

# PACKAGE ON LEARNING DISABILITIES

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## FOREWORD

Nearly 10% of the school going population experience learning disabilities in language, reading, writing and arithmetic. At present teachers do not possess the required knowledge and skill in managing children with learning disabilities in the classroom. Teacher educators also lack adequate knowledge and skill in this area. The literature available in the area of learning disabilities is very much limited in India. Regional Institute of Education, Mysore has so far published a Handbook and a Teachers' and Parents' Manual related to learning disabilities. There is always a need to enrich and expand the scope of such materials. Hence an attempt was made to prepare a Training package on Learning Disabilities which would supplement whatever material is already available in India.

A Workshop for the Development and Tryout of Training package for Training the DIET faculty in the Management of Learning Disabilities was conducted from 29.1.1996 to 3.2.1996 at Regional Institute of Education, Mysore. The material prepared by different resource persons were tried out during this Workshop. The participants gave feedback about the materials. On the basis of the feedback, the material was modified by the resource persons. Now, it is ready for use.

As an Academic Coordinator of the programme, I thank the Principal, Regional Institute of Education, Mysore for having provided me with the opportunity to prepare the package. I am highly thankful and grateful to all the Resource Persons who contributed to this package. My sincere thanks goes to all the participants of the programme who provided the feedback. I am also thankful to Ms.C.R.Srimani, JRF, RIE, Mysore who involved herself in the Workshop and also helped in finalizing the material. I thank one and all who helped directly or indirectly in bringout this package.

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## CONCEPT OF LEARNING DISABILITIES

Dr. Ramaa S

The term 'Learning Disability' indicates limited ability in learning. When a person exhibits inadequacy or limited ability in learning a wide variety of tasks which involves different levels of intellectual functioning, he can be considered to have mental retardation. On the other hand, if the limitation is restricted to certain areas of learning, mainly in language and number related areas, he can be considered to have learning disability. In order to differentiate between the two kinds of limitations, the term 'General Learning Disability' is suggested as an equivalent for mental retardation and the term 'Specific Learning Disability' for disabilities observed only in certain areas of learning. The specific learning disabilities are usually indicated as reading disability, writing disability etc. However, here the terms 'Learning Disability' and 'Specific Learning Disability' are considered as one and the same.

There are many definitions of Learning Disabilities. Out of these 3 definitions which are important are discussed below:

According to United States Office of Education [USOE, 1977], Specific Learning Disability means a disorder in one or more of the basic psychological processes, involved in understanding or in using language spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing or motor handicaps or mental retardation or emotional disturbance, or of environmental, cultural or economic disadvantage.

The Learning Disabilities are defined by the National Joint Committee for Learning Disabilities [NJCLD, 1981] as a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions (.e.g. cultural differences, insufficient or inappropriate instruction, psychogenic factors) it is not the direct result of those conditions or influences.

Board of the Association for Children and Adults with Learning disabilities [ACALD, 1985] has specified following

criteria for learning disabilities :

- \* Specific Learning Disability is a chronic condition of presumed neurological origin which selectively interferes with the development, integration, and/or demonstration of verbal and/or non-verbal abilities.
- \* Specific Learning Disability exists as a distinct handicapping condition in the presence of average to superior intelligence, adequate learning opportunities. The condition varies in its manifestations and in degree of severity.
- \* Throughout life the condition can affect self-esteem, education, vocation, socialization and/or daily living activities.

The above definitions have certain points of similarity. They are as follows:

- 1) Learning Disability (LD) or Specific Learning Disability refers to serious difficulty in basic academic skills - reading, writing, spelling and arithmetic, general skills like understanding and use of spoken language, social or vocational adjustment, daily living skills as well as lowered self-esteem which is manifested in lack of self confidence, inferiority complex etc.

These difficulties can occur in different combinations. That means all the children with learning disabilities need not have all these problems. The learning disabilities are persistent throughout the life. If one problem is solved other problems appear. So they need help to overcome different problems at different time in life time.

- 2) As the children with learning disabilities possess average or superior intelligence there exists a significant discrepancy between achievement and potential. This suggests that the children with LD are not learning and achieving to the extent they are capable of.
- 3) The problems experienced by the children with LD are not primarily due to visual or hearing problems, emotional problems, serious brain damage, lack of interest, motivation or lack of opportunities to learn or faulty teaching method.

However some children with LD might have sensory problems, or emotional problems or show lack of interest or motivation. It only indicates that these are not the primary causes of learning disabilities. So these causes have to be ruled out while identifying children with learning disabilities.

4) The learning disabilities are due to some neurological while dysfunctions. These things are discussed else where.

A child can be considered to have learning disability if (i) he has considerable difficulty in understanding or using spoken language, reading, writing, spelling and/or arithmetic during the developmental period (before 16 years of age), (ii) he is free from visual, hearing or motor disability, mental retardation, severe emotional problems, and (iii) he has adequate facilities, interest and motivation to learn.

# **GENERAL CHARACTERISTICS AND BEHAVIORAL MANIFESTATIONS OF LEARNING DISABILITIES**

**Dr. Ramaa S**

The children with learning disabilities exhibit certain general characteristic features. The knowledge of which is essential in identifying them at the very early stage and in understanding the difficulties faced by such children.

The Table-1 (Ramaa, 1992) gives a list of the commonly observed problems among learning disabled children, the nature of such problems and a few illustrations indicating their specific difficulties.

Every learning disabled child does not obviously demonstrate all these characteristics. They exhibit an unique combination of such traits. Depending upon such a combination they experience different kinds of learning disabilities. The Table-2 (Ramaa, 1992) gives the description of different types of learning disabled children.

**Table-1: Nature of the problems and their behavioural manifestations among Learning Disabled Children.**

Kinds of problems	Description	Examples of behaviour in which the problem is manifested
1.	2.	3.
<b>1. Abnormal Activity Level</b>		
a) Hyperactive	Constantly engaged in some form of motor (Physical) activity.	Restless tapping of finger or foot, jumping out of seat or skipping from one task to another before completing it.
b) Hypoactive	The opposite of hyper-activity. Fails to react to the environmental changes or seems to be everything in slow motion.	Do not show interest even in sports/games. When all the other children are engaged in some activity, may sit quietly. Takes more time to do even simple tasks.
<b>2. Attention Problem</b>		
a) Short attention span easily distractable	Easily distracted by what is going on in the surroundings, for e.g. lizard moving on the wall, running fan, foot step outside the classroom, etc. Unable to concentrate on any one tasks for the required amount of time.	In the classroom, may concentrate on what is being taught for a few minutes, then start doing something which he likes drawing some picture, looking outside, etc.
b) Perseveration (too much over doing)	Attention becomes fixed upon a single task. That task will be repeated over even if it is unwanted. It may be a motor activity or verbal task.	If the child starts drawing a picture, he may repeat the same several times; certain lines of a poem may be reproduced continuously; while playing with toys also same kind of act may be repeated. Even after noticing that a particular way of solving a mathematical problem he is following is wrong, still try to do the same way.

1.	2.	3.
<b>3. Motor Problems</b>		
a) Inadequate coordination	Physical activities are generally clumsy or awkward. Lack adequate gross and fine coordination.	Day-to-day activities are not done systematically; cannot handle utensils or instruments or play material properly. Finds difficulty in playing games appropriate to age; cannot draw or paint properly, write legibly.
b) Poor Tactile-kinesthetic discrimination	Has difficulty in discriminating shapes, textures sizes only through touching. Lacks adequate visual-motor memory.	Experiences difficulty in identifying subjects by touching. Cannot write or draw spontaneously/automatically. This leads to poor writing and drawing performance.
<b>4. Visual Perceptual Problems</b>		
a) Poor visual discrimination	Unable to distinguish between visual stimuli that means cannot find out the similarities/differences between objects, shapes, symbols only through seeing them.	Has difficulty in differentiating shapes which have some similarity-rectangle and a square, circle and an elliptic and symbols like + and X; > and <; b and d; P and Q etc. Has difficulty in sorting out objects in terms of size, shape, colour, etc.
b) Difficulty in visual figure ground differentiation.	Unable to perceive a foreground figure against a background. That means unable to attend to important visual stimuli by pushing all other stimuli into the background.	While reading or writing may skip lines, unable to paint within the outline, interpreting pictures, stores, or social situations.
c) Difficulty in visual closure	Cannot fill in missing parts when only part of a word or object is seen.	Has difficulty in identifying 'hidden' shapes or pictures, (the sort of puzzle given in popular magazines). Cannot complete the figures or letters written in dots. Has difficulty in identifying missing parts in pictures common objects.

1.	2.	3.
d) Poor visual memory-visual recognition, recall visual sequential memory.	<p>Have trouble in retaining or recalling visual experiences. Some children with such problems find it difficult to recognize visual stimuli (objects, persons, pictures, shapes symbols) they have already seen.</p> <p>Others are able to recognise visual stimuli easily but are unable to retrieve (recall/revisualise) visual image of this stimuli when they are asked to reproduce the figure, picture, letter number or symbol.</p> <p>Still others may recognise and revisualize but have difficulty in reproducing sequences of visual items from memory.</p> <p>Revisualization and visual sequential memory problems are more frequently noticed among learning disabled children.</p>	<p>Children with visual recognition problem cannot recognize objects, pictures, etc. When they are included in a group of other objects, pictures, etc.</p> <p>Children with revisualization (recall) problem cannot retrieve a visual image of the required letter, number or symbol from memory. That means they cannot write them by memory. But they may be able to read words which they cannot write. They can copy as long as the item remains visible.</p> <p>Children with visual sequential memory may have difficulty in reproducing a series of acts in the same order after seeing them demonstrated, recognizing a series of colors, blocks, pictures after their order has been scrambled, reproducing letters/numbers in the required order.</p>
5. Auditory Perceptual Problems		
a) Poor auditory discrimination.	Unable to distinguish one sound from another.	<p>Cannot determine whether non-language sounds-horn sounds of vehicles for example are same or different. Has difficulty in distinguishing non-language sounds from language sounds.</p> <p>Unable to hear the differences or similarities in initial or final sounds of words, consonant blends or vowels.</p>

1.	2.	3.
b) Poor auditory reception/comprehension	Unable to gain meaning from auditory symbols.	Has trouble in listening or attending to auditory stimuli (environmental sounds, verbal discussions). Unable to answer yes or no to a question containing one concept, for e.g. can you sing? Do tree walk? etc. Finds it difficult to identify objects from verbal descriptions, attach meaning to words.
c) Difficulty in auditory figure ground differentiation	Unable to attend to important auditory stimuli by pushing all other auditory stimuli into the symbols.	Cannot concentrate on verbal discussion for long time, easily distracted by other environmental sounds.
d) Deficiency in auditory closure.	Cannot fill in missing sounds when only part of the word/sentence is heard.	Has difficulty in fill in the gaps when they miss parts of words or conversations, completion of words and sentences.
e) Deficiency in auditory memory auditory recognition reauditoriza-tion, sequential memory.	<p>Children with auditory memory problems often have difficulty in retaining or recalling auditory experiences.</p> <p>Some children with this difficulty may find it hard to recognize auditory stimuli they have already heard. Some others can easily recognize but cannot retrieve (recall) the auditory signal needed to produce the desired sound.</p> <p>Reauditorization and auditory sequential memory problems are most frequently observed among learning disabled.</p>	<p>Persons with a reauditoriza-tion problem knows what he or she wants to say but is unable to recall from memory how the desired sound or word can be vocalized.</p> <p>They may substitute the sound produced by the animal or by the object for its name ("barking" for the word "dog") 'resort to gestures', pantomine (imitation), or drawing pictures to express their ideas, may wait several seconds before responding; may write the word as a means of communication.</p> <p>Children with inadequate auditory sequential memory fails to learn songs, stories, rhymes, names of</p>

1.	2.	3.
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weeks, months, multiplication tables, etc.

### 6. Language Problems

Delayed or slow development of speech; difficulty in formulation and syntax- unable to organize, words to form, phrases, clauses or sentences in the appropriate way.

The kinds of difficulties noticed in case of children with reauditorization, and auditory sequential memory deficits can be noticed here also. In addition to that defects in sentence structure can also be easily noticed.

### 7. Faulty Work Habits

Many organize work poorly, work slowly, frequently confuse directions, or rush through work carelessly.

Do not plan work properly, thus there is no systematicity in work; may start drawing, painting or writing from a wrong direction.

### 8. Social-emotional Behaviour Problems.

#### a) Impulsive

Fails to stop to think about the consequences of behaviour.

