A RESOURCE MANUAL FOR LEARNING DISABILITY (LD) WITH CENTRAL AUDITORY PROCESSING DISORDER (CAPD)

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June, 2011

CERTIFICATE

This is to certify that this dissertation entitled "***A Resource Manual for Learning Disability (LD) With Central Auditory Processing Disorder (CAPD)" is*** the bonafide work submitted in part fulfillment for the Degree of Master of Science (Speech Language Pathology) of the student with Registration No. : 09SLP012. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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CERTIFICATE

This is to certify that the dissertation entitled ***"A Resource Manual for Learning Disability (LD) With Central Auditory Processing Disorder (CAPD)"*** has been prepared under my supervision and guidance. It is also certified that this has not been submitted earlier in any other university for the award of any Diploma or Degree.

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DECLARATION

This is to certify that this Master's dissertation entitled ***"A Resource Manual for Learning Disability (LD) With Central Auditory Processing Disorder (CAPD)"*** is the result of my own study under the guidance of Dr. Jayashree C Shanbal, Lecturer of Speech Language Pathology, Department of Speech Language Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted in any other University for the award of any Diploma or Degree.

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DECLARATION

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Mysore

June, 2011 Register No. **09SLP012**

DEDICATION

Dedicated to my Lord

Jesus

My *Parents* and *Brother*

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Table of contents

LIST OF TABLES AND FIGURES

LIST OF FIGURES

CHAPTER 1: Introduction

Learning disability (LD) is conceptualized as unexpected difficulty with one or more academic areas that occur among children of normal intelligence who have had adequate opportunity for learning and who do not have social disadvantages or behavior or emotional problems. Learning problems may vary according to the severity across children. LD is not the result of developmental lag, and children do not "outgrow" LD, but rather, problems are lifelong. The term *learning disability* (LD) refers to difficulties with academic abilities such as reading, writing, spelling, and mathematics (American Psychiatric Association, 2000; Sarkees-Wircenski & Scott, 2003). Currently, the most widely used definition of LD can be found in the Individuals with Disabilities Education Act (IDEA). They defined LD as ". . . a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia." However, learning disabilities do not include, "...learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage."

Around half of students who receive special education services are identified as LD. In the USA, the prevalence of LD in school-based populations is around 5 percent. Among school-based samples, more males than females are identified as LD. The prevalence of LD was 1-3% of the school population as stated by Lerner (1993); but Hallahan and Kauffmann (1994) reports that the prevalence is 4-5% in six to 17 years old children. It has been estimated that as many as half of all children with a

learning disorder or 2-5% of school age population exhibit CAPD (Chermak & Musiek, 1997).

A variety of learning problems are listed under the umbrella of learning disabilities. However, there are some discriminative characteristics that separate children with learning disability from others. These characteristics include discrepancy between intellectual capacity and actual performance (with better intellectual capability and poor performance) (Bateman, 1964), reading problems, writing problems, arithmetic problems, study problems, communication problems, auditory/visual perceptual problems, conceptual deficits, metacognitive deficits, memory deficits, behavioural problems, neurological problems, motor output deficits, spatial relationship and body awareness deficits, academic failure, emotional problems, and social problems (Valenti & Vogel, 1990) . But not all children with learning disability exhibit all these problems.

Students with LD are highly heterogeneous. LD is not typically a problem that crosses all academic areas; rather, LD tends to be domain specific. That is, learning problems occur in specific academic areas. Although these types of LD are distinct and separable, some children may have a LD in more than one area. Three of the types involve reading, one is specific to math, one combines math and reading, and one centers on difficulty in written expression. The research base for different types varies considerably. The most common type of LD, dyslexia type (also termed "the reading - word level") has a considerable research base. In contrast, there has been relatively little research on the "reading - comprehension" group, which tends to occur in older children; however there is good evidence that skill at word reading can be dissociated from comprehension skills (Oakhill, Cain, & Bryant, 2003). Math disabilities are not yet well understood, although there is emerging evidence that

working memory deficits are closely associated with this type (Fuchs et al., 2006; Swanson & Sachs-Lee, 2001). Written expression groups suffer from a lack of a clear operational definition that addresses all areas of written language (Berninger, 2004). There is a clear need for research in this area, as many children with LD have difficulty with some form of written language. LD may also exist along with other co-morbid conditions (e.g., conduct disorder), and attention-deficit/hyperactivity disorder (ADHD) is common among children with LD.

The primary difficulties of a student identified as having LD occur in phonemic awareness (the ability to break up words into their constituent sounds) and manipulation, problems with phoneme grapheme correspondence, reading irregular words, reading non-words, rapid naming, single-word decoding, reading fluency, and spelling. Secondary consequences of dyslexia may include difficulties in reading comprehension and/or written expression. Reading fluency is the skill to read phrases and sentences effortlessly and speedily, while understanding them as expressions of complete ideas. Children with LDs in reading comprehension and basic reading skills commonly have weaknesses in reading fluency. Typically, they do not process groups of words as meaningful phrases. They may also make decoding errors in reading which slow them down and prevent them from grasping the meaning of the sentence. As a result, they do not comprehend and memorize meanings of passages. These difficulties are unexpected for the student's age, educational level, or cognitive abilities. Additionally, there is often a family history of similar difficulties.

Researchers have searched for the cause(s) of learning disabilities for decades. The search has been difficult for a number of reasons: (a) students with LD are a highly heterogeneous group; (b) a number of environmental or social factors can result in learning problems (e.g., brain damage, exposure to environmental toxins,

hunger, lack of exposure to effective instruction); (c) co-morbidity with other conditions (e.g., ADHD); and (d) until fairly recently it has been difficult to pinpoint the cognitive processes that result in learning problems. Although research has not yet fully unraveled the problem of LD, some cognitive processes that are related to the learning problems of students with LD have now been firmly established.

Many conceptual frameworks or models have been used to identify the causes of learning disabilities: medical (i.e. neurological, genetic, and biochemical), intrinsic processing, cognitive-information processing, and achievement-behavioral (Cunningham, 1998). From a medical perspective, neuropsychological models attempt to explain certain types of academic failure in terms of damage to specific brain functions. The category of major organic problems includes organic brain damage, brain injury, neurological disabilities, and central processing disorders. Research on the genetic transmission of reading disabilities has demonstrated that approximately 50% of all variability in the phonological processes that cause specific reading disabilities can be attributed to genetic factors (Olson, 1997). In addition, brain mapping research has demonstrated that a relationship exists between learning disabilities and subtle abnormalities in parts of the brain that process language (Manis, McBride, Seidenberg, Doi & Custodio, 1993). Biochemical imbalances have been identified as one of the causes of learning disabilities. This category, also referred to as "minor organic problems that are compounded by poor environments" includes maturational lags, vitamin deficiencies, allergic reactions, and sugar or food additives. Biochemical research related to learning disabilities has revealed that there is no scientific evidence linking the nature or extent of this factor on learning and behavior problems in children identified as LD. A cognitive-information processing

model taps psychological processes that attempts to understand how individuals with LD acquire, retain, and interpret information received through the senses.

Number of extremely encouraging experimental studies in the area of learning disabilities has been conducted. Studies have revealed that heterogeneity seen in learning disability in terms of characteristics causes associated deficits. Even though it is not known that whether it is a cause or just an associated deficit, results of various investigations have revealed that there is a sub group of children with learning disability having auditory processing deficits. The incidence of auditory processing disorder in children with dyslexics is estimated to be 40% (Ramus, 2003).

