emphasis is now placed on the necessity for collaborative or team teaching. However, it should be kept in mind that simply to include a special educator or a support team in the regular classroom will not automatically ensure an appropriate education in the least restrictive environment.

Most teachers can teach most students effectively if they have the right tools, but the tools are usually not acquired during preservice education. Most teachers and principals care deeply about the children in their charge and care even more when their children fail to learn. They look for ways that will work, but are painfully aware that they do not know the range of instructional methods from which to select those that best suit each student's learning style.

It is abuse of the concept of "least restrictive environment" to place disabled students in a regular classroom with the expectation that there will be any significant learning unless teachers are armed with instructionally effective programs.

One-size-fits-all may apply to clothing, but it does not work in the education of children.

## REDESIGN OF TEACHER EDUCATION

Research and data based articles written in the 70s and earlier repeatedly pointed to the need for inservice training of teachers. But why not redesign teacher education at the undergraduate and postgraduate preservice levels, where it is most needed? Because most attempts to redesign teacher education to date have been unsuccessful, some form of inservice education has always been necessary. It is interesting how many school districts rely on private-sector programs for inservice training in teaching reading, writing, spelling, and math. Many such programs (e.g., Project Read, Slingerland, Spalding, Alphabetic Phonics, Wilson, Lindamood) use a multisensory approach to teach the structure of language (International Multisensory Structured Language Education Council 1995).

In order to achieve significant reform, Colleges of Education could provide a core curriculum within comprehensive, interdisciplinary education and training programs in the preparation of *all* students, whether they plan to become administrators, regular classroom teachers, special educators, speech-language pathologists, reading specialists, or guidance counselors (National Joint Committee on Learning Disabilities 1982).

Central to a core curriculum is learning and the role of language in learning. A large majority of individuals with learning disabilities have specific difficulty in reading, writing, and spelling (Lyon 1995). Reading researchers have reached consensus that most of these disabilities originate with specific impairment of language processing. Thus, in order to prevent this major problem and to provide early and appropriate intervention, it is imperative that regular education teachers (especially in primary classrooms) and special educators, have thorough knowledge of the structure of language and the alphabetic writing system.

As of now teachers are not typically required to have a command of language and how to teach it. Teacher knowledge of phonetics, phonology, morphology, and the organization of the English spelling system is depressingly low (Moats 1994). Moats' survey of 103 teachers, a diverse group educated at a variety of colleges and graduate schools and experienced in classroom teaching, revealed poorly developed concepts about language and marked conceptual weaknesses in the very skills



needed for direct, systematic, language-focused reading instruction. Knowledge of phonics was surprisingly weak and only 27% were able to identify the component morphemes of words such as "psychology" or "perimeter" (Moats in press).

Clearly, those who teach beginning reading, as well as reading specialists, speech-language pathologists, and special educators, must have a command of all aspects of spoken and written language: the identity and categories of speech sounds, sound-symbol correspondence, historical changes in English spelling and pronunciation, and organization of the English orthographic system. They must have a working knowledge of syntax, semantics, and pragmatics in order to integrate instruction in language systems for listening, speaking, reading, and writing. It is my opinion that this type of preparation should be demonstrated in order to fulfill teacher-certification requirements in both regular and special education.

In order for dyslexic children to cope in the regular classroom, I think our first consideration should be directed to the preschool and primary grades, where children must learn to read, write, and spell—to learn the structure of their language. It is in these first years of school that learning difficulties or differences must be identified and dealt with before failure begins to take its toll. For dyslexic children, a multisensory, structured language education has proven to be most successful when provided by teachers who are well trained and experienced in this approach (Adams 1992).

Katrina deHirsch (1984) wrote: "Our present-day knowledge is sufficient to clear the way for preventive work. We are undoubtedly able to pick out those youngsters in kindergarten who are liable to turn into dyslexic children. Exposing these particular youngsters to a different educational approach would eliminate much of the later-developing frustrations and disabilities." Montessori showed that, with a multisensory, or sensorimotor approach, preschoolers can learn to write and read. Many studies have indicated that the code emphasis approach produces the best results in basic reading (Adams 1992). Preschool would also be the appropriate time to begin this approach for at-risk and dyslexic children.

Recognizing the need for institutions of higher education to reevaluate their roles and responsibilities for the preparation of all prospective professional personnel, the National Joint Committee on Learning Disabilities (NJCLD) recommended the establishment of a comprehensive, interdisciplinary teacher education and training program that consists of didactic and

practicum experiences within a core curriculum that would include the following areas (National Joint Committee on Learning Disabilities 1982)

1. *Human development and its psychology*: includes (a) knowledge of human growth, development, and its variations; (b) theories of learning, including the basis of motor, cognitive, and linguistic development; (c) knowledge of social and emotional growth; and (d) development of critical thinking and problem solving abilities.
2. *Theories of language acquisition and use*: includes (a) thorough knowledge of the interacting components of spoken and written language, such as phonology, syntax, semantics, and pragmatics; (b) knowledge of the acquisition of these components, variations in the development of language and the development of metalinguistic abilities; (c) discourse; (d) text comprehension; and (e) the relationship of language knowledge to school achievement, social and emotional growth.
3. *Educational theory and practice in learning disabilities*: includes (a) knowledge of the nature and manifestations of learning disabilities; (b) identification and assessment of the individual with learning disabilities; (c) educational/therapeutic management and intervention; (d) knowledge of teaching/clinical methods; (e) curriculum planning and sequences; (f) systems of teaching content material; (g) systems for development of an adaptive, modified, alternative, or unique curriculum; (h) technical support systems; and (i) training in effective communication with students, their families, other professionals, and various publics.
4. *The development of preservice clinical consortia, education, and training centers*. It is essential that the practica and field experiences provide for comprehensive, graduated, and varied student centered experiences in both regular and special education, supervised directly by master teachers and clinicians.

## CONCLUSION AND PERSONAL RECOMMENDATIONS

In light of all of the above, my recommendations for ways to cope with inclusion of a child with learning disabilities or

dyslexia in a regular classroom would be to redesign teacher education to incorporate the following:

1. Understand and learn from our past endeavors in attempting to cope with inclusion. We should be able to do it better this time.
2. Encourage training institutions to alter existing preparation programs to establish a core curriculum within comprehensive, interdisciplinary education and training programs in the preparation of *all* educators.
3. Mandate inservice training for all teachers of kindergarten through grade 4 that will provide a working knowledge of the structure of language: phonology, syntax, semantics, and pragmatics. To this end, it may be advisable and necessary to authorize private-sector inservice training for these teachers, and for teacher certification as well. Perhaps the colleges of education would ultimately need to include multisensory, structured language education in the methods curriculum.
4. Provide inservice education for the administrative staff in each school district in collaboration with regular and special educators, speech-language pathologists, reading specialists, psychologists, and guidance counselors.
5. Modify curriculum and methods for teaching the basic skills. Multisensory, structured language education should be provided for all at-risk and diagnosed dyslexic children at least from preschool through the first four grades.

These recommendations are personal and presumptuous, and I realize that this is all "pie in the sky." How to reconcile the coexistence of differing philosophies, a growing need for change in education, and shrinking budgets is a vexing problem. However, with a greater commitment of the resources we already have, and a greater degree of coordination at all levels, perhaps we can bring that "pie" closer to earth.

I once spoke of an old word that refers to the human tendency to follow tradition, refusing to correct an error—*mumpsimus*. An old priest was corrected for erroneously saying "mumpsimus" in the service instead of "sumpsimus" (we have received). He stated that he had said "mumpsimus" for 30 years and refused to change it! Mumpsimus is now in the dictionaries, defined in the Oxford as "a traditional custom obstinately adhered to regardless of how unreasonable it might be." Webster says "an exposed but customary error bigotedly adhered to."

When one thinks of the information and misinformation that has been copied from one educational text to its successors purely on the basis of authority, use, and misuse, it is obvious that there is a great deal of mumpsimus in the education literature. And much of the mumpsimus attitude may be found in colleges of education, where the boundaries of "regular" and "special" education still exist. They have been there for at least 30 years and all refuse to change them!

It behooves all who are committed to the education of children to examine now and periodically what we are doing, to retain what is demonstrably yielding good results, to consign what is obvious mumpsimus to the scrap-heap, to eliminate the mumpsimus attitude from teacher education, and to ensure that all educators have a common store of well-founded knowledge as in other professions.