Gives answers to questions without trying to see whether they are right or not (most often the answers are wrong); Fails to observe rules while playing; cannot wait for his turn for anything.

#### b) Explosive

Displays rage reaction or exhibit temper tantrums when needs are not met with.

Exhibit physical or verbal aggression on others, may throw away objects.

#### c) Inadequate social competence

Often below average social competence for age and ability, lack social skills

Unable to accept leadership; fails to complete the responsibility accepted.

#### d) Difficulty in adjusting to changes.

Take more time than others to adjust to changes in place, time, persons, nature of task, programmes etc.

Routine things have to be done at a particular time; things have to be kept or arranged in a particular place, change in class

1.	2.	3.
		<p>timings, sitting arrangement, change in classroom teacher all may upset them. Similarly, change in type of questions objective type to short answer type vice versa, different kinds of strategies for solving a mathematical problem may disturb them.</p>
<p>e) Drastic change in mood</p>	<p>Mood varies from hour to hour without obvious reason.</p>	<p>Quite obvious.</p>
<p>9. Orientation problems:</p>		
<p>a) Inadequate spatial organization</p>	<p>Poorly developed concept of space, distorted body image, trouble in judging distance and size, and difficulty in discriminating figures from ground, parts from the whole and left from right.</p>	<p>Cannot understand spatial concepts like top, bottom, inside, outside etc. Unable to point out left hand right eye etc; cannot judge the distance between himself and the ball coming from the opposite direction while playing; cannot understand concepts like more, less, some several, widest, biggest etc.</p>
<p>b) Inadequate temporal concepts</p>	<p>Disoriented in time.</p>	<p>Experiences trouble in relating concepts like before and after, now and when, today and tomorrow etc.</p>
<p>10. Academic Disabilities</p>		
	<p>Problems in reading, writing spelling and arithmetic.</p>	<p>Difficulty in reading and writing letters, words, sentences correctly and with optimum speed. Has difficulty in fundamental arithmetic operations-number concepts addition, subtraction, multiplication, division.</p>

**Table-2: Types of Learning Disabilities, Major Problems Encountered and Implications for Remediation.**

Type of Disability	Major/Primary Problems	Implications for remediations
1.	2.	3.
<b>1. Oral-Language Disabilities</b>		
a) Dysphasia	Partial inability to comprehend the spoken word (receptive dysphasia) and to speak (expressive dysphasia).	Intensive training in language and speech development is required. This should be done in a clinical set up.
b) Aphasia	Loss of the ability to comprehend, manipulate, or express words in speech, writing or gestures.	Same as in the case of dysphasia. But needs more intensive training than dysphasia.
<b>2. Reading Disabilities</b>		
a) Dyslexia	Partial ability to read or to understand what one reads silently or aloud.	Systematic exercises to enhance neurological and perceptual development in the clinical set up.
	Familial dyslexia is a form of reading disability believed to be caused by hereditary factors.	
	It is assumed that boys with reading problems possess a type of delayed neurological and perceptual development arising from neurophysiological characteristics which they have inherited from their reading disabled fathers.	

1.	2.	3.
	<p>Dyslexia is mainly due to deficiency in visual-verbal association (relating visual feature of a stimulus with its name, for e.g. letter and its name, symbol and its name etc.). In addition they may have deficiency in visual and/or auditory, perceptual problems, word analysis and synthesis (analyzing the word into its component sounds and blending the component sounds into words).</p>	<p>Remedial teaching to overcome reading and other associated difficulties.</p>
b) Alexia	<p>Loss of the ability to read write or printed language.</p>	<p>Same as in the case of dyslexia. Development of underlying psychological processes-perception, word analysis and synthesis should precede remedial teaching.</p>
3. Writing Disabilities		
a) Dysgraphia	<p>Dysgraphia refers to partial inability to wrote which is due to visual-motor integration disorder that interferes with the memory and execution of the motor patterns needed to write or copy letters, words, and numbers.</p>	<p>Thorough training should be given to enhance visual motor integration. Remedial teaching to improve writing skill should be provided.</p>
b) Agraphia	<p>Agraphia refers to the total inability to write. It is the inability to copy which differentiates agraphic children from other disorders of writing.</p>	
c) Revisualization Problems	<p>It is the inability to revisualise the image of letters or words. Children with this type of visual memory deficit can speak, read and copy, but have difficulty in writing the</p>	<p>Intensive training should be given to develop revisualization skills. Till they develop these skills spelling and arithmetic should be tested through recognition</p>

1.	2.	3.
	letters and words by memory.	type of question.
d) Formulation and syntax disorders	<p>Formulation disorders refers to the inability to organize the ideas into a clear, concise pattern of words.</p> <p>Syntax disorders refers to the difficulty in ordering the words to form phrases, clauses or sentences.</p> <p>Formulation and syntax disorders may involve both spoken and written language or may be limited to the production of written language.</p>	<p>Remedial teaching of formulation and syntax skills if it is confined to only written language. if it involves spoken language also, intensive training should be given to improve them.</p>
e) Spelling problems	<p>Most of the learning disabled children have spelling problems. It is observed that spelling problems are secondary to reading and revisualization problems. Thus, as reading improves spelling improves and as revisualization improves, spelling improves.</p>	<p>Remedial teaching to improve reading &amp; writing. In addition specific exercises should be given to improve spelling.</p>
f) Arithmetic Disabilities	<p>This refers to trouble in reading or writing isolated numerals or a series of numerals, reading and writing numbers whose names are not written the way they are spoken (twenty-one=21, not 201), recognizing the categorical structure of numbers (unit, tens, hundreds, thousands), and doing computational operations. This disability may arise from disturbance of quantitative thinking or from language or reading disabilities. Any how, arithmetic disability mainly</p>	<p>Oral language and reading skills have to be developed first if any deficiency in them is noticed.</p> <p>Remedial teaching to improve arithmetic skills.</p>

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1.

2.

3.

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refers to difficulty in  
quantitative thinking.

Acalculia denotes the  
inability to perform  
calculations.

Dyscalculia is a form of  
acalculia which involves a  
partial inability to perform  
calculations.

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## **LANGUAGE AND SOCIAL CHARACTERISTICS OF LEARNING DISABLED CHILDREN**

**Dr. Ramaa S**

The learning disabled children exhibit various language and social skill deficiencies. The knowledge of these are essential in planning remedial educational programs for them. So these characteristics are discussed in detail below:

### **Language Characteristics**

The specific difficulties noticed by learning disabled children (Thomas, 1989) in the area of language are discussed here.

#### **I. Cognitive Deficiencies**

1. Auditory - Symbolic Units (Speech sounds) - The ability to derive word structure from auditory stimuli constitutes the ability to comprehend or use those units. Learning disabled children often have problems in auditory perception which can be noticed in difficulty in sound blending. That means they cannot make words out of given speech sounds. While reading they may identify individual letters but fail to make words correctly.

For e.g. While reading the word 'Komala' they may identify letters correctly but may read as 'Kamala'.

2. Semantic units (words and Concepts) - The understanding of semantic units indicates knowledge of the precise meaning of familiar words as well as broad meaning of less familiar words. Many LD individuals have problems with concept formation and in the development of semantic units. That means they do not know the meaning of certain words properly and they cannot understand the meaning of certain words in the context.

3. Semantic classes (Word categories) - Individual words may be classified into groups or semantic classes according to some criteria. The ability to name the class name (super ordinate) when given names of class members constitutes one feature of understanding classes, and the ability to name class members when given a class name is another feature. LD children often experience difficulty in both forms of classification.

For e.g. Difficulty in giving examples for furniture, metals, cereals etc. Similarly cannot tell the class if you give the names of certain cereals, metals, etc.

4. Semantic Relations (word Relationship) - LD youngsters have difficulty in understanding the underlying sequences when

presented with such relations as comparison, spatial (corner, beyond, through etc.), temporal (one after the other, simultaneously, beginning, etc.) familial relationships (cousin, nephew, maternal uncle etc.).

5. Semantic systems (word problems) - In order to solve verbal problems, understanding the inherent relations in the problem and the processes involved in solving it are necessary. Many LD children have difficulties in reading comprehension and in mathematical, spatial (related to figures) and temporal (related to time) reasoning. They cannot solve these problems.

6. Semantic Transformations (Changes in Meaning) - The information transmitted by any word may vary, depending upon the context, role or significance of the utterance. The recognition of and ability to make changes in meanings of words reflected in understanding of semantic transformations (Wiig and Semel, 1984). Majority of LD children have difficulty in processing multiple meaning words, idioms and metaphors.

e.g. The boy is running; He is running a school. He is a Lion.

7) Semantic Implications (Implied meaning) - Considerable number of LD individuals have difficulty in understanding fables, myths and proverbs.

## II. Language Production Deficiencies

According to Wiig and Semel (1984), language production may be facilitated by memory and retrievals as well as by affective behaviors (such as ideas, practices, standards, values) and psychomotor behaviors (Sensory perception and mental, physical and emotional set). As LD youngsters are deficient in these aspects their overall language production is adversely affected.

1. Convergent Production Abilities - LD children may exhibit deficits in this area. Their rate and accuracy on naming pictured objects or event and verbal opposites, completing verbal analogies, completing sentences, and redefining words and concepts are lower than that of non-LD youngsters.

2) Divergent Production Abilities - The fluency, flexibility, originality and elaboration with which language is produced constitute a person's divergent semantic abilities. Divergent production abilities are involved in the following tasks:

- Naming words and concepts
- Completing verbal associations and analogies
- Formulating ideas and verbal problems
- Reformulating concepts and ideas
- Formulating alternatives and solutions.

According to Wiig and Semel (1984), LD youngsters have relative strength in divergent production abilities. However, specific deficit was noticed in the rate and accuracy with which they name semantic units.

### III. Deficiencies in Pragmatic Areas (Functional use of Language)

Bryan, Donohue and Pearl (1981) have noticed that LD children demonstrate more difficulty than non-LD children in such skills as asking questions, responding to inadequate messages, sustaining a conversation, and disagreeing with and supporting an argument.

### **Social Competence and Motivational Characteristics of Learning Disabled Students**

Unlike the categories of mental retardation and behavior disorders, learning disability is defined exclusively in terms of academic incompetence. Only recently, a number of researchers and educators started showing interest in the social competence characteristics of LD children. The reason for such an interest is that children with LD are often poorly accepted by peers and consistently exhibit deficits in positive social behaviors relative to their non-LD counterparts (Gresham, 1988). Gresham (1988) believes that identification and remediation of social skill deficiencies as well as enhancing the acceptance of LD students by peers and teachers are the critical aspects of an appropriate education to such children. Learning Disabled students exhibit the following social characteristics :

- Less able to predict the consequences for their behavior.
- Misinterpret social cues more often; less able to adapt their behaviors to the characteristics of their listeners; perform certain inappropriate social behaviors at significantly higher levels.
- Get low social status scores; less preferred by teachers than non-LD students.
- Lower than the normative samples in their participation in activities, social involvement and their performance in school.
- Exhibit more immaturity, hostility - withdrawal, aggressiveness, and hyperactivity indicating severe behavior disturbance.
- Poorer in giving positive feedback, giving negative feedback, accepting negative feedback, resisting peer pressure, negotiating conflict situations, following instructions,

carrying on conversations and solving personal problems, in empathy.

- More negative conscious and unconscious self-concepts - higher anxiety levels, more negative perceptions of their intellectual abilities, school status and popularity, and more feelings of insecurity, inadequacy, guilt, impulsivity and immaturity.
  
- Believe that their intellectual, academic and physical characteristics are significantly inferior to those of their non-LD mates.
  
- Less friendly in comparison with non-LD mates.

There is a need to develop social skills among learning disabled children. This should be one of the important aims in any education activity.

## **PROBABLE CAUSES OF LEARNING DISABILITIES AND REMEDIAL MEASURES**

**Dr. Ramaa S**

There are different causes for learning disabilities. The important ones are discussed below.