Most of the clients with LD have problems in central auditory processing. Central auditory processing disorder (CAPD) is defined as a deficit in the processing of auditory information, despite normal hearing thresholds, that primarily involves the auditory modality (ASHA, 2005; Jerger & Musiek, 2000). Even though CAPD is not posited as a direct cause of all or even most cases of academic failure, LD or reading disability, CAPD certainly can exacerbate academic challenge (eg; listening in noisy classroom environments) (Musiek, Bellis, & Chermak; 2005). Jerger and Musiek, (2000), defined auditory processing disorder (APD) as a deficit in the processing of information that is specific to auditory modality. The problem may be exacerbated in unfavorable conditions and may be associated with difficulties in understanding speech, language development and learning. It includes disability in subtle sound difference discrimination that interferes with accurate perception of individual word and leads to confusion of conversation, difficulty in auditory figure-ground (presence of noise) and auditory lags or delays in speech processing (Silver, 1993).

Children with CAPD and LD have problems with metalinguistic, metacognitive and cognitive skills. Although CAPD by definition is not a metacognitive disorder, the experimental deficit suffered by individuals with CAPD in processing the auditory signal can lead to metacognitive deficits, as metacognition develops through experience in a skill based context, such as spoken language processing (Harris, Reid & Graham, 2004; Wong, 1991). If left untreated, metacognitive deficits can exacerbate the impact of CAPD for spoken language understanding; with treatment, individuals with CAPD can become skilled listeners who actively engage in discovering what speakers are communicating. To achieve this goal they must be trained to use their metacognitive knowledge and strategies (Chermak & Musiek, 1992).

Hence one of the most difficult and clearly defined current challenges for Speech-language pathologists is to develop, disseminate and implement methods for training children on reading skills. The previous researches regarding the treatment trends available till now is briefly explained. Phonological awareness training is found to be the most discussed in literature regarding the treatment option for dyslexia. There have been number of studies reporting the efficacy of phonological awareness training on acquiring reading skills. Phonemic decoding skills play a critical role in the growth of word reading ability (Ehri, 1998; Share & Stanovich, 1995). This is because the children begin to acquire the orthographic reading skills that enable relatively fluent and effortless identification of words in text. Phonological remediation programs developed for children with dyslexia suggested that remediation in this respect has resulted in considerable improvement in their reading abilities (Salgado & Capellini, 2008). These evidences support the notion that

phonological awareness needs to be incorporated in the remediation programs from very early stages.

Reading fluency is another aspect which has received immense attention recently. Recent researchers opine this skill to be important in determining the overall reading efficiency. It is thought that reading fluently results in automatic processing and decoding such that the cognitive resources are available freely to be utilized for comprehension. Reading comprehension is often limited in children with reading disabilities because of difficulties with accurate and fluent word recognition, and because they have missed opportunities to acquire reading comprehension strategies (Brown, Palincsar, & Purcell, 1986). Hence, strategies like making use of contexts to comprehend, making inferences, visualization of the material being read etc. which have proven to be effective with children with dyslexia (Bender & Larkin, 2003) needs to be focused to attain a complete and efficient management outcome. CAPD intervention programs may incorporate several metacognitive approaches and elements of one metacognitive approach often reinforce aspects of another (Chermak & Musiek, 1997). Some of the strategies used are *Schema induction, Discourse cohesion devices, Vocabulary building, Cognitive style and reasoning, Mnemonics etc.* During the past 20 years, there has been considerable research on cognitive strategies that children use to aid memory, reading, attention, and problem solving. Research on cognitive development, learning-disabled children, and poor readers reveals that inappropriate motivation, metacognition, and cognitive strategies go hand in hand.

According to ASHA (2005a); Chermak and Musiek (2007) recommendations for intervention should employ both bottom-up and top-down treatment approaches. Bottom-up treatments focus on access to and acquisition of the auditory signal and

include auditory training as well as environmental modifications to improve the listening environment and enhance access to the acoustic signal. Top-down approaches address higher level central resources such as language, cognitive, memory, and related functions, along with environmental modifications to instructional, communicative, and other methods of imparting and learning information. Central resources training also referred to as Compensatory strategies, are designed to assist individuals in overcoming residual dysfunction and to address secondary motivational or related deficits by strengthening higher order, top-down cognitive, language, and related abilities (ASHA, 2005a; Bellis, 2003a; Chermak, 1998, 2007). These are some of the top down approaches which can be used with CAPD and LD. Few studies have been carried out regarding this in Indian scenario.

The goal of understanding LDs is to provide the most effective instruction possible in order to ameliorate the disabling effects of the conditions. Individuals with LD can develop strategies that can enable them to better compensate for problems, and today it is not uncommon for individuals with LD to successfully complete college or other advanced training.

Various studies and research conducted in the area of LD have reported that children with LD can have CAPD. It has been estimated that as many as half of all children with a learning disorder or 2-5% of school age population exhibit CAPD (Chermak & Musiek, 1997). Children with CAPD may have deficits in top down processing levels. Many strategies are available for top down processing. However these children also require essentially the top down processing in order to understand the concepts in classroom situation. Some of these children with top down processing deficits may show auditory figure ground problems, auditory memory problems, auditory cohesion problems, discrimination deficits, deficits in word knowledge,

attention, execution, and deficits in cognitive and metacognitive skills. Since metacognitive deficits are commonly seen in these children it's necessary to work on these areas during intervention. Chermak and Musiek (1997) recognized the use of strategies like metacognitive resources, cognitive resources and metalinguistic resources in order to improve their learning skills at a higher cognitive linguistic level. Hence, the present study primarily aimed to develop a resource manual in English for children with learning disability with CAPD based on the central resource training suggested by Chermak and Musiek (1997).

CHAPTER 2: Review of literature

Learning disability (LD) can be defined as ". . . a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia." However, learning disabilities do not include, "...learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage." (*IDEA, 2006).* LD is a general term which refers to a heterogeneous group of disorders who have significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. It is inherent to the individual, presumed to be due to central nervous system dysfunction. Problems in self-regulatory behaviours, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability.

The prevalence of LD was 1-3% of the school population as stated by Lerner (1993); but Hallahan & Kauffmann (1994) reports that the prevalence is 4-5% in 6 to 17 years old children. It has been estimated that as many as half of all children with a learning disorder or 2-5% of school age population exhibit CAPD (Chermak & Musiek, 1997). 17-20% of adults have this disorder. Males are two times more likely to be affected by the disorder than females. According to Snowling (2000) prevalence of this disability have been found to range from 3% to 10%. Prevalence rates can vary

across languages (Kujala & Naatanen, 2001). Prevalence rate in India varies from 3 to 10% (Ramaa, 2000).

Dyslexia is one of several distinct learning disabilities. It is a specific language-based disorder of constitutional origin characterized by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties in single word decoding are often unexpected in relation to age and other cognitive and academic abilities; they are not the result of generalized developmental disability or sensory impairment.

The causes of learning disability are unknown and often poorly defined. The debate on the nature of origin of learning disability as well as factors underlying it has been going on for decades resulting however in no clear agreement (Kujala & Naatanen, 2001). There are wide varieties of theories that attempt to account causes for dyslexia. However, in the majority of cases the direct etiology of LD is unclear. A number of possibilities have been proposed and these may explain some but not all cases of LD. For example, pathological neurodevelopmental processes have been identified in some persons with severe dyslexia (Culbertson & Edmonds, 1996). Individuals with this disorder appear to have alterations in brain structures such as the planum temporal, known to be important for language processing. Whereas in normal individuals the planum temporale is much larger in the left temporal lobe than in the right, persons with severe dyslexia do not show this pattern of asymmetry (tending toward symmetry instead). Moreover, researchers have identified microscopic cortical malformations called poly microgyria (numerous small convolutions) that parallel these structural differences. Several postmortem studies of persons with severe dyslexia have revealed these deviations at the cellular level. Dyslexia also appears to show a significant genetic component for some persons such that the idea of familial

dyslexia needs to be taken seriously. Snowling (1996) classifies the theories that have received most attention into two general approaches. First is domain specific view, which posits that the dyslexia arise from deficits in systems that are specifically linguistic. Here the deficits are traced to be present in phonological processing and memory. On the other hand, may claim that deficits in underlying nonlinguistic sensory mechanisms are the core deficits in the disorder such as visual and auditory processing. However, what must be emphasized is that for most individuals the etiology of LD remains a mystery.