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# Montessori Applied to Language Learning Differences

## Montessori Applied to Language Learning Differences

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“One of the oldest programs for preschool education, and one of the most successful, was devised by Dr. Maria Montessori. In Dr. Montessori’s Own Handbook (1914, 1965) she states: “The techniques of my method, as it follows the natural physiological and psychological development of the child, may be divided into three parts: (1) motor education; (2) sensory education; and (3) language or intellectual education. The care and management of the environment itself affords the principal means of motor education, while sensory education and education of language are provided for by my didactic materials.” these are the very areas of function which present difficulty for children who are considered to be at risk for learning to read and write.

Sylvia Richardson



Montessori language lesson combining the sandpaper letters and sound boxes containing objects which begin with two different sounds for sound sorting.

## **LEARNING DISABILITIES and YOUNG CHILDREN: ISSUES in EARLY IDENTIFICATION and INTERVENTION**

**Sylvia O. Richardson, M.D.**

Learning disability (LD) has been defined by the National Joint Committee on Learning Disabilities (NJCLD) as a heterogeneous group of disorders presumed to be of neurological origin manifested differently and to varying degrees during the life span of an individual. These disorders are developmental in nature, occur prior to kindergarten and continue into adult life. Various manifestations of LD may be seen at different ages and as a result of varying learning demands. Early indicators that a child may have LD include delays in speech and language development, motor coordination, perception, and reasoning, prerequisites to academic achievement and other areas relevant to meeting educational goals. These indicators may occur concomitantly with problems in attention and social interaction,

Dyslexia has been defined by the International Dyslexia Association (IDA) Research Committee as one of several distinct learning disabilities: dyslexia is a specific language-based disorder of constitutional origin characterized by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties in single word decoding are often unexpected in relation to age and other cognitive and academic abilities; they are not the result of generalized developmental disability or sensory impairment. Dyslexia is manifested by variable difficulty with different forms of language, often including, in addition to problems reading, a conspicuous problem with acquiring proficiency in writing and spelling.

Approximately four decades ago when the U.S. Congress asked the National Institute for Child Health and Human Development (NICHD) to investigate LD, the researchers found that approximately 80% of children who were labeled as LD had specific reading disability. The research then focused on reading disabilities because they were found to be the most common type of LD, and clearly the most damaging in terms of an individual's school learning, school adjustment, and occupational and vocational success.

The NICHD studies resulted in an explosion of scientific knowledge about reading and its disorders. The results of this research underlie much of the work of the Committee on the Prevention of Reading Difficulties in Young Children (National Research Council), and the National Reading Council,

which has resulted in many new early reading programs like No Child Left Behind (NCLB), Early Head Start, and others. Many state Departments of Education now require that the teaching of reading must include the “5 building blocks” of *phonemic awareness, phonics, fluency, vocabulary, and comprehension of text*.

The NICHD research, conducted in approximately 20 universities and laboratories has demonstrated that:

1. Reading disability affects approximately 17% of school-aged children to some degree. This is typically reflected in slow, inaccurate decoding and word recognition. Such laborious reading of single words impedes the individuals' ability to comprehend what they have read, even though their listening comprehension of spoken language is adequate.
2. While other factors, such as delay in processing rapidly presented items, have been identified as contributing to reading disability; deficits in phonological processing reflect the major impediment in learning to read. These deficits are characterized by difficulties in phonemic awareness and segmenting syllables and words into constituent sound units called phonemes; in brief, difficulty in perceiving that each word is made of single sounds and that they can be manipulated.
3. Deficits in phonological processing, can be identified prior to kindergarten and first grade. However, the majority of children with reading disability are not identified until third grade. This is much too late!
4. Measures of phonemic awareness, letter name knowledge, and rapid automatic naming of familiar objects and colors (RAN), administered in the first semester of kindergarten, can predict which children are likely to fall in the bottom 10% in word recognition ability at the beginning of second grade.
5. Poor decoding and verbal memory strategies result in poor vocabulary, poor word retrieval and speed, resulting in poor comprehension of written language.
6. Behavioral and genetic studies show that deficits in phonological processing appear to be heritable. In genetic studies genes have been isolated on many chromosomes which affect orthographic skill development, phonemic awareness, phonemic decoding and word recognition. It has been

6. Difficulty in rapid naming of colors, familiar pictures, or numbers, although he/she can match them successfully.
7. By 5 years of age unable to identify or write any letters of the alphabet, although child has been read to frequently. Uninterested in print and resists or ignores books and other printed materials. On the other hand, may be successful in puzzles, games, construction and other types of manual or physical activity.
8. Difficulty in following multi-step directions. May not understand directions such as up-down, front-back, over-under, above-below.
9. Poor motor coordination, especially fine motor, as in the hands. May have difficulty dressing or undressing, learning to tie, button, or zip. May have difficulty with use of pencil, crayon, or scissors.
10. Inattention, marked impulsivity or hyperactivity.

Overall, the major problems demonstrated by children at risk for learning disability include disorders of fine and gross motor *coordination*; disorders of *language*; disorders of *attention*; and disorders of *perception*. These are not isolated but interdependent functions, and are present in varying degree throughout the lifespan of the individual and in changing order of importance.

Currently the schools seem to be concentrating on children who may be at risk for learning to read. Several screening tests are in use, such as Dynamic Indicators of Early Literacy Skills (DIBELS), the Comprehensive Test of Phonological Processing (CTOPP), Rapid Automatized Naming of colors and familiar objects (RAN); and tests that include sound matching (which word begins with the same sound as pan: hat, pig, cone); elision (say cowboy without the boy, cup without the c); sound counting (how many sounds in the word cat, lay, ice, box); or rhyme (say a one syllable word such as hot, and ask the child to say a word that rhymes, or sounds the same). These, with family history and observation of behaviors, allow teachers and other professionals, with a brief assessment, to identify which children are at risk of failing to develop their reading skills.



In fact, seasoned, observant kindergarten teachers usually can predict within the first three weeks of school which children will have difficulty learning the alphabetic code.

Development from infancy through the preschool years is characterized by broad variability in rates and patterns of maturation. For some children, differences or delays in abilities are temporary and resolved during the course of development. For other children, delays may persist in different domains of functioning, necessitating the child's referral for targeted assessment. At present, no clear distinction can be made in the early years between children who will make adequate progress with time from those whose problems will persist. A "wait and see" attitude is not in the child's best interest, nor is the misbegotten hope that the child will just "grow out of it." Of note, the premature identification of a disability can be just as damaging. Although young children who demonstrate difficulties in early development may or may not be at risk for LD, all who are considered to be at risk should receive carefully planned and responsive services and supports without delay.

The at-risk factors can be observed at home and/or in preschool. In both settings much can be done to help these little ones: improved listening skills, with emphasis on sound discrimination; articulation (speaking); assistance in the development of phonological processing; reading to them; vocabulary building; the development of fine and gross motor coordination; and also the time to practice activities in which they may excel as well as those with which they have difficulties.

In the home, children can develop language as a wonderful interactive tool for communication. The children hear and learn the melody of their language, the prosodic features, or intonations and inflections of speech.

A literate home provides the means for "early intervention": it contains interesting pictures, shelves of books, alphabet blocks, and many coloring books and story books. In such a home, children can begin to understand the precursors to literacy: the fact that print corresponds to spoken language; the conventions of print, such as awareness of pages and the direction of print and letters; and even a somewhat literary orientation to story-telling as the notion of sequence begins to appear. The opportunity for children to tell their own stories, to talk about the stories that were read to them, singing, play-acting, even imitating accents, will help them to develop articulation

and vocabulary skills, and will increase the overall development of spoken language.

Experiences like shared book reading, conversations about current and past events, as well as family trips to the zoo, market, library, and playground provide opportunities for such interactions and also stimulate conceptual and linguistic development.

Because reading disabilities are linked to spoken language disorders, attention must be paid to young children's development of speech, the sounds of language, how they are produced when we speak and how they are perceived when we listen. It is important to observe the children's use of language, their understanding of what they hear, as well as their motor skills, which include the articulation of speech.

The connection between language and movement is observed early, not only in articulated speech. When infants are able to touch, they begin to grasp. Soon, anything they can hold in their hands will be brought to their body and then to the mouth. Usually by one year of age, when distinctive utterances become more common, babies can already hold small objects between the thumb and forefinger and transfer them from one hand to the other. They can grasp a block, bang it around and then let go. They can now point to things and accompany their actions with sounds that resemble human speech. It is noteworthy that the areas in the brain for speaking and fine motor movements are adjacent to each other.