### **I Neurological Basis of Dyslexia**

There are a variety of approaches to determine the neurological basis of dyslexia :

- 1) Behavioral psychometric approach : In this approach certain cognitive abilities of the dyslexics are assessed. It was noticed that dyslexics are invariably poor in semantic linguistic tasks. It has been inferred from these studies that these deficits are related to deficient neurological substrata. The performance of dyslexics on these tasks resembles that of brain damaged revealing minimal brain dysfunction. This approach suffers from severe inferential problems in terms of neural substrata.
- 2) The second approach employing more direct procedures such as computerized tomography (CT) scans, electrophysiological (ECG) studies or post-mortem studies. The major findings of these studies are as follows :
  - a) None of the CT scans evidenced any manifestation of brain damage. This implies that dyslexia is a developmental disability which is not manifested as gross pathology.
  - b) There may be several morphological or neuroanatomical correlates to developmental dyslexia. In normal individuals there is an asymmetry between the two hemispheres. Usually the left hemisphere is slightly larger than the right one. There may be some variation in dyslexics. The majority of right - handed dyslexics may have normal asymmetry between both the hemispheres. Other populations most notably left-handed dyslexics or severely language delayed dyslexics may have normal asymmetry, or symmetrical posterior cortexes or reversed occipital asymmetries.
  - c) Significant EEG abnormalities have been found to occur more frequently in children with severe reading problems.
  - d) A number of studies employing event related potentials (ERPs) or evoked responses have demonstrated differences between dyslexics & normal, children with spelling

difficulties & normal significant differences exist among subtypes of developmental dyslexia.

- e) The brains of nondisabled and dyslexics at rest did not differ in terms of the distribution of electrical activity. During reading & listening tasks, the brains of dyslexics showed less appropriate electrical activity in the regions hypothesized to be related to reading.
- f) Dyslexics differed from young less fluent readers also in electrical activity suggesting pathology and not delayed neurocognitive development.
- g) The post-mortem studies revealed that neurodevelopmental anomalies were associated with regions of the cortex known to be important in visual imagery, cross-modal integration and visual and auditory association.
- h) There is more involvement of the anterior cortex over the posterior cortex; left more than right. The right hemisphere may also be involved in some subtypes of behavioral or developmental learning disorders including dyslexia.
- i) There is a degree of involvement of the thalamus. Specifically the thalamus may play a major role in channelling stimuli specific input.

## II Embryological Theory

The embryological theory proposes that before the thirty first gestational week, the foetal brain of individuals with LD might be subjected to an unusual surge of the hormone testosterone, frequently in boys. As a result of this growth of the left hemisphere could be delayed while the right hemisphere remain unaffected.

The testosterone surge affects the development of thalamus which is necessary for normal immunological function. As a result Development of a normal immune system will be hindered.

The abnormal testosterone activity is likely to be controlled by gene complexes.

Genetic factors are responsible for familiar cluster of left handedness, immune disorders, (multiple food allergies, asthma etc.) and learning disabilities.

### **III) Hereditary and Genetic Influences**

Genetic relationship was noticed for reading spelling and writing disabilities.

Two modes of transmission have been hypothesized.

- 1) Single gene disorders-autosomal dominant or autosomal recessive or sex linked.
- 2) Multifactorial (polygenic traits) - combined effects of genetic factors acting in concert with prenatal environmental factors.

It is believed that the majority of congenital disorders results from the interaction of genes and the intra-uterine environment.

Although many youngsters with sex-linked abnormalities are mentally retarded, some are learning disabled.

Extra X or Y leads to learning disabilities.

### **IV) Teratogenic Influences**

Teratogenes are agents that produce or raise the incidence of congenital malformations. Exposure to critical periods during gestation, are important in leading to abnormality ; another factor is minimal amount of teratogen required. Threshold vary from individual to individual, depending on health, nutrition, genetics of mother, uterine environment as well as genetics of the foetus.

Some of the teratogens are alcohol, smoking, lead poisoning, N-Nitroso compounds which are pervasive in our environment, that is in cosmetics, polluted air and also radiation.

### **V) Nutritional Influences**

Sugar and other foods: sugar in particular cane sugar leads to hyperactivity.

Milk, chocolate, cola, cane sugar, beet sugar, cereal grains, eggs, citrus products, beef, pork, foods containing additives and colouring should be avoided in the diets of hyperactive children.

### **VI) Vitamin**

Vitamin deficiency may be a cause of learning and behavioral disabilities.

Increased doses of vitamins C, B3, B6, B12 & E have been given in megavitamin treatments for various disorders.

Deficiencies of essential fatty acids such as those obtained from cold - pressed vegetable oils (ex; Sunflower), plus associated deficiencies of vitamins and minerals may also lead to hyperactivity and disordered behavior.

Widespread systematic and nervous system illness, including hyperactivity and disturbed behavior can occur through colonization with candida albicans, a fungus in the gastrointestinal tract.

Patients should be put on a yeast free, sugar free diet with some restrictions of other carbohydrates as these promote candida growth.

Orally given Nystain-an antifungal agent may be needed to discourage candida growth.

### **Remedial Measures**

Multidisciplinary approach is needed for treating learning disabilities. The principle- Education starts where Medicine stops, has to be adopted.

#### a) Medical Intervention

- 1) If possible excessive production of Testosteron should be checked.
- 2) Parents with learning disabilities can be sensitive to the possible problems in the children so that - early identification & early intervention is possible.
- 3) Hormonal treatment to those with extra X or Y chromosome.
- 4) Identification of nutritional deficiencies in children & prescription of Megavitamin Therapy and Balanced Diet.
- 5) Identification of food allergies & dietary restriction.
- 6) Treatment of Immune Disorders.
- 7) Detecting and checking growth of candida albicans.
- 8) Administration of psychotropic Medication to reduce hyperactivity and to overcome psychiatric disorders. The effects of these drugs should be discussed with parents and teachers.

- 9) Public awareness programs related to Teratogens and Nutritional Influences so that problems can be prevented as far as possible.
- 10) Detailed Medical check-up of preschool children and school going children with case study.
- 11) Establishment of child guidance centers with interdisciplinary team of experts in Hospitals.
- 12) Providing knowledge and skill to all the Medical students about Learning Disabilities so that Doctors in the PHC also should be in a position to help children with LD.

### **Psychological Intervention**

1. Systematic exercises to develop the neuropsychological skills in which LD children are deficient. Perceptual motor training, and sensory integration training may be useful.
2. Guidance and counselling to children with LD.
3. Guidance and counselling to parents of children with LD.
4. Behaviour modification techniques to overcome hyperactivity and some other behaviour problems.

## **IDENTIFICATION OF CHILDREN WITH LEARNING DISABILITIES - TOOLS AND TECHNIQUES**

**Dr. K. Yeshodhara**

Identification of children with learning disabilities may begin when a teacher suspects that the child has a learning or behaviour problem. Identification of learning disability after the child has experienced continuous failure in academic learning has its own negative consequences like frustration, fear of failure, aversion towards schooling, aggravated problem in mastering academic skills etc. This emphasizes the need for early identification i.e. at pre-primary stage itself (between 3 to 6 years). In this stage, the data relating to various aspects of learning are collected rather than concentration only on academic learning. Early identification helps in taking proper remedial measures at right time so that further problems be either prevented or reduced.

Identification can be done through

- a) Teachers' observation of students activities/performance inside and outside the classroom situations (may be casual or deliberate). The knowledge of general characteristics and their behavioural manifestations will be useful in identifying the learning disabled at the early stage itself.
- b) Informal testing and evaluation - through question and answer technique, providing activities/tasks to children i.e. using behavioural check list.

Steps Involved in Using Behavioural Checklist

1. Find out whether the child exhibits majority of difficulties.
2. Collect enough data to verify this.
3. Cross check by our observation with other teachers and parents.
4. Note down kinds of difficulties and frequency of such difficulties.
5. Find out these difficulties are not due to other defects like sensory handicap, mental retardation etc.

In order to determine that child has a specific learning disability, the teacher should first eliminate the children with learning difficulties due to the other following reasons - mental retardation, sensory defects, environmental factors, like social and cultural deprivation, lack of opportunities and facilities, faulty method of teaching etc. emotional problems, motivation and interest problems, personal adjustment problems and ill-health etc. Then a particular type of learning disability can be diagnosed using specific test and techniques.

c) Formal Testing and Evaluation : Using various standardized tests and other techniques of evaluation.

Following are certain tools which are found useful in identification of learning disabled children.

1. Charles High's pupil behaviour rating scale.
2. Valett's psychoeducational inventory of basic learning abilities.
3. The Boehm Test of basic concepts.
4. The Illinois Test of psycholinguistic abilities
5. The specific language disability tests.
6. Specific diagnostic tests in reading, writing, spelling and arithmetic.

The Pupil behaviour Scale developed y Charles High is an important screening device. This is a five print rating scale with points 1 to 5 indicating (1) very poor ability (2) poor ability (3) average (4) above average and (5) superior. The teacher is expected to rate each child on the following five areas of learning and behavior.

1. Auditory comprehension and listening - 4 components.
2. Spoken language - 5 components
3. Orientation - 4 components
4. Behaviour - 8 components
5. Motor -3 components

The children whose ratings are 1 in majority of the components of these 5 areas can be considered to have severe learning disability and these rated as 2 can be considered to have mild learning disability.

Boehm Test of Basic concepts consists of fifty pictorial items arranged in an approximate order of increasing difficulty. These items are divided into two 25 items booklets, so that it can be administered in 2 sessions (15 to 20 minutes for each session). The child is asked to mark the picture which best describes the concept being tested and each is scored pass or fail. This is meant for kindergarten, a and grade 1 and 2.

The concepts measured are categorized into 4 groups

- S - Spatial concepts (location, direction, orientation, dimensions)
- Q - Quantitative concepts
- T - Temporal concepts
- M - Miscellaneous concepts

used to determine the child's mastery of concepts.

The Illinois Test of Psycholinguistic Abilities (ITPA) (by S.A. Kirk and others).

It is an intra individual diagnostic test of the psychological and linguistic functions involved in communication. The 3 cognitive dimensions of ITPA are levels of organization, psycholinguistic process and channels of communication

#### Difficulties in Identification of Learning Disabled

1. There is no general/accepted definition about learning disability i.e. lack of theoretical consensus.
2. Difficult to identify properly all the factors responsible for neurological development.
3. Difficulty to make parents understand the early development of children and the concept of learning disability.
4. Difficult in location of the brain damage.
5. Difficulty in isolating factors affecting learning problems.

**NOTE:** For detail : Ramaa, S. (1992) Handbook on Learning Disabilities.

## DIAGNOSIS AND REMEDIATION OF WRITING DISABILITIES

Dr. K. Yeshodara

Writing is one of the highest forms of languages, highest skill to be learnt, Myklebust (1965) describes writing as "a form of expressive language, a visual symbol system for conveying thoughts, feelings and ideas". The development of writing skills follows the development of speech comprehension and use, and the attainment of proficiency in reading. The complex process of writing integrates visual, motor and conceptual abilities. It includes competence in spelling, punctuation, capitalization, studying, making sound letter correspondence, learning the alphabets, distinguishing one letter from another etc.

Chalfant and Scheffelin (1969) pointed out that the act of writing i.e. the production of graphic language symbols involves four tasks :

**Task-1** : Intention - possessing a need to communicate or send a message in writing.

**Task-2** : Formulation of the message - Formulating the sequence of the general content of the message and retrieval of the auditory - language symbols suitable for the message.

**Task-3** : Retrieval of graphic - language symbols corresponding to the selected auditory - language symbols.

**Task-4** : Organizing the graphic - language sequence - Retrieval of the graphic motor sequence appropriate to the selected graphic - language symbols which represent the message.

On the whole, writing skill involves 2 components

(i) Hand writing - Mechanics of writing, i.e. production of graphic language symbol.

(ii) Writing expression - language aspect, expressing the ideas in graphic forms of language.

Writing disabilities/disorders are of three types. Dysgraphia, defective revisualization, formulation and syntax deficits.

1) Dysgraphia - Partial inability to write (to express in written symbols) Visual-motor integration disorder which interferes with the memory and execution of the motor patterns needed to write or copy letters, words numbers etc.

Agraphia - Total inability to write (cannot even copy).

2) Revisualization problems - Inability to revisualize the images of letters or words - can speak, read and copy but cannot write on their own or by dictation (i.e. by memory).

3) Formulation and syntax disorders - inability to formulate/organize the ideas they wish to express into syntactically correct language.

Formulation disorder - inability to organize the ideas into a clear, concise pattern of words.

Syntax disorders : difficulty in ordering the words to form phrases, clauses or sentences. Syntax disorder is characterized by word omissions, distorted word order, improper verb and pronoun usage, word endings and punctuation may involve both spoken or written language or may be limited to the production of written language.

### **Diagnosis of Writing Disability**

A. Teachers' observation - Observe the children at work with reference to the following specific tasks.

1. Can he write spontaneously? With a pencil? With alphabet blocks? With his eyes closed?
2. Can he write from dictation?
3. What words and spelling errors are made?
4. Can he copy from hand writing or print?
5. Does he lose his sense of direction in forming letters?  
s -> s    c   c   d   d
6. Can he copy geometric figures?
7. Can he write in one language and not in another?
8. Does the child profit from auditory or visual assistance?
9. Does he exhibit motor in-coordination? (eg. in holding a pencil, slate or book etc.)
10. Has he had opportunity to practice? etc.