The phonological deficit theory, which is the predominant etiological view on dyslexia, postulates that literacy problems originate from a cognitive deficit that is specific to the representation and processing of speech sounds (Snowling, 2000). Phonological deficits have been demonstrated in three broad areas (Wagner & Torgesen, 1987): phonological awareness (Liberman & Shankweiler, 1985; Mann & Liberman, 1984), retrieval of phonological codes from long-term memory (rapid automatized naming) (Bowers & Swanson, 1991), and verbal short-term memory (Catts, 1989; Mann & Liberman, 1984). Moreover, several prospective longitudinal studies have suggested a causal link between sensitivity to the phonological structure of words and later progress in reading acquisition (Bradley & Bryant, 1983; Wagner, Torgesen, & Rashotte, 1994). Research in the underlying neurological dysfunction of dyslexia suggests that the phonological problems may result from a more fundamental deficit in the basic perceptual mechanisms that are responsible for auditory temporal information processing. Dyslexics tend to have difficulties processing linguistic and non-linguistic stimuli that are short and enter the nervous system in rapid succession (Farmer & Klein, 1995; McArthur & Bishop, 2001). Recent studies in this context focus more specifically on an impaired perception of dynamic aspects in the auditory

signal itself, like amplitude and frequency modulations (Menell, McAnally, & Stein, 1999; Talcott et al., 1999, 2000, 2002; Van Ingelghem, Boets, van Wieringen, Onghena, Ghesquiere, & Wouters, 2005; Witton, Talcott, Hansen, Richardson, Griffiths & Rees, 1998). Besides, individuals with reading impairments also tend to have difficulties with speech perception, in particular with the perception of degraded speech or speech-in-noise (McBride-Chang, 1995). It has been hypothesized that the basic deficit in perceiving auditory temporal cues causes a problem for the accurate detection of the rapid acoustical changes in speech. Consequently, the speech perception problem causes a cascade of effects, starting with the disruption of normal development of the phonological system and resulting in problems learning to read and spell (Talcott & Witton, 2002; Tallal, 1980; Wright et al., 1997). The supporters of the auditory temporal processing deficit theory do not deny the existence of the phonological deficit, but rather see it as secondary to a more basic auditory impairment (Ramus, 2003).

Characteristic features of LD

Learning disability is a broad term which includes several disorders in which a person has difficulty learning in a typical manner, usually caused by an unknown factor or factors. The unidentified aspect is the disorder that affects the brain's ability to receive and process information. This disorder can make it problematic for a person to learn as quickly or in the same way as someone who is not affected by a learning disability. Rather, children with LD have trouble performing specific types of skills or carrying out tasks if left to figure things out by themselves or if taught in predictable ways. The primary difficulties of a student identified as having LD occur in phonemic awareness and manipulation, single-word decoding, reading fluency, and spelling. Difficulties in reading comprehension and/or written expression are some of the

secondary consequences of dyslexia. These difficulties are unexpected for the student's age, educational level, or cognitive abilities. Additionally, there is often a family history of similar difficulties. Early phonological difficulties include not attending to sounds of words (trouble learning nursery rhymes & difficulty in generating rhymes and matching initial sounds.

The most common type of LD in children is reading disorder. Of all children with specific learning disabilities, 70%-80% have deficits in reading. The term "dyslexia" is often used as a synonym for reading disability; however, many researchers state that there are different types of reading disabilities, of which dyslexia is one. A reading disability can affect any part of the reading process, including difficulty with accurate or fluent word recognition, or both, word decoding, reading rate, prosody (oral reading with expression), and reading comprehension.

General indicators of reading disability include difficulty with phonemic awareness -the ability to break up words into their constituent sounds, and complexity with matching letter combinations to specific sounds (sound-symbol correspondence). Studies have documented that, at the behavioural level a sub group of children with dyslexia have primary disturbance in phonological process. Deficit can be in any or all the three types of phonological processing skills which it includes phonological awareness, phonological memory and rate of access for phonological information (Rey, Demartino & Habib, Espesser, 2002). Studies have shown that children with dyslexia have poor speech discrimination ability that results in phonological processing deficits (Rosen & Manganari, 2001).

The best studied characteristic of dyslexia is deficits in phonological processing and in the processes underlying naming speed (Wolf, 1999). Studies suggest that children with reading disability exhibit a range of subtle deficits in their

spoken language including reduced grammatical complexity and a variety of problems with phonology (Snowling, Gallagher & Firth, 2003). Usually all aspects of language, spoken, and written are affected to some extent in children with LD (Wallach & Butler, 1994). Synthesizing of language rules seems to be particularly difficult, resulting in delays in morphological rule acquisition and in development of syntactic complexity. Problems with morphological markers are found both in speaking and writing, with the most common error being omission (Windsor, Scott & Street, 2000). Young children with LD have poor understanding of literal meanings. As these children age they experience difficulties with multiple meaning and figurative meanings (Lee & Kamhi, 1990; Seidenberg & Bernstein, 1986).

Dyslexics show primary deficits in decoding the print automatically due to deficits in phonological processing and phonological awareness (Torgesen, Wagner & Rashotte, et. al., 1997). The possible reasons could be unable to match graphemes and phonemes, difficulty in visual memory skills to remember orthographic configurations, unable to retrieve the sound symbol & orthographic representation quickly and automatically. Deficits in any of these areas will result in slow halt reading and as a result only a few of their resources are left for comprehension. Dyslexics also show low level of comprehension which is consistent with their other verbal skills (Stothard & Hulme, 1996). They exhibit difficulty tracking cohesive elements.

Deficits in language can be seen under all components of language, phonology, morphology, Semantics, syntax etc. The semantic deficits may include difficulty with multiple meaning words, verbs, adjectives, adverbs and prepositions, poor interpretation of alternative meanings of sentences with dual meaning words. Deficits in morphology are also seen in dyslexic children; they also tend to focus

more on words having stress or high information content and may also ignore ending unstressed words phases and parts of clauses etc. The word endings used for inflection and derivation may cause special problems because of their short duration and low intensity in running speech. The major difficulties experienced in acquiring the phonological conditioning rules for the – ez and –ed variations of inflectional word endings (noun plural ending in /dz/, and past tense of regular verb endings in /ed/. Another deficient area is Syntax. These children will have trouble learning and reading sentence transformations like the passive in which the usual order of presentation of objects is altered, interrupted or reversed. These delays are reflected in both interpreting spoken language and formulating sentences. These syntactic deficits persist into adolescence and adulthood if they remain untreated. (Wiig & Semel, 1980). They have difficulty in understanding, remembering and using structurally complex sentences e.g. Producing 'wh' questions sentences with demonstrative pronouns (this, that these; those) passive sentences, sentences with indirect object transformation and sentences with embedded clauses. They fail to recognize that different types of text and fail to integrate information across one or more texts to develop overall gist of text (Westby & Clauser, 1999). Making relevant inferences to what is "read between the lines" is absent in dyslexics.