Usually by the age of two years, give or take a bit, the little ones discover that the things around them have names. Then, just as they handle, manipulate and combine objects, they begin to manipulate and combine sounds and words. Good auditory perception and attentive listening are necessary for the production of clear articulation and later decoding. Fine motor coordination of the hand is requisite for the development of handwriting skill. Thus, it is important to provide preschoolers with ample opportunity for listening and speaking as well as to help them develop their motor skills by way of drawing, building blocks, coloring, copying, tracing, or scribbling, and the correct use of holding the crayon or colored pencil. Many household activities aid in motor coordination, a sense of sequence, require concentration, hold attention, and promote both self-reliance and self respect.



These precursors to language and literacy occur prior to school entry for most children, but they are often delayed or deviant for children who are at risk academically. The presence of risk indicators warrants substantial and serious efforts to facilitate early learning success. Assessment must include not only the usual tests but also observation of the child's responses to developmentally appropriate preschool activities. The child's family should be involved throughout the entire process. When a question is raised about the course of a child's development as a result of observation or screening, the findings should be discussed with the family and caregivers to be sure they understand the significance, and every effort should be made to help them to help the child. In many cases, preschool may be the best intervention. Optimally a diagnostic preschool would be part of a comprehensive assessment.

During the preschool years, the term, "intervention", is a misnomer. Providing developmentally oriented activities is part of assessment, which requires observing children's difficulties and also the ways they respond to assistance. Identification of children's strengths as well as their weaknesses should also be included in the assessment.

One of the oldest programs for preschool education, and one of the most successful, was devised by Dr. Maria Montessori. In Dr. Montessori's Own Handbook (1914, 1965) she states: "The techniques of my method, as it follows the natural physiological and psychological development of the child, may be divided into three parts: (1) motor education; (2) sensory education; and (3) language or intellectual education. The care and management of the environment itself affords the principal means of motor education, while sensory education and education of language are provided for by my didactic materials." These are the very areas of function which present difficulty for children who are considered to be at risk for learning to read and write.

Montessori believed that the child's environment should be "prepared" and maintained by the teacher. She saw the teacher as the caretaker of the environment and as the child's guide.

The "prepared environment" in a Montessori school contains objects which can be used to achieve a definite purpose, to allow the child to carry out a piece of work with a practical objective. Such activities are called "exercises

in practical life”, and include manual activities, house work, gymnastics, and rhythmic movements such as dance.

Montessori designed materials for learning to dress and undress called “dressing frames”, used for buttoning, tying, lacing, and hooking. These materials, now found in most preschools, assist children who have difficulty with fine motor coordination to care for themselves, and they are also indirect preparation of the hand for writing.

The concept of indirect and direct preparation for learning is of major importance in the rich heritage given us by Montessori. She saw the existence of an epigenesis of intellectual functioning, which implies that the experiential roots of a learned behavior will lie in antecedent activities that may be quite different in structure from the schema to be learned.

The indirect preparation for handwriting is a good example. Materials are provided that will allow children to use the small muscles of the hand that will eventually hold a pen or pencil, such as the dressing frames. Many of the exercises in practical life require the use of the thumb, index and second finger to pick up small objects: the little knobs on the cylinder block, the handles for the little pitchers for pouring rice, coloring in the metal inserts with a colored pencil. Practice in these antecedent activities, which are designed to develop digital dexterity, leads to automaticity in manipulating the writing instrument later on. Handwriting is the motor aspect of written language; articulation is the motor aspect of spoken language.

Montessori effectively links language development with sensory-motor education, one facilitating the other. She did not devise a specific method for teaching reading. Instead she focused on the functions of language. She viewed written language as an extension of oral language. Through the multisensory, especially kinesthetic, approach used with sandpaper letters, word building with the moveable alphabet, and through the preparation of the hand in the sensorial and practical life exercises, most children come to spontaneous writing.

Montessori wrote (1912) “Touching the letters and looking at them at the same time, fixes the image more quickly through the cooperation of the senses. Later, the two facts separate: looking ( and listening) becomes reading; touching becomes writing. According to the type of individual, some learn to read first, others to write.”

In a Montessori preschool the assessment, or tests, for phonological processing such as phoneme counting, sound matching or rhyming, sound substitution, or deletion can lead to exercises in the indirect preparation for reading. The children's responses to screening can guide the teacher's use of the materials for language instruction. Montessori's approach to early childhood education utilizes materials and techniques that can be diagnostic for children at risk academically, and can also assist all children.

There are other preschool programs that are designed to assist parents to establish an optimal learning environment, such as Home Instruction Program for Preschool Youngsters (HIPPY), which centers on professionally trained paraprofessionals, themselves mothers of small children from the community served by the program, to work with families in their homes. In this program, over a period of two or three years, parent(s) and children work together at home with a series of weekly packets that concentrate on language development, sensory and perceptual-motor discrimination skills, and problem solving. They provide semi-structured activities and open-ended creative application of this learning with the help of objects found in every home.

The materials are designed to help parents with little formal schooling to teach these activities to their children successfully. Weaknesses in the program have been found in lack of theoretical support for some of the materials, insecure funding, and inadequate supervision.

Head Start and Early Head Start are the best known early childhood programs for economically disadvantaged children, although state and Title 1 programs also provide services. Head Start provides or arranges comprehensive services, including a "developmental curriculum", psychological and social services, nutrition and health, parent involvement and education. Adequate funding is a major problem.

It is important to remember that during the early years, at risk factors are not related to school or academic learning; they are developmental in nature. Assessment of pre-kindergarten children from a developmental point of view requires observation and the use of developmentally oriented materials and activities; it also requires observation of children's strengths as well as their weaknesses. It does not mean concentrating solely on methods designed for the development of phonological processing, which seems to be occurring in preschools, although this approach may be appropriate for the school years.

During the preschool years when they are developing important social, motor and spatial skills, many children who are at risk for acquiring “symbolic knowledge” (reading) have special talents in “hand knowledge” such as art, music, dance, and construction. If, in these early years, we concentrate only on skills related to school learning, which requires “symbolic knowledge”, without identifying and recognizing the value of “hand knowledge” of motor and visuo-spatial skills, in which these children may be most capable and interested, we do them a disservice and the assessment will neither be comprehensive nor effective; it may be misleading.

It is important in the early years, as well as in later years, to recognize, respect and enable children’s abilities as well as their so-called disabilities. To build on their abilities and to honor their gifts can be an effective way to help them deal with their difficulties. This should be an integral part of all assessment and intervention.

Several federal, state and local agencies provide assistance for young children and their families. Many professionals are involved, especially speech and language pathologists, psychologists, social workers, and reading intervention specialists. However, adequate funding is always a problem and too few children and their families are being served.

Perhaps it is time for non-profit parent and professional organizations to become actively involved with community education agencies and public housing agencies like HUD.

Much is written about the rate of LD and illiteracy among delinquent teenagers and criminals, many of whom live in lower socioeconomic areas and have been school dropouts. There have been inadequate efforts toward the prevention of such problems; very little in the way of intervention, which would include good housing and top-notch early childhood education programs.

It seems to me that housing developments, public and private, should include space and facilities for day care/preschool programs. We may be the only major civilized nation that builds residential communities before planning school sites, including day care/preschools. Perhaps builders of housing developments should be required to provide day care/preschool space as part



of the zoning requirements. Clearly, such facilities would provide excellent school readiness programs as well as parent education. The cost would not be prohibitive. The benefits would be immense.

Young parents, especially those who work, should not have to travel by bus or on foot to find day care and/or preschool facilities for their children. Parents who work cannot do so; many cannot afford to do so.

Placing programs for young children within residential spaces would also make it easier to involve the community. For example, it would be easy for parents to be teachers' aides when they live in the same block or the same building. The emotional and learning environment for children and parents would be beneficial to all.

Most Universities and Community Colleges have fine Early Childhood Education programs. Their students would benefit from faculty-supervised practicum (practice teaching) in these facilities. The children would profit from quality teaching. The college students would profit from the experience. The parents would profit from teacher consultation and assistance.

One of the nation's priorities is literacy for all. One great step toward that goal could be the provision of appropriate, quality, early childhood care, not only for children at risk for academic failure, but for all children in such public housing---with their families, right where they live. This may seem like "pie in the sky" but it is a feasible and worth-while endeavor.