## B. Giving copying and Free Writing Exercises

With the following directions

1. Write as well and neatly you can
2. Write as rapidly as you can
3. Copy at your usual rate of writing

Exercise (1) One or two small paragraphs from any text book suitable to their level to copy.

- (2) To write 4 or 5 sentences on their own on any one of the topics - animals, things, incidents, etc.

## C. Dictation exercises - Words or sentences

D. Securing additional pertinent information - spelling and reading ability, school history, developmental history i.e. handedness, speech defects, accidents.

## E. Formal Testing or Evaluation -

By administering special psychological and physiological tests.

1. Tests of motor control and co-ordination
2. Tests of perception of form and spatial relation
3. Visual and auditory discrimination
4. Visual and auditory acuity (clarity)
5. Visual and auditory memory
6. Handedness

A few Particular tests

### (a) Lincoln Oseretsky Motor Development Scale (1955)

Activity based test to measure motor ability of children 6-14 years age group. Totally it consists of 36 activities out of which 13 activities are relevant to the writing aspect (i.e. movement of hands and figures, eye-hand co-ordination).

1. Touching finger tips (left and right hand)
2. Finger movement
3. Closing and opening of the hands alternatively
4. Making dots
5. Making a ball (L and R)
6. Winding thread (L and R)
7. Describing circles in the air
8. Tapping (L and R)
9. Putting match sticks inside a box
10. Drawing lines (L and R)
11. Putting coins in box (L and R)

12. Tracing Mazes (L and R)
13. Opening and closing of hands

- (b) Dr.S.Ramaa's visual Recognition Test
- (c) Devaki's Visual Discrimination Test
- (d) Dr.S.Ramaa's Auditory Reception Test
- (e) Dr.S.Ramaa's Visual Recall Test
- (f) Devaki's Auditory Discrimination Test

### **REMEDICATION OF WRITING DISABILITIES**

General and specific principles of remediation for learning disabled be considered here also.

#### **I. Dysgraphia**

The knowledge of the developmental hierarchy of writing (described by Chalfant and Scheffelin in 1969) among normal children will be helpful for remedying writing disorder i.e. Dysgraphia.

i) Scribbling (provide for free writing) children should be instructed and trained regarding position of paper and pencil, correct posture, manipulation of pencil, muscular movement and co-ordination, eye hand co-ordination.

ii) Tracing - Teach them to trace connected letters or figures first, then disconnected letters or figures; provide for development of muscular and eye hand co-ordination.

iii) Copying - Should start with reproduction of a visual model i.e. letter, word, figure, number etc. It should be followed by reproduction of the model from memory (both symbolic and non-symbolic figures).

iv) Completion of Tasks - give practice in completing the figures, when portion of them is missing i.e. indicated by dashes, then dots, then removing the whole portion. This is followed by word and then sentence completion.

v) Writing from Dictation : Give practice in writing letters, words and sentences as they are spoken, by dictation, supplying words and sentences that are missing.

vi) Prepositional Writing - Writing in sentences, paras etc. on their own i.e. training in expression of ideas of composition writing, letter writing etc.

Handwriting deficiencies - Provide suitable programmes to overcome handwriting deficiencies may be due to the following causal factors inherent in the pupil.

i) Lack of readiness to write (ii) Visual defects causing faulty imagery (iii) Immaturity in physical and motor development (iv) Perceptual deficiencies (v) Lack of aptitude for learning motor skills (vi) emotional instability (vii) Difficulty in retaining visual and motor images (viii) Inability to hold pen and use of incorrect posture (ix) Physical handicaps (x) Conditions associated with handedness.

Revisualization problems - The principles which are helpful in teaching word recognition skill among learning disabled are also helpful in developing writing skills among children with revisualization problems. The development of reading and writing are complementary to each others. So, some of the remedial measures suggested for reading defects will be useful for this purpose too i.e. activities to develop visual/auditory discrimination, memory, activities for improving spelling and vocabulary etc.

### **Formulation and Syntax Disorders**

Written expression involves (1) functional writing (conveying information in a structured form such as letters, invitations, reports etc. and (2) creative writing (personal expression of thoughts and experiences in a unique manner as in poetry, story writing etc.

1) Language Experience approach be used - provide experiences - discussions, field trips films etc. to stimulate ideas to write about. When he continues to express ideas in writing, punctuation and capitalization etc. will be taught i.e. writing mechanics are explained as needed and the student is made aware of their importance. The teacher should avoid excessive correction of the mechanical aspects of writing.

2) Different activities are provided depending upon the students needs activities for developing fluency, vocabulary, structure and content.

3) Cloze technique can be used to develop reading comprehension and written expression.

4) Spelling disorders can be corrected - a chart of alphabets be provided to use when the children forget letters - use sand papers or beaded letters and words to feel and see the letter and word.

5) Activities to develop vocabulary.

# **ASSESSMENT AND DIAGNOSIS OF READING AND WRITING DISABILITIES IN ENGLISH**

**Prema Raghavan**

## **Introduction**

In a highly literate society it is crucial that a child learns to read, write, spell and generally to manipulate language in order to communicate effectively. To do so is no small achievement for a number of complex skills which are both independent and interrelated have to be mastered. It is fortunate that a majority of children become proficient users of language - both written and oral, with only the minimum of supervision. Unfortunately there remains a significant proportion of those who experience specific difficulties with various aspects of language learning.

## **Overview**

The purpose of this paper is to describe various aspects of reading and writing disorders leading to a fuller recognition of children who are dyslexics. An attempt has been made to discuss what constitutes normal language development in children studying English at the primary level. This will provide a framework within which we can consider children who differ significantly in the development of oral and written skills. It may be noted that early detection of dyslexia (before reading failure), would become possible with proper diagnosis and assessment, making possible timely intervention and sometimes even the prevention of the difficulties.

## **Verbal deficits in Dyslexia**

Normal children have a remarkable propensity for accurately reproducing rhythmic sounds even when the meaning of these sounds is not clearly established. We see some three and four year olds mouth jingles from advertisements though it may be in a language with which these children are not conversant. It has also been established that children long before they begin to read can detect rhyme and alliteration and even reproduce them. They are particularly receptive to the rhythmic movement of lines caused by the rhyming words such as those in a nursery rhyme.

Most children come with no knowledge whatsoever of English. This is true even in schools where English is the medium of instruction. However, when nursery rhymes are taught to the accompaniment of gestures and some pictures which explain the meaning of key-words, children envisage interest and enjoy clapping and keeping time with the movement of the rhyme. They are also able after some drill and practice to repeat the nursery

rhyme almost verbatim. However, children who lack auditory organization as well as 'auditory memory' are characterized even at this stage by their inability to participate effectively in such activities. They are unable to discriminate the sounds in a word and therefore unable to detect the rhyme with which each word ends. Problems arise because the unfamiliar words of English have to be processed and segmented, a task which is particularly difficult for dyslexic children. A child who cannot say a word correctly will have difficulty segmenting it at the phonemic level. Moreover many learning disabled children have limited short-term verbal memory and therefore their capacity to reproduce rhymes is also limited. For the same reason such children fail at the task of following simple instruction even when they are repeated though the rest of the class goes ahead.

The ability to segment the sound stream into phonemic units at an early age is highly predictive of later reading achievement and disabled readers are consistently found to be worse than normal readers on tests of phoneme segmentation. A phoneme is a unit of sound in a language that cannot be analyzed into small linear units and it serves to distinguish one word from another for example /p/ and /b/ in English words like pat and bat.

Tests can be devised by the language teacher and carried out with individual students to test whether they have difficulty recognizing the various phonemes which constitute a word. The words are read out slowly by the teacher and the students have to respond to the sounds of the words by picking out words which rhyme. Words such as the following can be presented.

- a. cat, hat, man, fat
- b. sing, ring, wing, pick
- c. boat, fish, note, vote
- d. song, wrong, poke, gong.

A similar task can be constructed using words which begin with the same sound. Children have to respond by saying same or different.

- a. sun, suck, sum, see
- b. bat, bang, bus, bare
- c. pit, put, pick, pill
- d. fill, fell, fig, fit

Other tasks useful in assessing segmentation skills include getting children to tap out the individual sounds in syllables (b+a+t); adding or subtracting phonemes (they can be asked to add s to lip = slip, take n from bank = back); find the odd one out of four auditory presented words (shoe, show, shell, tell); blend sounds together to give words (c+a+t = cat) and exchange initial

sounds between two words to make a spoonerism (pick pocket - pock picket).

### **Letter Reversal in learning the English alphabet**

When letters of the English Alphabet are introduced the method normally followed is 'Look and Say' or the 'Phonic Method'. This is done in order to build a link between the shape of the letter seen and its sound. While both these methods have proved effective in teaching the letters of the alphabet to normal children they are inappropriate for children who do not remember shapes or sounds well. As such a child does not have the basic processing skills he cannot recognize or recall shapes and apply a sound to a particular shape. Such a child's progress in recognizing and reading letters will be slow and hesitant and if attempts are made to force his/her pace, the child will become increasingly hostile to the printed page. Writing of letters is accompanied by many reversals and the letters are badly formed. The reason why this happens may be because when children learn a new skill involving the manipulation of a symbol, they characteristically over-generalize. Thus a child learning to talk calls all women 'mommy' and all four legged animals 'dog'. A child who moves alphabets in an unacceptable way (rotating and inverting letters) likewise over generalizes. The child realizes that the letter cannot be changed but he thinks that it may be moved around in any fashion. If we examine the alphabet we find that inverting or rotating letters do not produce consistent results. There are some letters that cannot be transformed in any way without producing the response from the teacher of incorrect. They are F, G, S, L, Q, R, a, e, f, h, j, k, r and y. However, there are some letters that can be transformed in some fashion and still appear to be correct. These letters, when rotated or inverted look just the same. Thus, T, V, Y, i, t and V can be laterally inverted (i.e. flipped over appearing as reflected from a mirror - F appears as Q) and still seem correct. In the same way B, C, D, E, H, K and C can be longitudinally inverted (F written as t); S and s can be rotated; A, I, X, O, l, O and x can be both rotated and inverted. In all these cases the child makes a mental mistake that is, he can think of them as rotated or inverted while the teacher will respond to what he produced with 'correct'. The remaining letters of the alphabet are the most confusing of all. These are those letters which when transformed becomes other letters. Thus if 'M' is rotated 180 degree it become 'W' and vice versa. If 'Z' is rotated 90 degree, it become 'N', u rotated 180 degree become 'n'; W longitudinally inverted becomes m. The worse problems comes however with the letters b, p, P, d and possibly g and q since, by inverting or rotating any one of this family may become one of the others. Though most children learn the characteristics which define a given letter the L.D. child however cannot make this deduction. Thus despite a number of repetitions children with

SLD will have persistent confusion. They are unable to copy the letters from the black board. Writing of letters is accompanied by many reversal and the letters are badly formed.

### **Difficulty with Spontaneous Speech**

A task administered in the primary classes to most young children is to describe familiar things and objects like a pet, one's friend, one's family etc. Sometimes children are asked to speak on simple known themes or describe situations and vents. While normal children when encouraged by the teacher embark on these tasks with much gusto, the dyslexic child once again becomes conspicuous by the inability to do so. The speech of dyslexic children shows that they may face difficulties and retardations in three areas. They may face difficulties and retardations in three areas. They may have difficulties with the production of sounds of letters and later words i.e. articulation errors. Confusion may exist with regard to initial sound in words - pat may be spoken of as tap. Later on the same difficulties will persist in the sequencing of longer multisyllabic words. A word such as 'car part' may appear as 'part car'. More significantly some dyslexic children experience serious difficulty in expressing ideas coherently in an appropriate or correct sentence. For example when shown a picture and asked to identify the missing item (a dog without ears) a dyslexic child may recognize the missing item instantly. His/her visual problem solving may be fast and precise when asked however to express the idea in words the efficiency with which the task is carried out is low. Instead of replying that 'the ears of the dog are missing' he may reply 'its that thing there on top of the dog's head, you know which he hears with. These children thus experience some difficulty in defining words exactly. They may be familiar with the ideas and know what the word means but they cannot express the idea effectively in spoken language for others. This inability to express ideas coherently is a serious restriction in the child's development on entering the talk oriented background of the pre-primary and primary. If a child cannot say it, he will not read it, writing it or spell it.