Reading fluency is the skill to read phrases and sentences effortlessly and speedily, while understanding them as expressions of complete ideas. Children with LDs in reading comprehension and basic reading skills commonly have weaknesses in reading fluency. Typically, they do not process groups of words as meaningful phrases. They may also make decoding errors in reading which slow them down and prevent them from grasping the meaning of the sentence. As a result, they do not comprehend and memorize meanings of passages.

Use of metacognative skills, to notice inconsistencies in texts, and recognize when they do not comprehend is absent in dyslexics. Dyslexics exhibit poor use of linguistic devices that foster cohesion, such as anaphora and causal relationships. They used ambiguous pronouns and they were more likely to tell stories from pictures in present rather than past (Yuill & Oakhill, 1991). Vocabularies may be more limited than age, intelligence and background experiences indicate. Yuill and Oakhill (1991) investigated child's ability to give empirical and deductive explanations and found that dyslexics are poor in deductive explanations because they tended to interpret deductive as empirical. Consequently when asked to complete a sentence such as "we can tell that Mary has cold because…….they are unlikely to respond with of because she is sneezing". They exhibit greater difficulty in pronominal references, particularly when the pronoun and its referent are not adjacent to each other. Causal relationship is also central component for mental models for both narratives and expository text. Dyslexics are less likely to draw causal inferences when the causal relationships are not marked linguistically.

Arithmetic difficulty in Dyslexics are of two forms: True Dyscalculia where children have profound difficulty with number concepts and Operator dyslexia which is common type in which child may understand the mathematics and be able to solve the question but may use wrong operator or record digits inaccurately (Clayton, 2001). When they are learning to do cursive writing they find it hard to remember the motor patterns of letters, messy handwriting, and poor spelling result in difficulty in note taking in class (Shaywitz, 2003). They also have trouble relating sound to written symbols and blending these sounds into known words. Written expression will be simple even though they may have complex ideas to express.

Directional confusion and sequencing difficulties are a central part of dyslexic problem and intimately linked with their magnocellular deficit. Continue to confuse right and left directions and the orientation of body in the space. Cognitive deficits which are mostly seen in them are short term memory when retrieving verbal items (Gathercole & Pickering, 2001). Very poor working memory capacities of dyslexics largely affect their ability to process and sort different, incoming categories of information simultaneously. Fuchs, Fuchs, Stuebig, Fletcher and Hamlett (2008) found out that weak working memory and slow speed of visual processing is linked to the capacity for problem solving. Weak working memory affects problem solving because ides slip in and out of conscious thought in random manner.

Classification of LD

Classification of dyslexia has always been a matter of concern for many researchers since long. IQ discrepancy was considered as an indicator of pure dyslexia however it did not serve as a means to classify dyslexia into different sub-types. The most common classification has resulted in two basic sub types namely phonological type and surface type of dyslexia (Castles & Colt heart, 1993; Byrne, Freebody, & Gates, 1992; Zabell & Everatt, 2002). This classification was brought about by Castles & Coltheart (1993) however was criticized by Snowling (1996) because their classification was drawn from studies of acquired dyslexia in adults to the case of developmental dyslexia in children. Dyslexia as a condition is still viewed as a continuum with phonological processing at one end and orthographic processing at the other. The existence of sub-types is well compatible with this view suggesting that the sub-types fall at the two extremities. Phonological sub-type of dyslexia is considered to have deficient phonological processing leading to impairment in adequately converting the print to phonemes. In contrast surface dyslexia is

considered to arise from a milder form of phonological deficit than that of the phonological type. Manis, Seidenberg, McBridge-Chang and Peterson (1996) based on their observation concluded phonological dyslexia profile to represent specific deficit in phonological processing and surface dyslexia profile to represent a more general delay in word recognition.

There are various types of LD reported in literature. One such type discussed widely is that of Central auditory processing disorder (CAPD). Central auditory processing disorder (CAPD) is defined as a deficit in the processing of auditory information, despite normal hearing thresholds, that primarily involves the auditory modality (ASHA, 2005; Jerger & Musiek, 2000). Even though CAPD is not posited as a direct cause of all or even most cases of academic failure, LD or reading disability, CAPD certainly can exacerbate academic challenge (eg; listening in noisy classroom environments) (Musiek, Bellis, & Chermak, 2005). Deficits in word knowledge have been reported in individuals with CAPD and learning disabilities, including limited vocabulary, restrictions in word meaning, difficulties with comprehension of conjunctions, and deficits in interpreting figurative language (Ferre & Wilber, 1986; Johnson & Myklebust, 1967; Wren, 1983).

Commonly reported sub-group of children with reading disability have impaired word recognition with relatively intact higher cognitive and linguistic abilities and hence intact comprehension, suggesting the reason for higher level reading comprehension deficits as the result of breakdown in the basic process (Share & Stanovich, 1995; Shankweiler, Grain, Katz, Fowler, Liberman & Brady 1995). However there are reports suggesting the existence of other type of children with reading problems with poor word recognition abilities as well as poor listening comprehension which are commonly referred to as language learning disabled and yet

another variety though less publicized with problems in listening comprehension, but normal or above normal listening comprehension often referred to as hyperlexia (Aram & Healy, 1988). Other dyslexia variants include double-deficit dyslexia and alexia. Developmental dyslexia involves congenital cognitive disabilities in neural processing that impede reading (Vellutino & Fletcher. 2005). Reading comprehension is common across all the above mentioned variants but the reason varies.

How is the Information Processed?

The information can be processed in many ways. The common ones suggested are top-down and bottom-up processing. When all the information flows bottom-up, i.e. information is observed in an acoustic waveform, combined to provide meaningful auditory cues, and passed to higher level processes for further interpretation, this approach is called Bottom-up processing or *data-driven* processing. Another approach is top-down processing, which always utilizes internal, high-level models of the acoustic environment and prior knowledge of the properties and dependencies of the objects in it. In this approach information flows top-down, i.e. a sensing system collects evidence that would either justify or cause a change in an internal world model and in the state of the objects in it. This approach is also called *prediction-driven* processing, because it is strongly dependent on the predictions of an abstracted internal model, and on prior knowledge of the sound sources (Ellis, 1996). In general, during top-down processing the information processing is based on previous knowledge or schemata which allow us to make *inferences* i.e. to "perceive" or "know" *more than is contained in the data*.

The emerging conceptualization of central auditory processing views information processing as neither exclusively bottom-up nor top-down (Chermak &

Musiek, 1997). Bottom-up processing encompasses data-driven strategies in which the listener is alerted to novel or incompatible information. Complementary top-down strategies emphasize context and assimilation of lower order information within the experience and expectations of the listener (Chermak & Musiek, 1992; Neisser, 1976). According to information processing theory, an active listener selectively attends, processes data, and imposes higher level constraints to construct the signal or message (Borkowski & Burke. 1996; Watson & Foyle, 1985). Listeners assign meaning to audible discourse based on the extraction of information through various interactions among central auditory processing and cognitive, language, and metacognitive functions (Chermak & Musiek, 1997). Skilled listeners are actively engaged in discovering the speaker's message. They plan various bottom-up (e.g., segmenting, discriminating, and sequencing) and top-down strategies (e.g., question formulation, paraphrasing, mnemonics, and note taking, etc to monitor listening and extract information from the spoken message (Chermak & Musiek, 1997).