In conclusion, a caveat: The majority of children, regardless of label, can be taught to crack the alphabetic code with early intervention and when they are appropriately taught the structure of language. However, it is implied in all texts (even in first-grade primers) that the readers have the vocabulary and information that the writers take for granted. Knowing such implied information is the decisive skill in reading. Further, "reading skill" will vary with each text. We are all good readers of some texts and poor readers of others, our performance depending less on "reading skill" than on the quantity and quality of what we know. It is therefore incumbent on the education community to concern itself, not only with teaching all children the basic skills of reading, but also with the character, depth and breadth of the information conveyed in the schools.

# **The Montessori Preschool: Preparation for Writing and Reading**

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*Dr. Maria Montessori was a perceptive observer of the learning processes of children, and nowhere is this revealed more clearly than in her approach to language. She viewed reading as the ultimate abstraction of language rather than a specific skill to be taught. Decoding is the skill to be taught. The concept of indirect and direct preparation for learning is of major importance in the rich heritage she gave us. She saw the existence of an epigenesis of intellectual functioning, which implies that the experiential roots of a given schema, or learned behavior, will lie in antecedent activities that may be quite different in structure from the schema to be learned. She used this principle effectively. This article discusses how Montessori's method and materials address the indirect and direct preparation for learning written language.*

Maria Montessori (1870–1952) was the first woman to receive a degree in medicine from the University of Rome. Since January 6, 1907, when the first Casa dei Bambini (Children's House) opened its doors in Rome, Montessori has had an enormous influence on the education of young children. Yet, she is rarely cited as the author and advocate of the ideas and practices characteristic of her teaching, many of which are now standard fixtures in early childhood education in America.

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Montessori became known worldwide for her lifetime endeavors on behalf of the child, developing a system of education that includes a programmed preparation for learning, unique methods, and a collection of systematic educational devices designed for the indirect and direct preparation for writing and reading. In an era when education was stereotyped and discipline in the schools was almost brutal, an era that exploited child labor and placed retarded children in insane asylums, she fought for early childhood education as well as education for the retarded. She proposed revolutionary changes in curriculum and methods for teaching all children, and designed many of the materials and much of the child-sized furniture that we see today in all preschools.

In her classic work, *The Montessori Method* (1912), she stated: "The method used by me is that of making a pedagogical experiment with a didactic object and waiting the spontaneous reaction of the child" (p. 167). She did not try to make the child fit into any preconceived notions. Guided by the pioneer works of Rousseau, Itard, and Seguin, Montessori designed and had manufactured a large variety of teaching materials.

There have been many modifications and adaptations of Montessori methods in America to accommodate cultural differences and change. The basic philosophy and principles of instruction however, generally remain constant.

Montessori's method is largely based on a concept described by Seguin (1907): "To lead the child, as it were, by the hand, from the education of the muscular system, to that of the nervous system and of the senses, . . . and then from the education of the senses to general notions, from general notions to abstract thought, from abstract thought to morality" (p. 144). In *Dr. Montessori's Own Handbook* (1965), she states:

"The technique of my method, as it follows the natural physiological and psychological development of the child, may be divided into three parts: (1) Motor education; (2) Sensory education; and (3) Language or intellectual education. The care and management of the environment itself afford the principle means of motor education, while sensory education and education of language are provided for by my didactic material" (pp. 49-50).

The exercises for motor and sensory education comprise what Montessori saw as the indirect preparation for reading, writing, and mathematics. Sensorimotor development occurs



primarily in the first two to four years of life, but later academic learning depends on the development and integration of these skills. Piaget (1952) wrote: "Sensorimotor intelligence lies at the source of thought, and continues to affect it throughout life through perceptions and practical sets. . . . The role of perception in the most highly developed thought cannot be neglected. . . ." (p. 326). It is the purpose of this paper to point out how Montessori principles and practices pertain specifically to the indirect and direct preparation of the child for writing and reading. The general principles are outlined first, followed by a specific discussion relating Montessori's approach to language instruction to current issues in reading disability.

## THE PREPARED ENVIRONMENT AND EXERCISES IN PRACTICAL LIFE

Montessori believed that the child's environment should be "prepared" and maintained by the teacher. She saw the teacher as the caretaker of the environment and as the child's guide.

The furniture in the first Casa dei Bambini was designed to be light, child-sized, and easy for a child to move, or arrange, or wash with soap and water. Montessori believed that education should have as its object the development of independence in a child, and frequently stated that every unnecessary aid to a child is an impediment. Thus, the "prepared environment" includes the opportunity for movement and motor training, and, of major importance, the provision for order. Children are guided from the start by presenting them with familiar activities that they are prepared to do, at which they can be successful, and that thereby capture their attention. This concept of order is enormously important in the education of children, especially for those with learning disabilities.

For *muscular education*, exercises are chosen that tend to aid the development of coordination and movement. Climbing exercises and parallel bars to swing from can be used, remembering that in the earlier years, the child's arms are relatively stronger than the legs. Games such as listening and marching to music, playing with balls, beanbags, swings, etc. may be included.

The children like "Walking the Line," where they walk heel-to-toe along a line about 2 inches wide. Examples of these exercises in balance, posture, and control of movement are as follows:

1. Walking on a line—feet in correct position.
2. Walking on a line—feet in correct position, hands by sides, head erect.
3. Walking on a line—feet in correct position, hands by sides, head erect, an object in one hand.
4. Walking on a line—feet in correct position, carrying a tray with a solid object on it.
5. Walking on a line—feet in correct position, carrying a tray with a tumbler of water.

The prepared environment contains objects designed through their use to achieve a definite purpose, to allow a child to carry out a real piece of work having a practical objective. Each activity in the *exercises in practical life* is made up of a graded series of movements to be performed in logical sequence. Montessori broke down each exercise into points of interest, specific points within each exercise to which a child's attention is drawn. As children are taught each exercise, such as washing hands, polishing shoes, or cutting vegetables, each step of the operation is presented by the teacher verbally and by demonstration in logical, orderly sequence. The children learn to focus their attention and to analyze their body movements as they repeat the sequence each time. As the children's attention is directed to proprioceptive and external cues, they are learning to recognize and to use feedback. All of this helps the children develop efficient motor patterns as well as selective attention.

The exercises in practical life may well be the most important aids for children who have learning disabilities. Exercises such as pouring rice or liquids, carrying various apparatus, cutting, working with the dressing frames, all assist children to develop good gross and fine motor coordination. Exercises in care of the environment, such as washing hands, tables, or linen, or tidying and cleaning up the room, provide structure and help children learn order. Exercises in grace and courtesy teach social behavior, while walking the line is a marvelous lesson in coordination, as well as attention. The silence game, usually a favorite with the children, provides wonderful training in listening as well as body control.

The Soviet research psychologists, Zaporozhets and Elkonin (1971), found that to teach children how to carry out a complex task one must make sure that they are also taught how to organize their orienting responses (*attention*). They must learn what to look at; their action must be directed to the right cues, both external and proprioceptive. Thus, they must learn to make use

of feedback from the external situation and from their own action, and the teacher must help them to do this. Several experiments have shown that a task can be learned more rapidly if orienting behavior (attention) is specifically trained through motor mediation. Montessori exercises in practical life involve both verbal and motor mediation and are invaluable aids in helping children pay attention and coordinate their movements.

It has been my experience that some of the most hyperkinetic and disorganized children begin to quiet down and concentrate as they learn to exercise their motor drive in directed and purposeful activity. Children will repeat lessons in practical life over and over again, even though they may show no progress in speed or skill for quite some time. When mastery is finally accomplished, the child's expression is one of pure joy and pride!

The importance of the exercises in practical life cannot be over-emphasized in working with children who have learning disabilities. Through these exercises, they can develop self-respect and some independence. The self-assurance that comes with the knowledge that they can care for themselves and their environment will help them withstand the difficulties they may encounter later in their academic struggles.

## SENSORY EDUCATION

The sensorial materials are designed to attract children's attention, to "educate the senses," and to allow manipulation by the children. The goal is to assist children in their task of creating order and sequence in sensory input by presenting a carefully constructed sequence of experiences that proceed very slowly from the concrete to the abstract.

When one "educates the senses," one is not trying to make children see or hear or touch better, but is helping them to know what it is that they see or hear or touch. By providing strongly contrasted sensations, followed later by various graded series of sensation, one teaches children to discriminate. For example, if we teach them first red and then blue, then several shades of blue or several shades of red, we are teaching what is red and what is blue. Then they learn to contrast, to compare and match, to discriminate, to distinguish different sense impressions and to put them in some sort of order through the gradations of quality. This is the beginning of a conscious awareness of the environment as opposed to any unconscious knowledge they already may have.