### **Development of Reading Difficulty in oral Reading**

The reading aloud of stories or short passages is a much favored activity in the English language classroom. Children love to hear the sound of their own voices. If reading aloud is conducted after children have had sufficient practice in the pronunciation of specific words and intonation patterns, it can be successfully carried out by most children in the class.

Infact the enthusiasm with which children enter into the spirit of reading aloud is an exhilarating experience for both the teacher and the students.

The learning disabled can be recognized by the manner in which they approach the task of reading aloud. In contrast with the rest of the class reading is hesitant and laboured. This comes from their inability to blend words together. They often miss out on words or add extra words. Even though they may have met and discussed a word many times before i.e. they are familiar with a word, they fail to recognize it. Often such children either skip lines or read the lines over and over again. The teacher has often to come to their aid because they repeatedly lose their place. There is a total disregard for punctuation. While reading, confusion arises between similar looking words, e.g. on/no, for of/off/from, ever/even/every. Difficulty also occurs in breaking down long words into syllables and putting the syllables back into the correct order. Often syllables are missed out altogether e.g. fend for friend, song for strong. There is also attendance to make anagrams of words e.g. 'tired' for 'tired', 'wives' for 'views', 'breaded' for 'bearded'.

Reading a page from the classroom reader, a 12-year-old boy made the following errors.

- a. won for now - complete reversal
- b. on for no - complete reversal
- c. brown for down- reversal of b/d and addition of the letter r
- d. back for black - omission of second letter of initial blend
- e. every for very - confusion of similar looking and similar sounding words.
- f. concert for contest - confusion of similar looking words
- g. three for there - visual sequencing error or confusion of similar looking words.

For beginning readers the following test could be administered to assess their skill at recognizing and reading the given words with correct pronunciation.

### **Reading for Comprehension**

At the primary level children need to comprehend only at two levels - literal and inferential. Literal comprehension (Reading the lines) consists of the recall or recognition of main ideas, details, sequence of events, comparisons, character traits and the cause and effect relationships explicitly stated in a story. The passage below illustrates the meaning of literal comprehension.

A little black dog ran away from home. He played with two big dogs. They ran away from him. It began to rain. He went under a tree. He wanted to go home, but he did not know the way. He was a boy he knew. The boy took him home.

1. Who ran away from home?
2. How many other dogs did he play with?
3. Why did the dog go under the tree?
5. What did the dog want then?
5. Whom did he see?
6. How did he get home?

Each of the questions for this passage asks the child to recall literal information. Questions 1 and 2 could probably be answered by recalling phonological elements from the passage. Question 6 is highly related to question 5. A correct answer to number 5 increases the likelihood of getting question 6 correct.

Diagnosis of comprehension abilities beyond the literal i.e. inferential abilities or reading between the lines requires more questions like the following to be answered.

1. Does this animal like to get wet? How do you know?
2. How do you think this animal recognized the boy?
3. What kind of person do you think this boy is?

The child's response to these questions provides information about the understanding of ideas rather than just remembering facts.

Children with learning disability normally read at a rate much slower than their peers. Their independent reading level (the level at which they can comprehend without the teachers help) is much lower than the rest of the class. This arises due to lack of basic sight vocabulary; poor use of contextual clues to get word meanings. Even with questions of the literal type because of inadequate basic sight vocabulary, the inability to use contextual clues and because their silent reading is slow and laboured they lose track of the meaning and are unable to demonstrate adequate comprehension through recall or recognition of answers.

Since they are unable to read for main ideas, character traits or sequence of events they fail at answering questions of the inferential type as well. However when stories are presented in the visual form and dyslexic children are coaxed through questions which are repeated and rephrased with several references made to the pictures which tell the story, they indicate through gestures or short broken sentences comprehension of the main parts of the story.

### **Writing and Spelling**

Dyslexic children will exhibit poor standard of written work in comparison with oral ability. The work will be messy with many crossing outs and words tried several times e.g. sense,

wrong choice of letters due to failure in auditory discrimination particularly between the short vowel sounds a as in ant; ae as in egg; i as in ink; o as in oranges; u as in up. Confusion also exists between similar sounding consonant sounds e.g. t and d, p and b, m and n etc. Similar sounding words are confused e.g. 'accept' and 'except', 'our' and 'are', 'one' and 'won' (homonyms). Confusion between letter names and sounds results in mistakes such as 'ne' for 'any', 'not' for 'and', 'fit' for 'felt'. A word may also be spelt in several different ways in one place of writing e.g. campping, cammping, camping, kamping.

Not only is the written work badly set out but it demonstrates a marked inability to stay close to the margin poor hand writing usually deliberately done to disguise poor spelling. Often the children lose the point of the story being written. There is an indiscriminate use of punctuation. Children also manifest difficulty in writing the date e.g. 21 June 1984 (21.6.84) writing as 6.12.48.

The assessment of spelling strategies is based upon error analysis. It is important to examine errors made in free writing as well as in dictation. Many children can spell reasonably well when all their attention is devoted to the task. However, what will be important in their school experience will be to spell while also thinking, planning and developing ideas. In this situation many more spelling errors are likely to occur and these must be examined during a comprehensive assessment.

The speller can be asked to attempt a series of one, two, three and possibly four syllable words. The importance of increasing syllable length is that this imposes a gradually increasing memory load. Some dyslexic children can succeed in spelling one or two syllable words, but, when they need to hold three or four syllables in mind during the transcription process, are prone to error.

One syllable	Two syllable	Three syllable
pet	apple	membership
lip	puppy	cigarette
cap	packet	catalogue
fish	trumpet	September
sack	kitten	adventure
tent	traffic	contented
trap	callar	refreshment
bump	tutip	instructed
nest	polish	umbrella
bank	finger	understanding

Example of errors made by dyslexic children with two and three syllabic words.

Poleas for polish  
thinger for finger  
trupic for trumpet  
tyup for tutip  
kinetern for kitten  
enstructed for instructed  
mebership for membership  
cotelect for contented  
sigret for cigarette  
membship for membership.

### **Testing of children with dyslexia**

Children who fail consistently to perform tasks which are easily performed by normal children must be tested further to discover the nature of their learning difficulties.

1. Test of verbal deficit - A picture series for example the story of a thirty crow could be shown to the children using a flannelograph. Children are encouraged to express what they see in words. Teacher observes the child's posture, voice, tone and the use of inappropriate language or in coherence in expression.
2. Test of loud reading - one, two or three syllabic words can be included. Children can be asked to read aloud the following words.

That, tan, ball, reading, these, if, in, it on, of away.

### **Teacher observation should include the following**

Finger tracing, spelling aloud before blending, omission or substitution of a word, mispronunciation, the ignoring of punctuation or intonation, loudness of voice and the speed at which the child reads - too fast or too slow etc.

Test in reading comprehension - A simple passage like the following can be used.

One day a dog found a bone. With the bone in his mouth, the dog was crossing a bridge. When he looked down at the water he saw himself. He thought it was another dog with a bone so he began to bark. The bone fell into the water and was lost forever.

Children are asked questions on the passage like -

1. What did the dog find?
2. What did the dog see in the water?
3. What did he do when he saw himself?
4. What happened when he barked?

Teacher observation includes whether - the question has to be repeated once, twice, 3-5 times; questions need to be translated to mother tongue; refusal to answer or the repetition of the question by the student etc.

Dr. Jayanti Narayan (Assistant Professor of Special Education, NIMH) has developed Grade Level Assessment Tool for Children with Learning Problems in Schools. Teachers can use or adopt these tests for testing children who fail consistently in one or more subjects. The GLAD as the device is called issued to help a primary school teacher to test her this student while systematically making observation of the processing pattern in a child.

**Conclusion :** While tests may help a teacher to spot the probable dyslexics in the language classroom further assessment of specific areas of difficulty need to be carried out either by reference to specialists in the area of Special Education or through the battery of standardized tests specifically meant for the testing of children with SLD. The timely discovery of specific learning disability helps early intervention thereby increasing the chances of successful remediation through help and support through and beyond the school years.

# REMEDICATION OF READING AND WRITING DISABILITIES IN ENGLISH LANGUAGE - PHONETIC RULES AND STRUCTURAL ANALYSIS

Umadevi M.R.

## Introduction

Reading and writing are two aspects of the whole language - Communication Process. Reading becomes (to the student) "getting the words right" and writing is "getting the spelling right". Reading consists of a complex set of skills which include recognizing printed words, determining the meaning of words and phrases, and coordinating. This meaning with the general theme of text. Skilled readers recognize the vast majority of words in print directly but when unusual or novel word is encountered then it is read phonologically (Perfetti, 1985). Children learning to read, place considerable reliance on using a words phonological structure in order to read. This process is referred to as decoding.

Students with learning disabilities in general have a difficult time in decoding process. They do not make the early connection between letters and corresponding sounds. This lack of phonological awareness limits the systematic growth that typically takes place in the reading process. The students begin to have trouble blending the letter/sounds to form words or word parts. They also have difficulty recognizing that words have parts or letter clusters. hence, their reading rate is low and are also likely to have difficulty with spelling and in turn writing.

Reading disabled children face the following reading problems and require remediation in these skills.

### I. Problems in Decoding Skills

1. fails to notice distinctive features of letters and words (e.g. b and d; pig and dig).
2. fails to note differences of letter and word configurations.
3. cannot recognize upper and lower case letters of alphabet.
4. focuses only on certain characteristics (e.g. word beginnings, letter typography).
5. cannot verbalize phonetic sounds, when shown graphic symbols: (i.e. consonant sounds, short vowel sounds, long vowel sounds, consonant blends, consonant digraphs, regular vowel combinations, R-controlled vowel combinations, hard and soft sounds of g and c, vowel diphthongs).

6. has problem in blending sounds to form words.

## II. Problems in word recognition skills

1. Does not recognize common, irregular words on sight (e.g. was, to, come).
2. Cannot rhyme words.
3. Does not recognize words through contextual clues.
4. Does not make use of structural analysis for identification (i.e. compound words; common word endings noun, verb, and adjective forms; common prefixes; common suffixes; syllables within a word).

Source : Based on Bartel (1980) and Palloway, Patton, Payne, and Payne (1989).

(NOTE: Problems in comprehension skills are not mentioned since it is beyond the scope of topic allotted.)

### SCOPE OF READING SKILLS

#### Reading

Recognizing words		Understanding words and ideas	
Sight words	Word attack or word analysis skills	Vocabulary development	Other Comprehension skills
Basic sight words	Configuration clues		Literal meaning
Other sight words	Context clues		Inference
	Phonetic analysis		Evaluation
	Structural Analysis		Appreciation
	Dictionary skills		

#### Study Skills

Table No.1: Phonic components consonants.

Consonant				Vowels			
Single	Blend	Digraph	Silent	Single	Controlled R, L, W	Digraph	Diphthong
b	bl	sh	<b>tight</b>	long	r (bar)	ai	au
c	cl	ch	<b>write</b>	e		ay	aw
l	dl	th	<b>know</b>	i	l(always)	ea	oi
h	fl	wh	<b>chick</b>	a		ee	oy
g	gl	ph	<b>bomb</b>	o	w(awe)	ei	oo
t	sl			u			
w		qu					
m	br			short			
d	cr	-nk		e			
s+	dr	-ng		i			
j	gr	-ck		a			
p	pr			o			
k	tr			u			
Y							
n	sc			y			
	sk						
	sm						
	sn						
	sp						
	st						
	scr						
	spr						
	shr						
	str						

### Consonants

6. The following are the consonant components

- 1) The letters c and g have both hard and soft sounds. C tends to be hard when preceding a, o, or u and soft when preceding i, e, and y. G tends to be hard when preceding a, o, and u and soft when preceding e, i and y (cake, city, go gem).
- 2) The letter s has three prominent sounds:  
S sound as in SO.  
Z sound as in his.  
Sh sound as in sugar.
- 3) Consonant blend/two or three letter consonant combinations that produce a blended sound of the component letters; for example, the blended sound of the b and l in blend.

- 4) Consonant digraph : Two - letter consonant combinations that do not produce the blended sounds of the participating letters, but rather produce a variant speech sound; for example, the sound at the beginning of **phone**.
- 5) The th - digraph represents two different sounds as in words thin and then.
- 6) In some words the consonants are not accented. These are called silent consonants (e.g. k, b,w,g. Knew write; Comb gnaw) in. Unaccented syllables and is represented by the pronunciation symbol for examples.

a in about; e in taken; i in pencil; o in lemon; u in circus.