The relative contribution of bottom up and top-down processes is driven by the changing demands of the listening situation. The influence of top-down processes is more substantial when stimuli are presented in degraded form, including noisy environments and linguistically ambiguous contexts (Marslen-Wilson & Tyler, 1980; Rumelhart, 1980). For persons with (C)APD who already have internal distortions that degrade the signal, top-down processing exerts a more significant influence in all listening situations, especially in noisy and reverberant environments and when coupled with complex linguistic and cognitive demands.

Consistent with information processing theory, bottom-up and top-down approaches form two complementary components of a comprehensive intervention program for (C) APD. Bottom-up approaches for (C) APD focus on auditory training

and enhancement of the acoustic signal and the listening environment. Top-down approaches focus on central resources, including cognitive skills (e.g. attention, working memory); metacognitive knowledge and skills (e.g.. monitoring, coordinating, and deploying strategies); language (eg. metalinguistic) skills and strategies; class room, instructional, and learning strategies and workplace recreational, and home accommodations (ASHA, 2005; Chermak, 2002; Chermak & Musiek, 1997).

According to Cacace and McFarland (1998), the rationale to evaluate for APD in school-aged children is based on the premise that impairment in auditory perception can be the underlying cause of many learning problems, including specific reading and language disabilities. Carter and Musher (2006) said that evaluation for a central auditory processing disorder (CAPD) in school-aged children is based upon the assumption that an auditory-specific perceptual deficit is the foundation of learning problems such as reading and language disabilities.

Auditory Processing Disorders (APD) can be genetic or acquired. It may result from ear infections, head injuries or developmental delays that cause central nervous system difficulties that affect processing of auditory information. They can have trouble in sound localization and lateralization; auditory discrimination; auditory pattern recognition; temporal aspects of audition, including temporal integration, temporal discrimination (e.g., temporal gap detection), temporal ordering, and temporal masking; auditory performance in competing acoustic signals (including dichotic listening); and auditory performance with degraded acoustic signals."

Children with learning disability have auditory processing disorder has been experimentally investigated by many studies. But, whether these auditory processing

deficits are seen only in association with language disorder or as a causal factor is yet to be explored (Rosen, 2003). A majority of studies in the literature report that a subgroup of children with learning disability has auditory processing disorder. Tallal (1980) described a deficit in dyslexics involving processing of brief, rapidly changing auditory stimuli. The characteristic, brief and rapid spectral changes support the role of temporal processing in speech perception deficits of dyslexics. This basic temporal processing impairment underlies their inability to integrate sensory information that conveys in rapid succession in the central nervous system.

CAPD becomes more apparent in poorer listening environments such as open classrooms and background noise. Children may not show the problem until they begin school and have to actively listen in order to learn. Not all children with CAPD have the same problems. Some have problems sequencing speech sounds; others have problems understanding speech in background noise, and in some the timing appears off. In order for children to adequately decode speech they need to be able to process auditory information in less than 100 milliseconds. Many children with CAPD have processing speeds in excess of 400 msecs and sometimes as slow as 700 msecs. These children have great difficulty processing the order of sounds and hence spelling and comprehension will be compromised.

Cherry (1980) have also found that characteristically, individuals with CAPD experience difficulties in comprehending spoken language in competing speech or noise backgrounds. The child with an auditory processing disorder will 'misperceive' sounds, words and phrases. It is possible that some brief sound segments are not detected at all. Longer auditory messages are not retained in their entirety, or they may be missed altogether. This limitation in retention span also interferes with the

accurate reception and comprehension of language. The results of the study done by Smoski, Brunt and Tannahill (1992) provided evidence that children with CAPD may show difficulty with more than one listening condition but not necessarily with all listening conditions. Tallal, Miller, Bedi, Byma, Wang, Nagarajam, Schreiner, Jenkins, & Merzenich, (1996) reported that, individuals with learning disability specifically dyslexics are impaired in processing the rapidly varying signals, which may affect their speech perception ability in the presence of noisy situation.

APD usually exists as a blend of difficulties - however, one issue may be more dominant than the others. The main types of APD identified in children are: associative deficit, auditory decoding deficit, auditory integration deficit, organizational deficit, prosodic deficit and auditory hypersensitivity. This deficit of auditory processing can directly interfere with language and speech. It can also affect an individual's entire area of learning especially that of spelling and reading.

Human auditory system has the capacity to resolve the faster and slower changes in the amplitude, frequency with respect to time. Tallal et al., (1996) reported that, individuals with learning disability specifically dyslexics are impaired in processing the rapidly varying signals, which may affect their speech perception ability in the presence of noisy situation.

Children with LD are not actively involved in the learning task due in large part to a problem with metacognition. Metacognition is defined as one's knowledge concerning one's own cognitive processes and the products related to them (Flavell, 1971). For strategy instruction to be effective, especially students with LD must have a metacognitive knowledge of how, where, when, and why things are using a strategy, and the underlying reasons behind the components of the strategy (Pressley & Woloshyn, 1995).

Although CAPD by definition is not a metacognitive disorder, the experimental deficit suffered by individuals with CAPD in processing the auditory signal can lead to metacognitive deficits, as metacognition develops through experience in a skill based context, such as spoken language processing (Harris, Reid & Graham, 2004; Wong, 1991). Metacognitive deficits in individuals with CAPD are secondary deficits resulting from repeated failure and lack of task persistence, limited use of executive function, inadequate experience with successful listening strategies and low motivation (Chermak & Musiek, 1997). If left untreated, metacognitive deficits can exacerbate the impact of CAPD for spoken language understanding; with treatment, individuals with CAPD can become skilled listeners who actively engage in discovering what speakers are communicating. To achieve this goal they must be trained to use their metacognitive knowledge and strategies (Chermak & Musiek, 1992). Metalinguistic ability is the ability to reflect consciously upon the nature and properties of language (Van Kleeck, 1982). This reflective capacity is necessary not only for the mastery of phonological information but for semantic and syntactic competence as well. Metalinguistic is a cognitive skill that can be described as "the ability to think and talk about language" (Bernstein & Tiegerman-Farber, 2002).

Ehri (1998) differentiated between implicit and explicit knowledge and further stated that metalinguistic knowledge is explicit. Ehri (1998) defined metalinguistic awareness as the ability to focus, think or make judgments about the structures comprising language. According to Sinclair (1981), metalinguistic awareness includes all the capacities and activities concerning language and language judgement which are not themselves a part of (or very closely related to) production and comprehension processes. In general, any reflections, ideas, knowledge or explicit formulations of underlying principles, rules, etc., concerning language structure, functions or the rules

for its use have been classified under the label 'Linguistic awareness' or "Metalinguistic awareness'.

Complex phonological skills are reported to emerge only after 5 to 6 years of age (Liberman et al., 1974). Liberman, Mattingly and Shankweiler (1980) reported that segmentation of words into syllables is achieved at the age of four, five and six years. A supporting study by Liberman and Shankweiler (1985) revealed that in the group of four year old children, none could segment by phoneme whereas about 50% could segment by syllables; in the group of five year olds, 17% could segment by phonemes and about 50% would do so by syllable and in the six year old children, 70% would segment by phoneme and 90% by syllable. Thus, there is a continuum from simple to complex development of phonological skills. There have been several studies documenting the metalinguistic abilities children with various language impairments. Mattingly (1972), Tunmer and Bowey (1980), Hodgson (1992) and others emphasize that the metalinguistic processes, specially the metaphonological skills need to be paid more attention to in the identification and management of reading disabled children. Research in the area of metalinguistic in learning disability has reported deficits which hampers their reading abilities. Hence, assessment and remediation of metalinguistic skills becomes an essential component in the diagnosis and management of children with developmental dyslexia.