The Montessori materials for "sense training" represent a selection from material used by Itard (1962) and Seguin (1907) in their attempts to educate deaf and/or mentally retarded children, from objects used as tests in experimental biology, and from materials designed by Dr. Montessori. She saw these exercises as indirect preparation for writing, reading, and mathematics.

The materials are grouped according to sense. Each sense is trained in isolation. There is no particular order of presentation, but there is an order in the *method* of presentation. Contrasts are always presented first, identities are established through matching, and finally, gradations of quality are presented for finer discrimination.

Isolation of a single quality in the material helps children focus their attention on the stimulus. In many exercises, the objects are identical in all respects except for gradation. For example, the color tablets are all the same size, weight, and shape, differing only in color, thereby enabling the child to concentrate on color alone. Because children may have difficulty in organizing incoming stimuli, the sensory information is presented in a systematic, orderly way.

Another important facet in working with young children, is to present materials that allow for a child's activity (motor mediation). The possibility of arousing a child's attention and maintaining it depends less on an object's qualities than on the opportunities which it offers for *doing*. Children may not be able to concentrate on *things*, but they will learn to develop a focus of attention that is sometimes remarkable in *doing* a specific activity.

The idea of always presenting two contrasting stimuli in each sensory exercise was derived from Seguin (1907): "We must never confine to automatic memory what can be learned by comparison, nor teach a thing without its natural correlations and generalizations; otherwise we give a false or incomplete idea, or none, but a dry notion with a name . . ." (p. 66).

Materials are available for training auditory and visual senses, tactile sense, baric sense, stereognostic sense, chromatic sense, even taste and smell. Material for training the tactile sense includes touch boards: one wooden board divided into two equal rectangles, one of perfectly smooth, polished wood, the other being covered with sandpaper; one board with alternating strips of sandpaper and bare wood; and another covered with strips of sandpaper graduated from very rough to almost smooth. There are fabrics of different kinds, always in pairs so that they can be matched as well as contrasted. For the baric sense, materials are matched and graded according to weight.

The cylinder blocks are blocks of wood containing holes for wooden insets which are used for recognition of dimensions by visual and stereognostic means: in one series of cylinder blocks, the insets differ only in height; in the second series, the only difference is in diameter; in another, there is a graduated difference in all three dimensions.

The "Pink Tower" is a series of 10 cubes, the sides beginning at 10 mm. and increasing by 10 mm. for each so that the largest is 4 in. (100 mm.). The child gradually learns to make a column, correctly graded from the largest to the smallest cube.

There are 10 rods, each 30 mm. square, but varying in length from one decimeter to one meter by regular increments of one decimeter. These rods are to enable the child to discriminate lengths, and also indirectly prepare for arithmetic: children work first with the solid red rods and later the rods will be colored alternately red and blue in one decimeter segments signifying number.

For the sense of color, there are tablets in 8 colors; and for each color there are 8 corresponding shades varying in intensity. Two sets are used so that the children can match each pair of colors, until they are ready for grading shades.

Plane metal frames and insets and geometrical solids are used for tactile and kinesthetic exploration of form. Cards are printed with geometrical figures corresponding to geometrical solids, so that a child can match them and visually interpret the graphic symbol for the wooden geometrical shapes.

Many of the materials have small knobs, which children pick up with their thumb and first two fingers, just as they will use those fingers to hold a pencil. When coloring, the children are taught to draw parallel strokes and, where indicated, to move the colored pencil from left to right. Thus, the hand is indirectly prepared for writing.

After a child has practiced handling the materials and begins to show that he can identify difference and contrasts, the teacher begins to teach *nomenclature*. Here she uses the "Three Period Lesson," which was originally used by Seguin, to obtain the association between an object or quality and the corresponding name.

The First Period consists of associating the sense perception with the name. The teacher presents, for instance, the longest and the shortest rod and says, "This is short"—"This is long." She repeats this many times, slowly and clearly. No other words are used in order to avoid confusing the child.

The Second Period tests the child's *recognition* of the object corresponding to the name. After the name is given for a suitable

period of time and after a few moments of silence, the teacher asks, "Which is short?"—"Which is long?" If the child points correctly, the rods are mixed and the teacher repeats the questions, continuing to strengthen and fix the association until the child is ready for another activity.

The Third Period is verification that the child can *recall* the name corresponding to the object. Now teacher simply asks, "What is this?" "What is this?" The teacher may insist now on correct articulation, and a good bit of repetition is usually required.

The *Three Period Lesson* may seem slow and tedious, but it is effective. The period of time between success in the second and third periods (i.e., between recognition and recall) is often quite lengthy and provides a striking illustration of the amount of time and repetition required for a child to establish such associations, so necessary in language development (Richardson 1969, p. 78).

It should be recapitulated that it is by practicing the sensory exercises first that a child gains the mental experience and concept of a particular item or quality; after this, the name is introduced. The exercises all involve motor mediation, without which training does not facilitate discrimination and attention.

The same principle is used in the education of auditory discrimination. Developmentally, a child must first learn to distinguish between noise and sound as apart from silence. Since this training starts with strongly contrasting differences and passes on to almost imperceptible differences, part of "auditory training" for young children includes training in silence with the "Silence Game." In this game, the children are asked to lie on their mats very, very quietly; the teacher then goes out into the hall and softly whispers a child's name. As the children silently listen, the child called by the teacher goes out to the hall. This is repeated until each child is called. Many variations of the game can maintain the children's interest and attention. The Silence Game has many advantages, some of which are obvious.

The method of tactile and kinesthetic exploration of geometric forms is presented just as Zaporozhets and other Russian psychologists later described eye and hand movements they observed in the perception and recognition of forms. In experimenting with 3-year olds, they reported that children differentiate figures visually only after they have learned to follow contours of a figure manually; movements of the eyes follow movements of the hand (Berlyne 1963).

Children in a Montessori classroom are taught to trace sandpaper letters with their fingers. They voice the sound of each letter simultaneously, thus using an integrated tactile-



kinesthetic-visual-auditory approach. They were prepared for this by previous experience with the touch boards, by tracing wooden plane geometric forms, and by tracing and coloring in the metal insets. They have also been learning to develop a conscious attentive process combined with reinforcement and the mediation of continuous feedback. All of this is indirect preparation for writing.

## LANGUAGE EXERCISES: PREPARATION FOR WRITING AND READING

Because one of the underlying neuropsychological deficits in dyslexia is a problem in phonemic awareness and segmentation, one can appreciate the importance and significance of Montessori's early language exercises and their indirect preparation for the development of writing and reading.

Children from birth to two years are exposed to whole-word perception through the auditory sense. Yet a complex inner analysis leads them to the production of single sounds and syllables, and finally the ability to reproduce whole words. Building on this same pattern, Montessori helps children to analyze for the individual sounds again, only this time the visual, auditory, tactile, and especially the kinesthetic percepts of the written symbol are added as they listen to the sound.

*Montessori effectively linked language development with sensorimotor education, one facilitating the other.* She did not devise a specific method for teaching reading per se. In fact, in her handbook, the table of contents does not mention reading. There is, however, a section on material for preparation for writing and another on exercises for writing "alphabetical signs."

Written language is viewed as an extension of oral language: "To train the child's attention to follow sounds and noises which are produced in the environment, to recognize them and to discriminate between them, is to prepare his attention to follow more accurately the sounds of articulate language" (Montessori 1965, p. 123). Such attention (listening) aids children in their development of phonemic awareness.

Children are taught the precise *nomenclature* for the sensorial materials, the names of objects and words describing the specific attributes. For children with language learning differences this is imperative, because one of the factors most characteristic of dyslexia is a deficit in rapid naming. As indicated earlier, Seguin's *Three Period Lesson* is used to teach nomencla-

ture. The children learn the language of forms and dimensions. They also learn the language of gradations of quality and contrasts; e.g., colors are graded according to tint and to richness of tone, silence is distinct from non-silence, noises from sounds, and everything has its own exact name. It is remarkable to hear 4- or 5-year-old children correctly name, for example, an equilateral or isosceles triangle, a cube, or a rhombus.

Montessori (1965) stated:

The didactic material, in fact, does not offer to the child the "content" of the mind, but the *order* for that content. It causes him to distinguish identities from differences, extreme differences from fine gradations, and to classify, under conceptions of quality and of quantity, the most varying sensations appertaining to surfaces, color, dimensions, forms and sounds. The mind has formed itself by a special exercise of attention, observing, comparing, and classifying (p. 136).