Studies by Clymer (1968), Emans (1965), Burrows (1963), Bailey (1967), Johnson (1970) and Burmeister (1968) have clearly pointed out the instability of the most widely known phonics generation. "When two vowels go walking the first one does the talking". Research by the above persons indicate the prime offenders. They are -

1. four pairs that act most often as diphthongs au, oi, oy, oo.
2. two pairs that act in many ways: ie, ei.
3. two pairs normally called diphthongs, but which act more often as something else.

ou ow

ou produces sometimes schwa sound as in rigorous.

ow as digraph in own and diphthong in town.

Based on above research, we might revive the following two-vowel generalization; "when two vowels go walking, the first one generally does the talking unless it is au, ei, ie, or a diphthong beginning with O".

### **Vowels:**

The following are the vowel components.

1. Single a, e, o, u, i and sometimes y are the single vowels. These vowels sometimes represent long sounds and sometimes short sounds. Normally, when there is one vowel in the middle of a syllable or word, it has a short sound - hat, met, sit, rot, but. When an -e is added to such words, the -e normally is not heard, while the previously short vowel becomes long - hate, mate, site, note, bute.

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 Frank, J. Guszak "Diagnostic reading instruction in elementary school. Second Edn. Harper & Row Publishers. New York, 1978, P.40-45.

2. Single - r, l, w controlled/single vowels preceding r, l, and w often produce sounds that are neither long nor short, but unique. Because they are unique and we have no better name for them. We call them r controlled sounds. l controlled sounds, and w controlled sounds - bar, all, awe.
3. Diagraphs : One vowel of an adjacent vowel combination (rain, gray) receives the long vowel sound, while the other is silent. Such vowel combinations are called vowel diagraphs.
4. Vowel diphthongs : Two adjacent vowels. Each of which contributes to the sound heard (the vowel counterpart of the consonant blend). Common diphthongs are au in haul, oi in boil, oy in boy.
5. Schwa : Schwa is the name given to the sound often introduced by vowels.

**Phonetic rules related to consonants:**

**Consonants:**

1. When 'c' is frequently followed by e, i, or y it has the sound of s, as in race, city, fancy.
2. Otherwise, c has the sound of k, as in come, cat.
3. G followed by e, i, or y sounds like j, as in gem, giant.
4. Otherwise g sounds hard as in gone.
5. When c and h are next to each other, they make only one sound.
6. Ch is usually pronounced as it is in kitchen, not like sh (in machine).
7. When a word ends in ck, it has the same last sound, as in look.
8. When two of the same consonants one side by side, only one is heard, as in butter.
9. Sometimes s has the sound of 'z' as in raisin, music.
10. The letter X, has the sounds of ks or k and s, as in box, taxi.
11. Initial s usually has the sound heard in sex, sat, sow (exceptions sugar, sure).

12. The sound of t is usually that heard in tent, tom & melt; in -tion endings, however, it has the sound of nation or action.
13. One syllable words ending in l, s, f which have a short vowel take double ll, double ss, double ff in words with k ending, do not take double kk because we do not get double kk in English hence, Ck. e.g. ball, less, puff, suck, neck.

### **Phonics generalizations related to single-letter vowels**

1. A vowel between two consonants in a word or syllable is usually "short" e.g. pin, cap, hot, bug, bed.
2. A vowel before two or more consonants is usually "short", e.g. wish, graph, much; blotter, lettuce, happen, itch, hospital, wrestle, cinder, dampen bumper.
3. A vowel followed by a final consonant plus e is usually "long", e.g. pine, date, dope, cute, cede.
4. A vowel at the end of a one syllable word is usually "long", e.g. go, me she.
5. When it occurs in the final position of a word, the letter y functions as a vowel. In one syllable words, it has the sound heard in my, try, cry. In longer words the y has the long e sound as in baby.
6. The r gives the preceding vowel a sound that is neither long nor short, as in car, far, fur, fir. The letter l and w have the same effect.

### **Vowel Digraphs and Diphthongs**

1. The first vowel is usually long and the second silent in oa, ay, ai, and ee, as in beat, say, gain, feed.
2. In ea the first letter may be long and the second silent, or it may have the short e sound, as in bread.
3. ow has two sounds; one is the long sound as o in own; the other is the ou sound as in cow.
4. These double vowels blend in a single sound; au, aw, oi, oy as in auto, awful, coin, boy.
5. The combination ou has a schwa sound, as in vigorous, or a sound as in out.
6. The combination oo has two sounds, as in moon and as in wood.

## **Syllabication generalizations**

Syllabication should be an aid where it can be used. These six generalizations may be helpful.

1. When two consonants fall between two vowels the division of syllables is usually between the two consonants (for e.g. rab-bit, sis-ter).
2. When a vowel is followed by a single consonant the consonant usually begins the second syllable (for e.g. be-fore.)
3. When a word ends in le, and a consonant precedes the le, then that consonant goes with the le syllable (for e.g. ta-ble).
4. If the word contains a prefix, the division comes between the prefix and the root word (for e.g. re-view).
5. If the word has a suffix, the division comes between the suffix and the root word (for e.g. like-ly).
6. Consonant digraphs and blends are never divided (for e.g. rocket).
7. All syllables have a vowel in them.

## **Structural analysis**

The smallest units of meaning are called morpheme. Some words are morphemes, but other words are contain several morphemes.

Many basic words undergo changes in meaning and pronunciation because of prefixes, suffixes, inflections, and compounding. Making use of these word parts to arrive at the meaning or the pronunciation of words is called Structural Analysis. Readers at all levels must have structural analysis skills to aid in word recognition.

Instruction in the recognition and use of structural analysis cues can begin as soon as words containing prefixes, suffixes, inflectional endings. Compounds or contractions begin to appear in the child's reading material. Once the basic skills have been mastered, teacher alerts the learner incidentally to structural components. The teacher must lead children to analyze the word into meaningful units, and derive recognition and understanding of the word. Some of the cues children must learn about the components of structural analysis are :

1. **Root Word** : A word base that is not compounded or modified by a prefix, suffix or inflectional ending, and that remains unchanged through such modification (for e.g. run, play).
2. **Compound word** : Two or more root words that are combined to form one word. Sometimes the compound word keeps the meaning of the original two words (e.g. classroom) but frequently the meaning of the compound is completely new (e.g. Understand).
3. **Inflectional endings** : Endings that change root words grammatically, such as case, gender, number, tense, person, mood or voice (e.g. girl, girls, produce, produced, producing).
4. **Prefix** : A unit of meaning attached to the beginning of a word, thereby changing that words meaning (e.g. report, deport, import, export).
5. **Suffix** : A unit of meaning attached to the end of a word, thereby changing that words meaning (e.g. selfish, selfless).
6. **Contraction** : A shortend form of two words that have been combined into one word. In this process one or more letters has been omitted. Such missing elements are indicated by the addition of an apostrophe (') (e.g. can't).

### **Inflectional endings generalizations**

The addition of the simple endings -s, -es, -ed, and -ing to known words may often be the first use a child makes of structural analysis.

Here are some generalizations students must learn -

1. Very often, inflectional endings are added with no change needed in the root word (e.g. walking, matches, called, girls, going).
2. If the root word ends in a final e, the e is usually dropped when adding an inflectional ending that begins with a vowel (e.g. hoping, taking, baked).
3. When a root word ends in a single consonant following a single vowel the final consonant is usually doubled when an ending is added (e.g. running, dropped).
4. When the word ends in y preceded by a consonant the y is usually changed to i before adding the ending (e.g. cried, fried, babies).

5. If the final y is preceded by a vowel, the ending is added with no change in the root word (e.g. buys, monkeys).

6. If the word ends in f, the f is usually changed to v before the addition of an ending (e.g. calves, wolves).

OUS Y ET IVE AL

Note that all these ending begin with a vowel:

**Rule I** When a word has one vowel before a single final consonant double that consonant before adding the ending : hop hopped hopping hopper.

**Rule II** When a word ends in 'lazy.e' drop it before adding the ending if the suffix begins with a vowel - hope dived hoping.

**Rule III** when the ending begins with a consonant like ly nes ful s lers ment some keep the 'e' and first add the ending - hope hopes hopeful hopeless.

**Rule IV** Words ending in 'ce' or 'ge' keep the 'e' or change it to 'i' to keep the 'c' or 'g' soft when it is followed by 'a' or 'o' - peace able service able.

**Rule V** When a word ends in 'y' it usually changes to 'i' before adding the ending - baby babies lady ladies.

**Rule VI** If the ending is 'ING' however, you have to keep the 'y' otherwise you would have to 'li's' together with odd words like 'die' 'lie' and 'tie'. You have to give them a 'y' if you add 'ing' vary varying copy coping.

**Rule VII** If there is a vowel before the 'y' you keep the 'y' before all suffixes - play plays played playing player playable.

## I. Developing Word Recognition through the use of Phonic Instruction

### Tasks involved in phonic Instruction

1. Auditory discrimination of speech sounds in words.
2. Written letters are used to represent those speech sounds.
3. The sound represented by a letter or letters in a known word. Can be used to unlock the pronunciation of unknown words in which these particular letter occurs.

4. Sounds of consonants:
  - a) Initial position in words
  - b) Final position in words
  - c) Hard and soft sounds : c and g.
5. Consonants which are blended
  - a) Initial consonant blend
  - b) Final consonant blend
6. Special consonant digraphs (th, ch, sh, wh)
7. Vowel sounds
  - a) Short vowel sound
  - b) Long vowel sounds
  - c) Double vowels : (1) Digraphs (2) Diphthongs
  - d) Vowels followed by r
  - e) Final y sounded as long i.
8. Silent consonants and 'V' rule and Schwa sound.
9. Syllabication

This Remedial Programme adopts an eclectic approach to meet the needs of the disabled readers. The two reading skills; phonic rules and structural analysis are both word recognition skills. Children apply both. These skills simultaneously in word recognition. Another important skill in word recognition is Contextual Analysis. The child uses surrounding context to identify an unfamiliar word by making an educated 'guess' figuring out a word by the way its used in the sentence.

Frame work of the Remedial Programme for Developing Word Recognition Skills.

1. Developing word recognition through the use of phonic instruction.
2. Developing word recognition through the use of structural analysis.

## **II. Developing Word Recognition through the use of Structural Analysis**

### **Tasks involved in Structural Analysis**

1. Root word
2. Compound word
3. Inflectional Endings
4. Prefix
5. Suffix
6. Contraction

## DIAGNOSIS AND REMEDIATION OF ARITHMETIC DISABILITIES

Lakshmi Radhakrishnan

More and more schools are experiencing learning disabled children having difficulty in learning not only language but also arithmetic. Learning disabilities a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur concomitantly with other handicapping conditions (for e.g. sensory impairment, mental retardation, serious emotional disturbances), or with extrinsic influences (such as cultural differences, insufficient or inappropriate instructions etc.). But they are not the results of these conditions or influences.

Generally, L.D. students' I.Q. ranges from average to gifted. This disability due to the neurological deficit of information processing. This is a way of the mind. This cannot be cured. Students find a way to cope with their learning problems. We, as teachers can help them to cope by providing some learning and testing accommodations.

Arithmetic is a science pertaining to carrying out calculations that involve numbers. So, it is very concrete in nature. Mathematics is the mapping out of language on to symbols and it is abstract. Visual perceptual skill is very important to mastering arithmetic. A student who sees 6 as 9 or + as x is going to get his answers wrong.

Short term memory deficit also affects learning. Usually S.T.M. holds information for 20 to 30 secs. Digit span test reveals this deficit. When sums are dictated in class children with short term deficit cannot take down properly. These children will have problem in doing mental sums also. Doing mental sums involves : remembering the problem (holding in S.T.M.), perform arithmetical problem operations, arrive at the answer and writing the answer.

**READING MATHS** : Research show that mathematical texts require a far higher reading age than the chronological age of the pupils from whom it is intended. Students cannot adapt the same procedure to read maths test as they do for other texts. This requires quick recognition and an understanding of words mixed with symbols, pay attention to every word.

Mathematics requires a linear learning, i.e. material learned one day is used the next day, next month and the next year. If a student misunderstands the first concept taught or

there are gaps and holds in their basic knowledge, then they cannot follow the rest of the lessons. L.D. students with S.T.M. and/or L.T.M. problems can have difficulty. They do better in non-linear courses like history etc.

Another type of learning disability is manifested in problems with fluid reasoning or thinking. The student will understand the concept but is unable to use it effectively in solving problems. They experience difficulty in solving problems that requires conceptualization and abstract mental processing. This may also be related to reading comprehension. Usually L.D. students with reasoning problems often have difficulty verbalizing what has been learned, relating the concepts with symbolic language, and auditorially or visually understanding the instructor's explanation. Algebra is one area where this deficit hampers learning.