Assessment of CAPD

There are many screening checklists, screening tests, behavioural tests and physiological assessment available for the assessment of (C)APD. There are many screening checklists available which can be used by parents, teachers etc for identification of CAPD. Some checklists which are commonly used are Fisher's

Auditory Problems checklist (Fisher, 1976), Children's Auditory Processing Performance Scale (CHAPPS) given by Smoski, Brunt and Tannahill (1992), Screening Checklist for Auditory Processing (SCAP) given by Yathiraj and Mascarenhas (2003) etc. The SCAN-C, given by Keith (2000) is a widely used audiological test which is designed for CAPD screening of children ages five through eleven. This test determines if additional CAPD testing is necessary. The behavioural tests include various tests which assess different areas of auditory processing. These tests checks for binaural interaction (tests like Masking Level Difference, Binaural Fusion Test, and Dichotic Digit Test etc), binaural separation (Competing Sentence Test), temporal processing (Duration Pattern test, Gap Detection Test). Most of the researchers strongly suggest that a diagnosis of APD should not be made based upon one single behavioural measure, but rather a test battery (ASHA, 1996; Bellis, 2003; Jerger & Musiek, 2000). Electrophysiological measures were recommended by the 1996 ASHA Task Force on Central Auditory Processing Consensus Development and were recommended as part of the Minimal APD battery by the 2000 Consensus Conference on the Diagnosis of Auditory Processing in School-Aged Children. Electrophysiological tests in the APD evaluation may aid in the diagnosis or aid in validating the results of the behavioral test battery (Bellis, 2003; Chermak & Musiek, 1997). Unfortunately, there have been no published investigations which support or negate the inclusion of electrophysiological measures in the APD battery. Evoked potentials are not as popular as the behavioural tests currently.

Previous investigations have reported no latency differences in the ABR recording from various recording sites (Hashimoto, Ishiyama, Yoshimoto & Nemoto, 1981). Musiek and Gollegly (1998) reported that Wave I and wave III latencies were within normal limits for all control and experimental subjects in their study. Sohmer

(1978) reported abnormal ABR latency results in 16 subjects with minimal brain dysfunction. Subjects had traits of hyperactivity, learning difficulty and coordination defects. Sohmer's investigation reported abnormalities in ABR latency in other broad-spectrum disorders such as autism, and mental retardation. Worthington and Peters, (1981) has reported no differences in the ABR latencies between controls and 83 children with APD. This lack of difference is in contrast to the investigation by Worthington and Peters (1981) which reported abnormal ABR latencies in 8 out of 18 subjects with severe developmental and or/language delays.

Late auditory evoked potentials are believed to represent the sensory processing that takes place between peripheral encoding of the acoustic stimulus and conscious perception. Late auditory evoked potentials demonstrate different maturational patterns. Late auditory potentials have previously been used to investigate special populations such as language impairment (Tornquist-Uhlen, 1996) learning disorders (Cunningham, Nicol, Zecker, Bradlow & Kraus, 2001) and ADHD (Cunningham et. al., 2001). Jirsa (1992) reported an increase in latency and a decrease in amplitude of the P300 response in a group of children with APD when compared to normal individuals. This decrease was not evident in the N1 or P2 response. But they have not discussed about the description or characteristics of APD.

The dichotic listening task is thought to assess the development of central auditory processing and lateralized language ability localized in the left temporal region. Orton (1937) first proposed that learning-disabled children suffer from delayed cerebral dominance for language; hence countless studies have sought to correlate deficient or delayed lateral or perceptual asymmetries with cognitive and academic disorders.

Chermak, Vonhof, and Bendel (1989) studied word identification performance in the presence of competing speech and noise in learning disabled children. Results revealed that the performance of learning disability children was poorer than that of the control subjects under each masking condition. Word identification score was poorest in the presence of speech noise for learning disability individuals and children with normal hearing. No difference in performance was seen as a function of linguistic content of the competing speech maskers. These results suggested that the learning disability subjects presents greater susceptibility to acoustic masking relative to control subjects and may support the view that auditory-language deficits observed in learning disability individuals may be secondary to an underlying acoustic-phonetic disorder rather than a phonological disorder.

Intervention/Management approaches of children with LD

Learning disabilities (LD) represent a heterogeneous set of disorders that include difficulty in a variety of academic and social domains. Over the years, researchers have studied the cognitive profiles and brain-behaviour relationships associated with different types of LD. Of these, reading disabilities have been the most extensively researched (Adams, 1990); other types of LD, such as math and written language disorders, have also been investigated, but to a lesser extent (Swanson & Sachs-Lee 2001).

The advances in intervention are especially promising in the reading area, as the research shows that reading disabilities are preventable in many children, and that intensive interventions can be effective with older children who have severe reading difficulties. Moreover, in the reading area, research is converging on a comprehensive model of the most common LD (dyslexia) that is grounded in reading development

theory and accounts for neurobiological and environmental factors as well as for the effects of intervention (Snowling, 1996). Given these advances for dyslexia, similar advances for other LDs cannot be far behind.

Most common interventions used for instructing children with dyslexia include direct instruction and multisensory teaching. Direct approach starts with instruction on basic skills such as decoding proceeding to more advanced skills such as paraphrasing a reading passage. This approach is well supported by both cognitive and behavioral learning principles. This approach makes use of explicit instruction, guided practice with appropriate feedback, independent practice and also generalization. Another widely used approach in the western setting includes multisensory teaching which simultaneously focuses on visual, auditory, tactile & kinaesthetic information to enhancement in memory and learning. It helps in integrating all the information obtained from different modalities.

Phonic model highlights the importance of phonology and the sounds of letters and letter combinations. There are a number of structured phonic programmes in existence that teach children to distinguish the 44 phonemes or sound units of English by using a variety of strategies. These strategies may include color coding and marks to indicate short or long vowels. Many researchers emphasize the need to teach phonics and argue that if taught well phonic programme is highly meaningful (Chall, 1967). Another model is 'look and say' model, it emphasizes exposure to print on the grounds that children become familiar with words and build up a sight vocabulary with increased exposure. Hence the emphasis here is on meaningful units of language rather than sounds of speech. But it requires good memory for recognizing the shapes of letters and also to master many of the irregularities of spelling and sound-symbol correspondence.

Another model focuses on language, both oral and written, as an aid to learning to read through various modes of language enrichment. This helps children to develop important language concepts and schemata, which in turn help to bring meaning to print. Although the child may have a decoding problem, the experience gained in language can help to compensate for this and bring some meaning to the text.

During the past 20 years, there has been considerable research on cognitive strategies that children use to aid memory, reading, attention, and problem solving. In general, researchers found that young children and beginner problem solvers did not spontaneously recruit and use effective strategies that they were capable of employing with an adult's guidance (Paris & Lindauer, 1982). This emphasis on production rather than mediation deficiencies (Flavell, 1976) clearly suggested a tangible, remedial source of difficulty in children's thinking that had appeal to researchers in learning disabilities. In this framework, learning disabilities were not due to cognitive deficits but rather were based on differences in children's understanding or motivation to use appropriate strategies. Viewing learning-disabled children as nonstrategic led researchers to portray them as "inactive" or "passive" learners (Hallahan & Kaufman, 1982). Although they may be more passive in typical learning situations, they may also be more confused, anxious, and threatened.