### PHONOLOGICAL PROCESSING

Exercises with sandpaper letters enable children to develop or reinforce their phonemic awareness and the ability to analyze spoken words into component sounds and syllables. Through gradual mastery of the association between the sound and the written symbol (phoneme-grapheme association), children are led through the process of building words, segmenting and blending sounds, using the moveable alphabet.

The moveable alphabet consists of a partitioned box containing cardboard letters that the children can hold in their hands and manipulate themselves. Through the kinesthetic approach used with the sandpaper letters, word building with the moveable alphabet, and also through the preparation of the hand in sensorial and practical life exercises, children will come to spontaneous writing, first letters and then words.

Montessori viewed graphic, or written, language as offering to a child an essential tool for communication as well as a means of perfecting spoken language. This reciprocal function of speaking and writing is an essential point that has been overlooked in education and has surfaced only recently in language research.

Montessori saw that indirect preparation for written language would include all of a child's experience: exercises in practical life, which begin to prepare the hand for writing and which help establish control of movement and eye-hand coordination; sensorial materials, which develop the child's percep-

tual abilities, visual and auditory discrimination, ability to compare and classify; and learning precise nomenclature. All of these are necessary for written language. Through practice, the hand learns to control a pencil with the metal insets; sandpaper letters and moveable alphabet provide the kinesthetic sense with memory for forms pertinent to written language. At the same time, sounding out letters and words reinforces oral (articulatory) kinesthetic memory, increases auditory discrimination and auditory memory, and *assists the child in the final perfection of speech itself.*

Lieberman (1979) pointed out clearly that if readers and writers are to use the alphabetic principle productively they must be aware of the phonological structure that the letters represent. When children work with sandpaper letters, they are exploring the sounds of language and the shapes of the symbols for these sounds, but this is neither an exercise in writing nor in reading. It is through their increasing ability to analyze spoken words into component sounds, and through their mastery of the association between sound and written symbol that children are led into the process of building words.

The moveable alphabet enables a child to build words but, again, this material is simply for the mechanical production of children's words and later their phrases and sentences, preparing for reading and writing. The teacher can incorporate various exercises for phonemic awareness using the moveable alphabet. For example, phoneme counting, such as asking the children how many sounds are in words such as *box*, *sat*, *top*, etc.; phoneme identification, such as saying the first or last sound in monosyllabic words; matching, as in rhymes; substitution of the initial consonant of a word to make a new word; reversal, such as saying *cat* backwards; or deletion of a letter in a word to make a new one, such as deleting the /m/ from *smack*. In each case, after the children say the word or sound, they take the appropriate letter(s) from the alphabet box and place them in order on the table or mat.

Montessori (1912) says, "Touching the letters and looking at them at the same time, fixes the image more quickly through the cooperation of the senses. Later, the two facts separate: looking becomes reading; touching becomes writing. According to the type of individual, some learn to read first, others to write" (p. 325). When the children place the cardboard letters in the sequential order in which they hear them in the spoken word, they can build a visual image of the written word for themselves. Then they are led to analyze the written word into its

component parts, to articulate them, and to blend them together to form the spoken word—the process of mechanical reading. Children who can compose a word with letters of the moveable alphabet are neither reading nor writing, but they are preparing for these activities.

To summarize, the basic steps in preparing a child for written language are (1) indirect preparation of the muscular mechanism for holding and using the pencil; (2) use of the sandpaper letters to establish the visual-motor image of graphic symbols and to establish kinesthetic memory of the movements necessary for writing, associating these with the sounds of the letters; and (3) use of the moveable alphabet to compose words that are first “sounded out” by the child. Montessori (1912) found that “in general, all children of four are intensely interested in writing” and the “writing is one of the easiest and most delightful conquests made by the child” (pp. 293–294).

We have discussed briefly the development of writing and mechanical reading, or decoding. In order for a child to read with comprehension, however, further work of a different, more direct, nature is required. “I do not consider as reading the test which the child makes when he verifies the word he has written. He is translating signs into sounds, as he first translated sounds into signs. . . . What I understand by reading is the interpretation of an idea from the written signs. . . . So, until the child reads a transmission of ideas from the written word, he does not read” (Montessori 1912, p. 296).

When a child can read back the words he has made with the moveable alphabet, the teacher introduces the Phonetics Object game. A box is presented which contains small objects, each with a C-V-C combination, such as pin, cup, bat. The teacher writes one of the words on a slip of paper and asks, “Can you give me the one I want?” If so, the child can then take off, matching objects and labels. Most Montessori classrooms have an enormous number of these object games available, and the children love decoding the labels and placing them with the correct objects. They will also put a label on everything in the room, if they can.

Phonogram cards and “puzzle words” (non-phonetic) are introduced and, later, after the grammar games, the roots of words are explored. Usually children are between six and nine years of age when they become interested in roots, prefixes, and suffixes, although this may not be true of children with learning disabilities for quite a while.

Gradually, the children begin to explore the *functions* of words. This is the first time that Montessori uses the term, “in-

troduction of reading," She states: "Before the child can understand and enjoy a book, the *logical language* must be established in him. Between knowing how to read the words, and how to read the *sense*, of a book there lies the same distance that exists between knowing how to pronounce a word and how to make a speech" (1912, p. 304).

Many grammar games are introduced in sequence over time. These are presented to small groups of children, usually around 5 or 6 years of age, who have learned to decode through all the previous exercises. First the nouns, or "naming words"; then their modifiers, articles, "the little words"; and adjectives, "the describing words"; then conjunctions, "the joining words"; prepositions, "the placing words"; finally the dynamic "doing words," verbs, and their modifiers: adverbs, "the word describing the doing word" and pronouns, "the person words." The exercises require many little materials and the children's activity.

One example would be learning the function of the article. The materials are a plastic box containing assorted small objects, such as one spoon, several marbles, erasers, etc. A child is asked to take *the* spoon from the box. The teacher writes "spoon" on a slip of paper, the child says the word and places the label with the object. The teacher writes "the" on a slip of paper that the child places in front of the word, "spoon." The teacher then asks the child for *the* marble. Since there are several marbles in the box, the child will not know which one to select. The teacher explains that if she says *a* marble, the child can pick any of the marbles. The child takes *a* marble, the teacher makes the labels for the noun and the article, and the child places these with the object as before. Finally, the teacher asks for *the* eraser. However, there are several erasers in the box and *a* eraser doesn't sound correct, so the article *an* is introduced and the correct labels are written and placed.

In this exercise, the children have been directly taught about "the little words" that go with the naming words and when the various little words are used. They also read the labels written by the teacher. Each of the parts of speech are taught with a variety of materials in similar fashion. Later, when the children are ready to write phrases and sentences, symbols are introduced for them to place above each of the parts of speech. For example, a black pyramid for nouns; a small yellow pyramid for articles; a blue pyramid for adjectives; a pink bar for conjunctions; a red ball for verbs, etc. These exercises are indirect preparation for sentence analysis, grammar, and composition, as well as direct instruction in the functions of words.

Montessori (1912) believed that elementary school should begin with "children who possess, besides a perfect mastery of articulate language, the ability to read written language in an elementary way, and who begin to enter upon the conquest of logical language" (p. 308). She was too wise to specify an age. Children with learning differences move very slowly through the language exercises. In fact, it is usually necessary for the teacher to lead such children by the hand into these areas when they are reluctant or resistant. The Montessori teacher should know the developmental stages of reading and how to extend or modify teaching as needed.

Children with specific language learning disability can profit from this carefully programmed and cumulative sequence of learning experiences, from the concrete exercises in practical life to the final abstraction of interpretive reading and writing. A multisensory approach is a requisite in the instruction of children with language learning differences.

There are many excellent multisensory remedial programs for children with dyslexia, most of which are offshoots of the Orton-Gillingham Approach (Richardson 1989). June L. Orton (1957) has summarized these in two basic principles: (1) Start language training with small units that pupils can handle easily and then proceed by orderly steps from the simple to the more complex. Be sure to teach blending of separate units into syllables and words for recognition in reading and recall in writing. (2) Use an "integrated, total language approach. Each unit and sequence is established through hearing, seeing and writing it" (p. 6). The various patterns reinforce individual differences among students.

The similarities between these remedial approaches and that of Montessori are clear. Why then have we not initiated such preschool programs for children who appear to be at-risk academically, programs that can continue through the primary grades, or longer if necessary, using the multisensory structured language methods?