### **SYMPTOMS**

1. Counts on his fingers - even older children.
2. Cannot commit tables to memory and repeat sequentially.
3. There is no automatic recall.
4. Difficulties in addition, subtraction, multiplication and/or division.
5. Reversals of numbers and symbolic forms - e.g. 6 as 9, + as X.
6. Confusion regarding place value.
7. Adds or subtracts without taking into account the place value.
8. Difficulty in getting proper change after monetary transactions.
9. Sequencing problems - missing steps in statement sums.
10. Directionality problems. Solves from left to right.
11. Difficulty in understanding the reversibility of functions.  
e.g.  $2+3=5$ ;  $5-3=2$ .
12. Rigidity of thought  $5 \times 6 = 30$  so,  $6 \times 5 = 30$ .
13. Cannot see similarities and differences and patterns.
14. Poor short term memory and/or long term memory.

15. Short attention span.

16. Poor language skills.

Digit Span Test and analyzing their error pattern will give an insight about their problems and take suitable remedial actions to remediate.

**ADDITION : ERROR PATTERN**

$$\begin{array}{r} 23 \quad - \text{Summing all digits. No concern for place values} \\ + \quad 5 \\ \hline 29 \\ \hline \end{array}$$

**CORRECTION** Teach place values. Give place value dictation.

H	T	O
3	4	1

Using tactile method ask them to sort out bundle and put in appropriate columns - match sticks.

$$\begin{array}{r} 38 \quad \text{No concept of carry over} \\ + \quad 47 \\ \hline 715 \\ \hline \end{array}$$

**CORRECTION** Write the steps in a card and place before him. Ask him to follow those steps.

1. Add the ones  $8 + 7 = 15$
2. Record the ones and regroup the tens in the ten column (using a different colour if needed)
3. Add the tens
4. Record the tens
5. Read your answer

$$\begin{array}{r} 246 \quad \text{Adds left to right: Problem with directions regroups} \\ + \quad 832 \quad \text{backwards} \\ \hline 188 \\ \hline \end{array}$$

Teach directionality - i.e. from right to left. From ones to hundreds, regrouping must be done.



$$\begin{array}{r}
 210 \\
 3 \overline{) 830} \\
 \underline{6} \phantom{0} \\
 3 \phantom{0} \\
 \underline{3} \phantom{0} \\
 0
 \end{array}$$

Does not know to use remainders

$$\begin{array}{r}
 25 \text{ Q} \\
 7 \overline{) 365} \\
 \underline{35} \phantom{0} \\
 15 \\
 \underline{14} \\
 1 \text{ R}
 \end{array}$$

Place value probable at the Quotient level  
Directionality guidance needed. Records the quotient first digit in the ones place.

$$\begin{array}{r}
 74 \\
 7 \overline{) 4930} \\
 \underline{49} \phantom{0} \\
 30 \\
 \underline{28} \\
 2 \text{ R}
 \end{array}$$

Does not record zero after dividing a number.

**Correction:** From the beginning teach division by giving them biscuits etc. to be shared or divided among x no. of people. Teach them frictorially. Connect multiplication with division. Eg. How many 25 in 83 etc. Teach missing factors by using tables.

$$\begin{array}{r}
 \text{----} \\
 \text{----}
 \end{array}
 \times 6 = 42 \quad \text{or} \quad \begin{array}{r}
 \text{---} \\
 \text{---}
 \end{array} = 42 \div 6$$

Just as in addition steps must be drawn and given.

### MULTIPLICATION

$$\begin{array}{r}
 43 \\
 \times 5 \\
 \underline{\phantom{00}} \\
 205
 \end{array}$$

Cannot carry digits

$$\begin{array}{r}
 32 \\
 \times 3 \\
 \underline{\phantom{00}}
 \end{array}$$

Incorrect processing. Place value problem also.

$$\begin{array}{r} 6 \\ 9 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 43 \text{ Place value problem.} \\ \times 32 \\ \hline 86 \\ 129 \\ \hline 215 \end{array}$$

$$\begin{array}{r} 20 \text{ Problem with zero. When a number is multiplied by zero,} \\ \times 15 \text{ the answers is zero. But at the tenth position it has} \\ \hline 30 \text{ value.} \\ \hline \end{array}$$

Teach them place values and to carry digits.

Tables: Drill sessions  
 Keep the drill sessions short  
 Everyday drilling is necessary  
 Constant review  
 Emphasize remembering  
 No explanation  
 Emphasize learning by rote.  
 Emphasize over learning.

**Teaching Method :** Students with deep problem must be taught in the following way:

1. The teacher works out the sum step by step the student listens.
2. The teacher works out the **same sum** step by step on board. As the teacher says student **repeats**.
3. The student does alone the **same sum** (speaking step by step on his paper).
5. Similar problems are given to the students.
6. Student follows with steps 3 and 4.

**Maths Vocabulary and Problem Solving**

Read the problem orally and correctly. Paraphrase the problem orally. Visualize the problem. State the problem. Hypothesize and estimate, calculate, self correction.

Build up good ..... vocabulary. Once facts and operations are mastered, emphasize on activities that help to enhance long term memory.

## **REMEDIATION**

Learning disabled students cannot learn at the same speed or pace as others. Special accommodations have to be made in the classroom. Use of calculators relieves the tension of manipulation of numbers. Learning style of the student and content needs of the pupil are important factors in evolving an instructional programme for the students.

Defective teaching : Diagnose, analyze and understand their problems before adopting teaching techniques. Error pattern must be analyzed to fix the problem and to select teaching method to overcome it.

Maths vocabulary must be built up. Concepts must be made explicit. Multi-sensory teaching is essential. Right from the stage of beginning to count, concrete, pictorial and symbolic representations must be taught. Eg.Count 3 objects, \*\*\* (visual), 3 symbolic.

Drill sessions : Meaningful drill sessions and constant reviewing yields results. For eg. learning 2 Tables : Emphasize learning by rote and remembering; no explanation, only short sessions, everyday routine and constant recall practice.

Visualizing and verbalizing is an important exercise. Concepts should become part of child's thinking - eg. small, large, twice, less... They must get a mental picture of the process involved.

Arithmetic is not an isolated class activity, but has application in everyday life. E.g. Fractions can be introduced at the dining table :  $\frac{1}{2}$  or  $\frac{1}{4}$  cup milk etc.

Maths is quantitative thinking involving how much, how much more or how much less etc.

Time and space concept : show the child to give directions to go to his school or draw a circle and mark center position etc. He must observe the area of rooms to get an idea of space. Sequencing of days of the week, months of the year, time of the day etc. teaches him time concept.

**Linking:** The students must understand the underlying relationships. For e.g. After teaching multiplication and

division, we can show the relationship as  $6 \times 6 = 36$  and  $36 \div 6 = 6$ .  
Visually : cut 1 apple into 2 halves  $1/2 + 1/2 = 1$ .

**Talk in about maths and estimations:**  $23 - 7$  ? Will it be bigger than 23 or 7?  $1007 \& 107$  - which is bigger and why?  $40+7=47$ . They should know that addition and multiplication will yield larger numbers than either of 2 original numbers. They should be trained to say whether their answers would be in the range of 10s, 100s, or 1000s. They should also be taught to round it up to nearest 5s or 10s.

The place of zero : The meaning of zero : (1) as nothing in additions and subtraction, (2) as a place holder in the number system 10, 100, etc. (3) as a beginning on a scale.

Teach them to find clues in word problems. For e.g. Ram gets 2 more means additions, and Ram gets 2 times more means multiplication etc. Teach them to read every word.

**Numerical fluency or quickness:** There are students who have good logical deductive analytical ability but lack numerical fluency. They cannot do manipulating numbers quickly. They can be allowed to use calculators. After a while they develop their own short cuts. Timed activities also help.

Structured teaching is essential. Never assume prior knowledge. Always revise before beginning a new chapter. Diagrams, charts, graphs must be explained. They cannot interpret data of their own.

Writing examination is a skill. Teach them to read the question paper, time their answers etc. Relaxation exercises must be taught to overcome exam panic.

Regular physical exercises, good balanced diet, restricted T.V. viewing, good personal hygiene and happy school and school atmosphere helps them to fare better in their academics.

NOTE: For more details refer **HANDBOOK ON LEARNING DISABILITIES** by Dr.S.Ramaa, RIEM (NCERT)

## **DETAILED DIAGNOSTIC CHARACTERISTICS IN APHASIA**

Dr. Shyamala K.C.

### **Non-fluent Syndromes**

The child with aphasia / dysphasia/specific language impairment/clinical language disorder may be dysfluent. Such children struggle to say their words, their speaking patterns lack the prosodic flow or melody (Smooth flow of speech) that characterizes normal fluent speech. The speech is telegraphic with its syntax severely interrupted.

### **Fluent Syndromes**

These are less common and occur very rarely among the DLD. Child appears quite talkative and fluent but he may be echolalic (echolalia refers to well articulated repetition of heard speech). Such echos may or may not be appropriate to the child's situation and they are generally more prominent in younger children (TV Commercials, Slogans, etc.). They may lessen gradually with advancing age. They produce long strings of words and sentences which may appear "empty". This may improve. Even reading with out meaning may develop. But reading comprehension may pose problems.

Severe manifestations of "fluent" language disorder may include circumlocutory speech, paraphasias or substitutions. Severe underlying comprehension deficit may be overlooked or underestimated because they are fluent. Such children may exhibit evidences of cerebral pathology as EEG abnormalities etc.

### **Developmental Apraxia of Speech (DAS)**

In addition to dysphasia, children may also exhibit a "developmental Apraxia of Speech" an impairment in the ability to program, combine and sequence the elements of speech. Aphasia and DAS (also called as oral verbal apraxia) often can be found together. A child with a pure apraxia of speech would demonstrate relatively normal (sometimes superior) comprehension of the spoken word of others, but be unable to imitate a simple spoken word, such as ball, despite having no muscular weakness or paralysis. Children with severe apraxia may show mutism (absence of speech) with or without struggle behaviour while attempting to speak.

In oral verbal apraxia, the individual can often functionally use a word without much problem once it has become

automatic. Apraxia of speech is manifested in terms of phonological errors (articulation errors as we saw in an earlier section) while speaking. The presence of apraxia creates a marked discrepancy between receptive language and the ability to express one's language by speech forcing the individual to struggle at a single word level, often lacking normal prosody (rhythm) for each intended utterance. Each of these things have to be considered for therapy.

### **Speech and Language Characteristics in LD**

- (1) Misarticulations and stuttering may co-exist with learning disabilities (LD). (This has been found at AIISH Clinic also - Prema, 1994; Swathy Kiran and Shyamala, 1994)
- (2) Children with speech and language impairment, deficits in vocabulary, deficiencies in the use of morphology (study of words) or syntax (study of sentences) and difficulties in the comprehension of syntactic structures experience difficulties in learning to read.
- (3) Lack of phonological awareness (awareness of sound, phonemes, syllables) and problem in representing verbal stimuli phonologically may be found in LD (Ex. Use of word ben for pen).
- (4) Ability to blend phonemes (join phonemes) may play a causal role in the acquisition of beginning reading skills and acquisition of reading skills plays a causal role in the development of phoneme segmentation (separating phonemes) skill. Phonological processes of awareness, recoding in lexical access, recoding in working memory are causally related to reading aspects of word recognition, word analysis and sentence comprehension. Phonological delay (developmental lag in the acquisition of speech sounds) may be present in poor readers (DAS).
- (5) Deficiencies in morphology, vocabulary, and comprehension and expression of syntax in LD children.
- (6) Metalinguistic awareness is the ability to think about and reflect from the structural and functional features of language (see later section on metalinguistic measures also). Many studies have demonstrated that reading disabled children who lack explicit awareness of the sound segments in speech perform poorly on phoneme and syllable segmentation tasks, show deficits in rhyming and alliteration (use of similar sounding words). Children with better rhyming are good at making more analogies in reading (Goswami, 1990). (Ex. Grouping pen, ten, men, ben together on a rhyme recognition task).

Poor comprehension, longer reaction time, paraphasias, circumlocutory expressions (drawing, gesturing etc. when he cannot retrieve a word), (ex. for 'pen' he may draw its picture gesticulate or say something to write with), word finding difficulties, hesitations may be found in LD children.

Delayed speech and language development, persisting articulatory problems, word finding problems, immature syntax, poor segmentation and blending skills co-exist with reading disability (Snowling, 1987).