Inclusion of phonological awareness in treatment of CWLD has been emphasized by researchers since ages together and is not a new finding. Many studies concluded that phonological awareness training is beneficial for beginning readers starting as early as age 4 (Bradley & Bryant, 1985; Byrne & Fielding-Barnsley, 1991). Smith et al., (1998) did a review of phonological research, and concluded that phonological awareness can be developed before reading and that it facilitates the

subsequent acquisition of reading skills. The effective approaches to teaching phonological awareness which are documented generally include activities that are age appropriate and highly engaging. Instruction for a 4-year-old should involve rhyming activities, whereas kindergarten and first-grade instruction should include blending and segmenting of words, and advancing to deleting phonemes. Effectiveness of phonemic awareness intervention in older children with dyslexia and specifically for bilingual children having English as their second language has been emphasized by the findings of Swanson et al., (2005), in their study on Spanish-English older bilingual children (7^{th} grade). During the last few years, researchers have produced multiple programs in phonological awareness, some of which are based on research. Ladders to Literacy (O'Connor, Notari-Syverson, & Vadasy, 1998) and Teaching Phonemic Awareness (Adams et al., 1996) are two examples of these programs. Torgesen et al., (1997) concluded that training for at-risk children must be more explicit or more intense than what is typically described in the research literature if it is to have a substantial impact on the phonological awareness of many children with severe reading disabilities. Therefore, two tiers of instruction are recommended. The first tier of instruction is the highly engaging, age-appropriate instruction, and the second tier of instruction includes more intensive and strategic instruction in segmenting and blending at the phoneme level (Snider, 1995)

The importance of vocabulary knowledge to school success and in particular reading comprehension is widely documented (Anderson & Nagy, 1991; Becker, 1977; Cunningham & Stanovich, 1998). While vocabulary knowledge is fundamental to reading comprehension (Baumann & Kame'enui, 1991; Stanovich, 1986), existing research does not support a specific vocabulary development method or program to address the discrepancies in word knowledge between students with poor and rich

vocabularies (Baker, Simmons, & Kame'enui, 1997; Snow, 2002). Rather, the development of proficient reading skills is documented as the most effective independent word learning strategy.

Pany, Jenkins, and Schreck, (1982) reported that for students with learning disabilities, strategies for contextual word learning are also less proficient. Swanson et al., (2005) reported that because of the ineffective word learning strategies, children with disabilities have a fragmented and less complete knowledge of words, as well as a narrow understanding of particular word features. The most critical obstacles to vocabulary development for students with learning disabilities are poor ability in the amount of independent reading, lack of strategies to learn words from context, and diffuse word knowledge (Stahl & Shiel, 1999). Because they have problem in learning vocabulary during independent reading, vocabulary and word learning skills must be taught. Yet, current practice deemphasizes vocabulary instruction despite the established robust and reciprocal relationship between vocabulary and reading comprehension (Snow, 2002). Vocabulary should be taught through productive approaches that optimize word learning (Snow, 2002) for example, rather than focusing on a set of targeted words, instruction might focus on one word with multiple semantic connections to other words (Stahl & Shiel, 1999). Productive approaches might include teaching students strategies to learn words from context, word parts (e.g., decomposing words to examine affixes and roots), or semantic mapping (Baumann & Kame'enui, 1991).

Torgesen (1982) states that between 1976 and 1981 there were 40 studies conducted on learning-disabled children's use of information-processing strategies: 78% of which investigated strategies to promote memory and attention. He concludes

that "the research conducted thus far provides convincing evidence that learning disabled children as a group do not engage readily in certain organized, goal-directed strategies that aid performance on intellectual tasks". Although there have been relatively few studies of learning-disabled students reading comprehension strategies, the available evidence reveals similar strategic inefficiency. For example, learning-disabled students in junior high and high school fail to read ahead and to use context as strategies for identifying missing words in text.

Paris and Myers (1981) compared the comprehension strategies of fourth-grade good and poor readers who were matched by pairs on age, sex, and arithmetic achievement scores. The major difference between the two groups was that poor readers scored much below grade level on reading achievement tests whereas good readers were above grade level. The poor readers were less able to detect incongruous information inserted into passages while reading orally or when directed to underline parts of the story that did not make sense. They also used fewer aids to study text for later recall and they recalled less information in a more disorganized fashion.

The large number of studies of poor readers confirms the lack of strategic comprehension. Poor readers do not integrate word meanings well in sentences or sentence meanings within paragraphs (Willows & Ryan, 1981). They also do not discriminate well between important and unimportant information in text nor make inferences as well as good readers. Although research has shown a strong correlation between poor comprehension strategies and children's identification as learning-disabled or poor readers, the reasons are unclear. Part of the disabled reader's difficulty in using sophisticated comprehension strategies may be due to poorer word recognition and decoding skills (Kavale, 2005). Alternatively, poor readers may not

expend much effort or persist long on a difficult task. Or it may be that poor readers do not understand comprehension strategies, how they operate, or when to use them.

Metacognition generally refers to one's knowledge about cognition as well as self-regulation of one's thinking. Many researchers believe that the failure to use effective cognitive strategies is a manifestation of inadequate or erroneous metacognition (Wong, 1991). Thus, the research tactic of identifying meta-cognitive shortcomings in young or poor learners has helped to target specific weaknesses and to prescribe remediation. Baker (1989) provides a concise summary of nine "metacognitive deficits" in reading that are often observed in young and/or poor readers. They are as follows:

- Young readers focus on reading as decoding and fail to appreciate appre-hension of meaning as the purpose of reading (Myers & Paris, 1981).
- Immature readers do not modify their reading behaviour to meet different goals (Forlizz, 1992).
- Young children have difficulty identifying the main theme of a simple nar-rative (Brown, 1980), and learning-disabled children often require help in focusing on important information (Wong, 1991).
- Low-achieving students may have difficulty recognizing the logical structure and relations embedded within stories (Owings, Peterson, Bransford, Morris, & Stein, 1980).
- Poor readers do not effectively relate new information to prior knowledge (Sullivan, 1978).
- Good readers attend better to syntactic and semantic constraints (Beebe, 1980).

- Young children do not often evaluate text thoroughly for clarity, completeness, and consistency.
- Poor readers have less knowledge about effective strategies for coping with comprehension difficulties and they are less likely to apply those strategies (Paris & Myers, 1981).
- Immature readers often cannot tell how well the material has been understood or if their answers to questions are correct (Forlizz, 1992).

Most of this research has been conducted with children who have not been identified as learning disabled although many studies have tested poor readers. The strong implication from these studies is that learning-disabled children are unaware of many variables that influence reading and they do not understand how to plan, evaluate, and regulate their own thinking. Some of these metacognitive deficits may be characteristic of reading only and some may be more pervasive handicaps. More research is needed to determine if learning-disabled children have specific metacognitive deficits that accompany particular disabilities.

Mnemonics is a memory enhancing instructional strategy that involves teaching students to link new information that is taught to information they already know. According to Levine (1993), mnemonic instruction is useful for students across a wide age range. Though children in the early elementary grades are usually not expected to learn and recall as many facts as older students, they are involved in a number of activities that involve making associations that employ mnemonic principles. There are at least three distinct methods for teaching mnemonics: keyword, pegword, and letter strategies. Mnemonic instruction has been well researched and validated for students with high incidence disabilities, particularly students with learning disabilities, as well as for general education students in elementary and

middle school (DLD/DR Current Practice Alerts, p.1). According to Swanson (1999) the use of mnemonic strategies has helped students with learning disabilities significantly improve their academic achievement. Mnemonic strategy was first used in a general education setting by college undergraduates learning foreign language vocabulary (Uberti, Scruggs, & Mastropieri, 2003). Later research extended the use of such instruction into classrooms of younger students and among students with learning disabilities.