## CONCLUSION

Montessori's approach to early childhood education is developmental; it utilizes techniques and materials that can also assist the intelligent child who demonstrates deviant development of coordination, language, attention, and perception; the young child who is at-risk academically. The sensorimotor foundations



of language development are built in an orderly, logical fashion. Training is provided in the motor bases of behavior and learning, such as posture and gross and fine motor coordination, the development of directionality and laterality, and the development of body image and control. Training in perceptual skills includes form perception, space discrimination, stereognosis (the ability to identify objects by touch or feel), and recognition of texture, size, and structure. The child receives multisensory training in auditory perception (listening), in visual perception (looking), and in kinesthetic perception (muscular memory of movement, positions, and postures). These provisions help the child develop the prelinguistic and preliteracy skills that are among the requisites for the development of symbolic language, spoken and written.

During the past decade the National Institute of Child Health and Human Development (NICHD) has supported programs in seven medical centers for research on reading disabilities, which are by far the most prevalent of the learning disabilities. They have shown that deficits in phonemic awareness reflect the core deficit in dyslexia, and that the best predictor of reading ability from kindergarten and first-grade performance is phoneme segmentation ability. Further, the NICHD studies on intervention have shown that disabled readers must be provided highly structured programs that explicitly teach the application of phonological rules to print (Lyon 1995).

Montessori's structured, multisensory language exercises provide assistance in phonological processing for pre-school children between the ages of three and six years. Her method and materials address the language roots of reading, such as are reviewed in Richardson 1991: phonological awareness and discrimination of the sound structure of language, including phonemes and syllables; syntax, the rules governing the sequential ordering of words in phrases and sentences, and understanding the functions of words; semantics, the meaning system that is attached to words and phrases as a result of experiences in a variety of contexts; and pragmatics, the use of language in different contexts or situations. All of these depend upon short- and long-term memory, which are strengthened by the utilization of all of the senses used in learning.

Finally, and most important, Montessori demanded humility and careful clinical observation on the part of the teacher. She had profound respect for children and their work. So must we all! Children with dyslexia and other learning differences are handicapped only by a system that fails to provide them

with access to an appropriate education that meets their learning needs.

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PHONOLOGICAL PROCESSING FOR YOUNG CHILDREN: THE MONTESSORI APPROACH  
Sylvia Onesti Richardson, M.D.

Once again the pendulum has returned to stress the importance of literacy and early childhood education. The emphasis on literacy can be seen in television shows such as "Between the Lions". The Verizon Foundation, the philanthropic arm of Verizon, the national communications company formed through the merger of GTE and Bell Atlantic, has made a corporate commitment to fund more than \$5.5 million in literacy initiatives this year.

Dr. Maria Montessori, the first woman to receive a medical degree from the University of Rome, made her commitment to young children at the beginning of the 20<sup>th</sup> century. She became known world-wide for her lifetime endeavors on behalf of the child. Her system of education includes a sequentially programmed preparation for learning, unique methods, and a collection of multisensory, systematic educational devices designed for the indirect and direct preparation for writing and reading. The achievement of children's literacy was one of her major goals. The wonder is that more than half a century later research has proven her wisdom.

One of the underlying neuropsychological deficits in dyslexia is now known to be a problem in phonemic awareness and phonemic segmentation. In this regard, Montessori's sensorial and early language exercises and their preparation for the development of writing and reading are significant and important.

Children from birth to two years are exposed to whole word perception through the auditory sense. Yet a complex inner analysis leads them to the production of single sounds, then syllables, and finally the ability to reproduce whole words. Building on this same pattern, Dr. Montessori helps children to analyze the individual sounds, only this time the visual, tactile, and especially the kinesthetic percepts of the written symbol are added as they listen to the sound. The kinesthetic sense is of particular importance, since it is our strongest memory.

Dr. Montessori introduced sandpaper letters for the children to look at and trace with their fingers as they voice the sound of each letter. This enables them to develop or to reinforce their phonemic awareness and the ability to analyze spoken words into component sounds, and prepares them for blending. Zaporozhets and other Russian psychologists described the eye and hand movements they observed in the perception and recognition of forms (Berlyne, 1963). In experimenting with 3 year olds, they reported that children differentiate figures visually only after they have learned to follow the contours of a figure manually; movements of the eyes follow movements of the hands.

Through gradual mastery of the association between the sound and the written symbol (grapheme-phoneme association), the children are led through the process of building words with the moveable alphabet.

The moveable alphabet consists of a partitioned case containing cardboard letters which the children can hold in their hands and manipulate themselves. In each instance, after the children say a word or sound, they take the appropriate letter from the alphabet box and place it in order on the table or mat as they sound it out. Short-term memory comes into play when, after the first letter is found and placed, the children must remember which sound/letter is the next one, find it, place it next to the first, and so forth until they sound out the entire word they made.

When the children place the cardboard letters in the sequential order in which they hear them in the spoken word, they are building a visual image of the written word for themselves. Then they are led to analyze the written word into its component parts, to articulate them, and to blend them together to form the spoken word---the process of mechanical reading, or decoding.

The concept of indirect and direct preparation for learning is of major importance in the rich heritage given us by Montessori . She saw the existence of an epigenesis of intellectual functioning, which implies that the experiential roots of a given schema, or learned behavior, will lie in antecedent activities which may be quite different in structure from the schema to be learned.

The indirect preparation for writing is a good example. Materials are provided that will allow children to use the small muscles of the hand that will eventually hold the pen or pencil. Many of the Montessori "exercises in practical life", require using the thumb, index and second finger to pick up small objects, the little knobs on the cylinder blocks, the little pitchers for pouring rice, coloring in the metal insets with a colored pencil. (Fine motor coordination is one of the functions of the left cerebral hemisphere, as well as language). Practice in these antecedent activities, which are designed to develop digital dexterity, is required for the little ones to develop fluidity and automaticity in manipulating the writing instrument later on.

Through the multisensory, especially the kinesthetic, approach used with the sandpaper letters, word building with the moveable alphabet, and through the preparation of the hand in the sensorial and practical life exercises, the children will come to spontaneous writing, first letters, then, after word-building, words.

Montessori says (1912): "Touching the letters and looking at them at the same time, fixes the image more quickly through the cooperation of the senses. Later, the two facts separate: looking becomes reading; touching becomes writing. According to the type of individual, some learn to read first, others to write".

Various exercises for phonemic awareness can be used with or without the moveable alphabet. For example: phoneme counting, asking the children how many sounds are in words such as "sat, top, box", etc.; phoneme identification, such as saying the first or last sound in monosyllabic words as "look"; matching, as in rhymes; substitution of the initial consonant of a word to make a new word, as in "rap, lap, tap, etc.", reversal, as saying "cat" backwards, or pig latin; deletion of a letter in a word to make a new one, such as deleting the /m/ from "smack."

The exercises for phonemic awareness using the moveable alphabet are important. They assist the children to convert the visual symbols into a temporal auditory sequence; in other words, to connect what is seen with what is heard. This connection, or integration of the functions of the two hemispheres (spatial and temporal) is particularly difficult for the individual with dyslexia.

Montessori viewed graphic, or written, language as offering to the child an essential tool for communication as well as a means of perfecting spoken language. This reciprocal function of speaking and writing is an essential point that has been overlooked in education and has surfaced only recently in language research.

The link between spoken and written language should not be underestimated. Both require interpretation of phonological forms. Both require auditory and visual short-term memory. Both require understanding of word meaning and sentence structure. Both require automaticity for fluid performance.

Montessori's approach to teaching the functions of words, (syntax) is less well-known than are the sandpaper letters and moveable alphabet, which have been utilized and/or modified by many different multisensory teaching approaches. The "grammar games" are unique can be used successfully in late preschool and kindergarten. Children are fascinated that words have function.

The many grammar games are introduced and practiced in sequence over time. These are presented to small groups of children, usually around 5 or 6 years of age, who have learned to decode through all the previous exercises. First the nouns ("naming words"); then articles, their modifiers ("the little words) and adjectives ("describing words"); conjunctions, ("joining words"); prepositions, ("placing words"); finally the dynamic verbs ("doing words") and their modifiers, adverbs, ("the words describing the doing word") and pronouns, ("person words"). The exercises require many little materials and the children's activity.

One example would be learning the function of the article. The materials could be a plastic box containing assorted small objects, such as several marbles and erasers, and one spoon. A child is asked to



take the spoon from the box. The teacher writes "spoon" on a slip of paper, which the child reads aloud and places the label with the object. The teacher writes "the" on a slip of paper, which the child reads and places in front of the naming word, "spoon." The teacher then asks the child for the marble. Since there are several marbles in the box, the child will not know which one to select. The teacher explains that if she says a marble, the child can pick any of the marbles. The child takes a marble, the teacher makes labels for the noun and the article, and the child reads and places these with the object as before. Finally, the teacher asks for the eraser. However, there are several erasers in the box and a eraser doesn't sound right, so the teacher discusses the need to put a consonant between the two vowels. The article an is introduced and the correct labels are read aloud, written and placed.