In general, compared to good readers, poor readers have been found to have (1) smaller speaking vocabularies (2) less appropriate use of grammar and syntax (3) poorer verbal fluency and organization of verbal concepts (4) poorer word retrieval (5) history of oral language problems, (6) differences in morphological usage (7) slower response time in vocalization and (8) poorer listening comprehension.

Although some groups of poor readers may have problems in visual perceptual areas many poor readers may have problems in linguistic processing as above. Many young readers may have difficulty in phonological formulation whereas older readers may have difficulties in semantic and syntactic processing.

Particularly word recognition and reading comprehension in reading are said to be influenced by poorer linguistic attributes of phonological processing, grammatical and general language abilities.

In general, it has been well established that the majority of language problems uncovered in school years have their genesis in the preschool years. The literature demonstrates that children with a preschool language disorder constitute a high-risk group for subsequent academic difficulties. Most academic subjects are based on language concepts and the child with a preschool language disorder appears to be at risk for experiencing later language learning problems. In the preschool years their problems (dysphasic language problem) in aural listening, following directions and formulating spoken responses are often attributed to general immaturity. Further the preschool child's communicative competence is often facilitated by well developed non-verbal behaviours that cover up verbal deficits.

When such language disordered children enter elementary school, they often come to be associated with different labels: LD, Language and Learning Disabled, Reading Disabled or Dyslexic. It is not that language disordered children radically change when they reach 6 or 7 years of age. Rather their problems in, processing and producing oral language make it difficult for them

to acquire written language : the ability to read, spell and write composition.

It is not surprising therefore that USOE 1977 defines language disabled as those with intact sensory functioning, normal psychosocial development, general cognitive abilities in normal range who demonstrate "a disorder in one or more of basic psychological processes involved in understanding or using language, spoken or written". This disability is reflected in a significant discrepancy between age or general abilities and academic achievement. This population then, seems to constitute the greater proportionate of school aged children with language disorders.

### **Problems in Language Processing**

This section examines in detail the semantic, syntactic, morphological and pragmatic processing and production deficits of language disordered youngsters (LD in dyslexia).

They include:

- I Lexical processing and production
  - (a) Word comprehension
  - (b) Word retrieval
  
- II Syntactic processing and production
  - (a) Comprehension of syntactic and morphological problems
  - (b) Production of syntactic and morphological problem
  
- III Pragmatic processing and production
  - (a) Processing pragmatic structures
  - (b) Producing pragmatic structures

#### **I. Lexical Processing and Production**

The semantic component of language refers to the meaning carried by words. Our concern with meaning directs our attention to the lexicon or internalized dictionary that one carries in one's head. The knowledge of a word includes several components; information of phonetic shape (for ex. pen consisting of /p/ /e/ and /n/, its pronunciation, syntactic class of word (Noun, verb, etc.), primary meaning, alternate multiple referential meanings etc.

LD children may have problems in processing and producing lexical item.

**Word Comprehension** - These problems will not be evident if their ability to comprehend primary meaning of single words on vocabulary tests as PPVT (Dunn, 1965; Dunn and Dunn, 1981) is

intact. They seem to differ rather in their comprehension of specific word categories, comprehension of words that express spatial, temporal and kinship relations: They do not refer to events, actions or objects or persons but refer to relationship between objects and /or persons.

<b>Spatial</b>	Prepositions here, there, on, in etc.
<b>Temporal</b>	Prepositions like before, after
<b>Kinship</b>	Aunt, uncle, etc. (relationship between two or more persons)

These relational words then, require that the child keep more than one referent in mind. This aspect is difficult for language disordered children. Over extensions and underextensions like in the use of pronouns may be common.

### **Word Retrieval**

They have difficulty in accessing words from their lexicon during conversational exchanges which may imply formulation deficits. Anomia or naming problems are commonly cited. Circumlocutions may be present.

## **II Syntactic Processing and Production**

Problems comprehending and using syntax and associated morphology of language are evidence in LD children. Sentence formulation may appear adequate but actually may be awkward characterized by simple sentence forms, sentential fragments, repeated use of stereotyped phrases. Delayed morphological development is seen particularly in the use of irregular past-tense markers and other grammatical markers or inflections.

### **Comprehension of Syntactic and Morphological Forms**

Problems in comprehending passive sentence forms and morphological markers have been noticed. Problems in comprehending complex syntactic (late) constructions as subject - adjective, (The bird is happy to bite), object - adjective (The bird is tasty to bite), relative clause constructions etc. are present.

### **Production of Syntactic and Morphological Forms**

Lower type-sample ratio, less frequent use of subject - verb - object frames, and clauses as direct objects, indicate objects and complements, are fewer (transformational complexity of o/p is lesser), subject verb agreement constructions are poor all of which indicate, deficient syntactic formulation. A study of inflectional morphology (word inflections) also revealed use of deviant verb forms (verb-tense markers, use of 'did' to avoid

past tense markers example; she did climb). Uninflected verb root forms, use of redundant markers (jumped), problems in producing apt irregular morphological forms are noticed (for ex. use of "goes" for went).

### **III Pragmatic Processing and Production**

Functions and uses of syntactic constructions are examined. (This is a recent approach - a post Chomskyan development). Types of speech acts children perform with their utterances, direct and indirect requests or directives, acknowledgments, solicitations, responses and threats are looked at normally. By the time children enter school, they will have mastered most of these to achieve social goals. They learn to initiate, develop and maintain conversational topics, structure their course narratives and revise their utterances.

LD children seem to have problems in many pragmatic aspects as they do in structural aspects.

In summary, they appear to have problems in producing indirect forms. Discourse processing and producing were problematic w.r.t. narrative and conversational discourse comprehension is seen. As conversational partners they seem to be more passive and agreeable partners who cannot control flow of conversation even when its direction is their responsibility.

### **Assessment/Diagnosis and Intervention of Language Disorders**

Historically, concern for language disorders in children has not included the concern for reading disorders. But one can no longer ignore problems of LD children. If the phonological, semantic and syntactic aspects of the language code as well as auditory perception and memory, play a role in learning to read and if dysfunction of these processes is related to reading disorders, the Speech-Language Pathologist will have an important role in the identification, assessment and remediation of reading disorders.

#### **Team Work**

Assessment and remediation involves a team work. The members include. Clinical Psychologists (IQ verbal and performance), Neurologist (to treat if there is a cause) (for most no cause is specifically identified [EEG]). Pediatrician\ENT specialist who treats otitis media, social worker (reflects of LD on child's emotional and educational development).

Educationist (Educational needs)  
SLP (normal sequences and language interactions).

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SLP (normal sequences and language interactions).

SLP helps in early identification of children at risk for reading problems. SLP initially follows these steps (1) taking a history, (2) observing the child, (3) assessing skills, (4) referring additional professionals, (5) establishing a tentative diagnosis and (6) developing a program of treatment or continued observation. Working closely with parents/caretakers, SLP describes child's language skills/deficiencies.

Delayed articulation and language development and a history of poor response to sound are among early indicators of future reading problems in the child. History taking would reveal inattentiveness, misunderstanding of instructions, frequent slips of the tongue like enemy/enemy, escalator/escalator etc. misarticulations of sounds etc. noticed by the motor in the absence of tested hearing loss.

Tests used for evaluation of phonological, syntactic and semantic processing reveal guidelines for assessment of reading disorders besides directing therapy.

Measures of phonological awareness, morphology, syntax and metalinguistic skills help identifying them.

### **Testing for Auditory Perceptual Problems**

The stimulus has to be identified, discriminated, categorized and must be retained in sequential memory for processing.

**Auditory verbal retention and memory** - have the child to repeat a sentence or a series of numbers forward and backward after the examiner.

**Auditory Discrimination** is the ability to detect differences between either linguistic or non-linguistic sounds. The child can be asked to identify two sounds. Ex. ch-sh as 'same' or different (by 5-6 normal).

**Knowledge of concepts** small and big, before/after, up/down, same and different.

**Knowledge of receptive vocabulary** : can be given a word and asked to point to appropriate picture from many; can be asked to give meaning of a word. E.g. 'lamp'; can be asked to fill up missing word in a sentence; can be asked to fill up missing word in a sentence.

The ability to sequence sounds; can be asked to repeat in the same order as presented - numbers, words in a sentence, alphabet letters etc.

If any of the above pose problems a referral to an SLP should be made.

In addition to testing auditory discrimination, auditory blending and auditory memory, tests of phonetic segmentation and syllabification which involve the ability to identify the phonetic parts of words either by individual sounds or by syllables may be included in the test battery.

Prereading skills (Carrow-woolfolk, 1980) that may be taught to children include -

1. Auditory awareness, recognition and discrimination of environmental sounds, speech sounds and sound sequences.
2. Recognition of the position of sounds in words.
3. Sound letter associations.
4. Visual discrimination of letters.
5. Left to right directionality.
6. Relation of temporal sequences of sounds.
7. Translation of sounds and syllables to letters.
8. Translation of letters groups to sounds.
9. Phonetic segmentation of words through audition.
10. Syllabic identification of words through audition.

### **Metalinguistic Awareness and Its Measures**

Includes reflections, ideas, knowledge rules etc. concerning language structures, functions, and rules for its use (Sinclair, 1981).

It is supposed to develop concomitantly with language acquisition and proceeds through reading acquisition (Clark, 1978).

There are numerous studies reported over last decade that unequivocally suggest that metalinguistic awareness at phonological, lexical, syntactic and pragmatic levels is cardinal in successful literacy acquisition (Prakash et al. 1993).

Phonological awareness has been the topic of most interest among researchers because of its intricate and intimate

relationship with primary literacy acquisition skills such as reading and spelling. It is viewed as a bridge between language and literacy (Morais, 1989).

Phonological awareness or the lack of it may be the most important barrier to reading acquisition and it is felt that phonologic awareness at school entry was the best predictor of reading achievement 2 years later. Reading promotes phonological awareness on the corollary.

Phonological awareness includes awareness of phonological strings (awareness of phonological length, sound similarity etc.), awareness of phonetic features, phonemes, and syllables, phoneme awareness is also called segmental awareness.

The phonological tasks include rhyme detection (identifying the rhyming pair as against non-rhyming pair or words), phoneme oddity (identifying the odd word based on common phoneme being present or not), phoneme deletion (deleting a given phoneme or syllable in initial, medial or final positions of the word Ex. /p/ in /pink/ = /ink/), counting tasks (phoneme or syllable tapping) segmentation tasks (ability to split the word into phonemes, syllables), phoneme or sound blending tasks (ability to string the sounds together), phoneme reversal tasks (reversing the orally presented sound/phonemes in the word Ex. /bus/ = /sub/.

Syntactic and morphological tasks include grammaticality /syntactic/ judgment, semantic judgment tasks etc. producing antonyms, synonyms, semantic ambiguity (identifying ambiguity in meaning of words and sentences) judgments etc.

Tests of phonology, syntax and semantics in the given language of the child is mandatory.

We do not have innumerable tests for all aspects of language as in the west. Here in multilingual context of India, we have a dearth of such tests. At AIISH, REEL (Bzoch and League, 1975) STASK (Vijayalakshmi, 1981; TPAK (Karanth, 1980) are used.

A description of a child's language skills will include all modalities appropriate for child's level of development in the areas of phonology, vocabulary, syntax and their functional use.

Standardized, norm-referenced tests are needed to document the presence of a disorder. Analysis of spontaneous expressive language is needed to determine therapy objectives.

Information concerning the level and pattern of language disorder will influence decisions regarding what the child is ready to learn.

The earlier is the child identified and intervened, the better, is the outcome.

Traditionally a developmental model is considered for guiding language intervention; multi-sensory approach, identifying deficits and working on improving them works.

Individually directed remedial procedures are best owing to the wide variation seen in the LD group. Each child should be tested for recognition of phonemes, discrimination of phonemes, the speech of comprehension, of auditory verbal input, the comprehension of visual clues, modality-specific memory abilities, the increase or decrease of comprehension when there is multi modal presentation of the material or interferences and distracting noises in the background. For children with severe auditory comprehension difficulties it may be necessary to establish a gesture language even before verbal language can be considered. For mild and no comprehension deficit with problems in articulation and expression exposure to normal (slow and clear) speech, verbal commands training may help.

Phonological skills and linguistic skills can be taught as early as possible to avoid future reading problems.

### **Prognosis**

Level of cognitive development is the major determinant of expected rate and level of progress within each developmental disability group.

After 6 years, trends become obvious. For many below 6 years, progress is not predictable. Some questions still remain unanswered. How much of improvement is due to natural development and how much due to intervention? How does one measure improvement? How long do we continue with intervention and with what intensity? etc.

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