In this exercise the children have been directly taught the "little words" that go with "the naming words", and when the various little words are to be used. Each of the parts of speech are taught with a variety of materials in similar fashion, but they aren't called "parts of speech." These exercises are the indirect preparation for later sentence analysis, grammar and composition, as well as direct instruction in the functions of words.

Reading is not a skill to be taught; it is the ultimate abstraction of language. The skill to be taught is decoding, for which the child can also be prepared indirectly through the various sensorial exercises previously discussed. Decoding must be learned to the point of automaticity and fluidity. Until this is achieved, comprehension of the written words will not occur. Children must also learn that words have functions, in order to comprehend what is decoded.

Montessori states; "Before the child can understand and enjoy a book, the logical language must be established in him. Between knowing how to read the words and how to read the sense of a book there lies the same distance that exists between knowing how to pronounce a word and how to make a speech."

As Margaret Rawson has said: "Decoding, properly taught, is the way to the reception of the printed verbal message. We cannot read without

it. The other side of the coin, the apprehension of meaning, which is the reason for reading, is the business of all education."

Dr. Montessori's method and materials address the language roots of reading: phonological awareness and discrimination of the sound structure of language, including phonemes and syllables; syntax, the rules governing the sequential ordering of words in phrases and sentences; semantics, the meaning system that is attached to words and phrases as a result of experience in a variety of contexts; and pragmatics, the use of language in different contexts or situations. All of these depend on short and long-term memory, which are strengthened by the utilization of all the senses in learning.

Finally, Dr. Montessori demanded humility and careful clinical observation on the part of the teacher. She had profound respect for children and their work. Her philosophy and methods are most effective in preparing children for successful academic progress.

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# Montessori: Still Fresh & Relevant

*Especially in today's quest to achieve literacy for all children*

*Touching the letters and looking at them at the same time fixes the image more quickly through the cooperation of the senses.*

By Sylvia O. Richardson

Once again the pendulum has returned to stress the importance of literacy and early childhood education. The emphasis on literacy can be seen in television shows such as "Between the Lions." The Verizon Foundation, the philanthropic arm of Verizon, the national communications company formed through the merger of GTE and Bell Atlantic, has made a corporate commitment to fund more than \$5.5 million in literacy initiatives this year.

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## PHONEMIC AWARENESS

One of the underlying neuropsychological deficits in dyslexia is now known to be a problem in phonemic awareness and phonemic segmentation. In this regard, Montessori's early language exercises and their preparation for the development of writing and reading are significant and important.

Children from birth to two years are exposed to whole-word perception through the auditory sense. Yet a complex inner analysis leads them to the production of single sounds, then syllables, and finally the ability to reproduce whole words. Building on this same pattern, Montessori helps children to analyze for the individual sounds again, only this time the visual, tactile, and especially the kinesthetic percepts of the written symbol are added as they listen to the sounds. The kinesthetic sense is of particular importance, since it is our strongest memory.

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awareness and the ability to analyze spoken words into component sounds, and prepares them for blending. Zaporozhets and other Russian psychologists described the eye and hand movements they observed in the perception and recognition of forms (Berlyne 1963). In experimenting with three year olds, they reported that children differentiate figures visually only after they have learned to follow the contours of a figure manually; movements of the eyes follow movements of the hands.

Through gradual mastery of the association between the sound and the written symbol (grapheme-phoneme association), the children are led through the process of building words with the moveable alphabet.

The moveable alphabet consists of a partitioned case containing cardboard letters which the children can hold and manipulate themselves. In each instance, after the children say the word or sound, they take the appropriate letter(s) from the alphabet box and place them in order on the table or mat as they sound them out. Short-term memory comes into play when, after the first letter is found and placed, the children must remember which sound/letter is the next one, find it and place it next to the first, and so forth.

When the children place the cardboard letters in the sequential order in which they hear them in the spoken word, they can build a visual image of the written word for themselves. Then they are led to analyze the written word into its component parts, to articulate their parts, and to blend them together to form the spoken word—the process of mechanical reading, or decoding.

Through the multisensory, especially the kinesthetic, approach used with sandpaper letters, word building with the moveable alphabet, and also through the preparation of the hand in the sensorial and practical life exercises, the children will come to spontaneous writing—first letters, then, after word-building, words. Montessori says (1912): "Touching the letters and looking at them at the same time fixes the image more quickly through the cooperation of the senses. Later, the two facts separate: looking becomes reading, touching becomes writing. According to the type of individual, some learn to read first, others to write."

Various exercises for phonemic awareness can be used with the moveable alphabet. For example:

phoneme counting, asking the children how many sounds are in words such as *sat*, *top*, *box*, etc.; phoneme identification, such as saying the first or last sound in monosyllabic words; matching, as in rhymes; substitution of the initial consonant of a word to make a new word; reversal, such as saying *cat* backwards; or deletion of letter in a word to make a new one, such as deleting the *m* from *smack*.

The exercises for phonemic awareness using the moveable alphabet are important. They assist children to convert visual symbols into a temporal auditory sequence; in other words, to connect what is seen with what is heard. This connection, or integration of the functions of the two hemispheres (spatial and temporal) is particularly difficult for the individual with dyslexia.

Dr. Montessori's method and materials address the language roots of reading (Richardson 1991): phonological awareness and discrimination of the sound structure of language (including phoneme and syllables); syntax (the rules governing sequential ordering of words in phrases and sentences, and understanding the functions of words); semantics (the meaning system that is attached to words and phrases as a result of experiences in a variety of contexts); and pragmatics (the use of language in different contexts or situations). All of these depend upon short and long-term memory, which are strengthened by using all the senses required in learning.

### SYNTAX

Montessori's approach to teaching the *functions* of words, (syntax) is less well-known than are the sandpaper letters and moveable alphabet which have been used and/or modified by many different multisensory teaching approaches. The "grammar games" are unique and can be used successfully in late preschool and kindergarten.

The many grammar games are introduced and practiced in sequence over time. These are presented to small groups of children, usually around five or six years of age, who have learned to decode through all the previous exercises. First the nouns ("naming words"); then their modifiers, articles, ("the little words") and adjectives, ("describing words"); conjunctions, ("joining words"); prepositions, ("placing words"); finally the dynamic verbs ("doing words") and their modifiers, adverbs, ("the words describing the doing word") and pronouns, ("person words"). The exercises require many little materials and the children's activity.

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### INDIRECT & DIRECT PREPARATION

The concept of indirect and direct preparation for learning has major importance in the rich heritage given us by Montessori. She saw the existence of an epigenesis of intellectual functioning, which implies that the experiential roots of a given schema, or learned behavior, will lie in antecedent activities which may be quite different in structure from schema to be learned.

The preparation for clear, legible handwriting is an example. The indirect preparation for this goal is first to provide materials that will allow children to use the small muscles of the hand that will eventually hold the pen or pencil. Montessori uses "exercises in practical life," such as using the thumb, index, and second finger to pick up small objects, the little knob on cylinder blocks, the little pitchers for pouring rice, coloring in the metal insets with a colored pencil. Fine motor coordination is one of the functions of the left cerebral hemisphere (as in language). Practice in these antecedent activities is required for the little ones to develop fluidity and automaticity in writing later on.

(MONTESSORI-Page 10)

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**MONTESSORI**  
(from page 9)

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**LITTLE BLACK MARKS**

Arthur Gordon, Guideposts Associates, wrote "Isn't it amazing, how we take them for granted, those little black marks on paper; 26 different shapes known as letters, arranged in endless combinations known as words. Lifeless until someone's eye falls on them."

Then a miracle happens, along the optic nerve, almost at the speed of light, these tiny symbols are

flashed to the brain, where they are instantly decoded into images, ideas concepts, meanings.

The eye's owner is changed too. The little black marks can make him love or hate, laugh or cry, fight or run away. And what do we call this incredible chain of events? Reading.

"The spoken word rushes by and is gone, but the written word remains . . . endures. It can be consulted over and over again . . . forever." It is this enduring miracle of literacy that we must help to blossom in all our young children.■

*Sylvia O. Richardson, M.D., Distinguished Professor of Communication Science/Disorders and Clinical Professor of Pediatrics at the University of South Florida, Tampa.*

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