Two recent studies on using mnemonics for social studies instruction showed not only test improvement among all students but also marked improvement among students with disabilities (Mastropieri, Sweda, & Scruggs, 2000). Students who may benefit from the use of mnemonic instruction may not be able to construct their own mnemonics effectively. For example, in one study mnemonic instruction was used to teach general education middle school students about 18th, 19th, and 20th century inventions and their corresponding dates. This study found that the students had difficulty using mnemonic strategies independently; that is, they were unable to effectively apply them and create mnemonics on their own (Hwang & Levin, 2002). Thus, keyword mnemonics can either be provided by the teacher or created by the student. However, it may be more effective for the teacher to provide the keyword mnemonics to the students (Scruggs & Mastropieri, 1992).

It is widely accepted that learning-disabled students have poor memories. Scruggs and Mastropieri (1992) state that, "One of the most commonly described characteristics of learning-disabled students is their failure to remember important information." A deficit in memory is only one in a cluster of deficits that limit the achievement of LD students (Kirk, 1971) particularly with respect to recall of semantically based information, have been regarded as a central characteristic of

learning disabilities (Swanson, 1994). These deficits contribute to problems in reading and math and acquisition of academic vocabulary and content. Hence the intervention strategies that specifically target these memory deficits could be expected to provide beneficial output in the performance of LD students. Recently, techniques, referred to as "mnemonic instruction." have been implemented with learning disabled students with very positive results. Scruggs and Mastropieri (1992) evaluated the results of mnemonic instruction in learning disabilities intervention, and concluded that "mnemonic instruction delivers the greatest learning increases seen in the history of learning disabilities intervention research."

Mind mapping is a visual strategy that's been used for decades in education and is usually defined as a diagram that visually represents concepts or ideas. Using mind maps (also called graphic organizers and concept maps) can be a valuable strategy for visual learners. Mind maps can be especially helpful for students with learning disabilities in brainstorming, note-taking, expression of ideas, recall, concept development, understanding relationships, organization for the writing process, and problem-solving. Mind mapping software has been very effective when used with students with learning disabilities who are visual learners. There has been a great deal of research on mind maps, graphic organizers and their use with students with learning disabilities. The Council of Exceptional Children has published information on current practices with graphic organizers in (2003). The results indicated significant findings in the areas like Reading comprehension (effective in improving reading comprehension), student achievement (benefits are also seen with students with learning disabilities), thinking and learning skills (enhances skills such as developing and organizing ideas, seeing relationships, and categorizing concepts), retention(aids in retention and recall of information), cognitive learning theory.

Self-instruction is an interventional strategy where in individuals are literally taught to "talk themselves" through a task. Self-instruction uses induced self-statements. Self-instruction serves many purposes. It may aid in orienting, organizing, and/or structuring behavior. Children will use private speech to consciously understand or focus on a problem or situation and to overcome difficulties. The goal of self-instruction is to go from modeled, induced, strategic, task-relevant, private speech to covert, strategic, task-relevant, private speech. Employing self-instruction to teach mathematics skills is evident in the research of Lovitt and Curtiss (1968), and Smith and Lovitt (1975). One of the findings highlighted the importance of simply requiring that math problems be read aloud before writing a response. Cognitive self-instruction benefits for mathematics computations were documented by Barling (1980). Barling (1980) found that children who received both self-monitoring and self-reinforcement were superior on assessments of accuracy and persistence. Johnston (1983) found that self-instruction produced more accurate mathematics problem solving than didactic instruction. Thrackway, Meyers, Schleser, and Cohen (1985), stated that specific strategy training yielded improvements on a specific math task; whereas the general strategy training aided generalization tasks. To obtain specific skill improvement and generalized improvements to other mathematics tasks, both specific and generalized self-instructional strategies should be used.

Schunk and Cox (1986) have studied the effects of self-instruction on learning-disabled (LD) children's mathematics skills. Their findings revealed that continuous self-verbalization aids math performance and produces higher self-efficacy in LD children than discontinuous or no self-verbalizations. Many students, especially students with learning problems, fail to spontaneously transfer learned strategies to tasks or situations different from those in the training setting (Chan,

1991; Chan, Cole, & Morris, 1990). Transfer can occur only when the learner recognizes that "the solution principle or strategy in the learned task corresponds to that required in the new task" (Mayer, 1999). Therefore, teaching for transfer may involve use of both heuristics and metacognitive strategies.

Metacognitive skills (e.g., prediction, planning, monitoring, and evaluation) and strategies (e.g., self-questioning, self-monitoring, self-regulation, self-evaluation) that require students to discuss, think aloud, and generally become more aware of the various processes they use to solve problems are known to enhance problem solving (Desoete et al., 2002). The transition from teacher control to student self-regulation of strategy use is especially important for students at risk for mathematics difficulties who tend to be passive learners (Wong, 1991; Palincsar, & Brown, 1984). Despite the increasing evidence concerning the importance of monitoring understanding during problem solving, schools and classroom instruction do little to effectively promote the development of metacognition in children (Silver & Marshall, 1990).

A study by Steve and Karen (1989) investigated the viability of self-instructional strategy training among learning disabled (LD) students exhibiting composition deficiencies on 22 LD subjects and 11 normally achieving students in the 5th and 6th grades. Results indicated that self-instructional strategy training produced meaningful and lasting effects on subject's composition skills and a significantly heightened sense of self-efficacy. Composition performance after instruction among LD subjects did not differ significantly in terms of story grammar elements from that of a contrast group of normally achieving, competent writers. However, normally achieving students' compositions were longer and received significantly higher quality ratings.

Swanson's (Swanson, 1999; Swanson & Sachs-Lee, 2000) meta-analyses of 30 years of both group and single-subject intervention studies conducted with students with LD revealed that direct instruction and strategy instruction were the two most effective instructional approaches, particularly when combined, for teaching students with LD across academic domains (i.e., reading, writing, and mathematics).

In summary, research on cognitive development, learning-disabled children, and poor readers reveals that inappropriate motivation, metacognition, and cognitive strategies go hand in hand. Although we may isolate many cognitive skills that appear deficient in LD children it seems unlikely that such descriptions of deficits will inform us why children do not use better learning skills. A consideration of their knowledge about reading, attitudes, and self-perceptions can enlarge our understanding by including motivational and metacognitive beliefs that function over time to orient children positively or negatively to particular tasks such as reading.

A final influence that has been implicated as a source of LD children's poor reading is working memory (Siegel & Ryan, 1989; Swanson, 1999). Working memory is a processing resource of limited capacity that has been shown to be relevant to reading (Perfetti, 1985). Several studies suggest that LD readers can be characterized by their inability to retain information in memory while simultaneously processing the same or other information (Siegel & Ryan, 1989; Swanson, 1999). This skill is critical to a wide range of reading tasks because an important feature of many reading activities is that incoming information must be temporarily preserved while other information is being acquired or manipulated.

Thus, because of the diversity of processing difficulties experienced by LD children, there are numerous treatment orientations regarding how to handle the

various processing deficits attributed to these students. For example, sharp divisions exist about the most effective method of teaching reading (Adams, 1990; Chall, 1967; Palincsar & Brown, 1984). On one side of the continuum, several studies trying to decipher some of the features of learning disabilities have traced aspects of the condition to a deficit in phonological awareness, the ability to code words into individual assigned units. Advocates of the phonological deficit theory want to replace current context-based reading instruction with highly structured explicit and intensive instruction in phonological rules and other applications to print. On the other side of the continuum, there are those who argue that reading has meaning only within the context of language. Advocates of this approach point out that, research showing generalization of isolated word intervention to text reading fluency and comprehension is limited (Aaron, Frantz, & Manges, 1990; Byrne, Free-body, & Gates, 1992), and argue that the primary function of reading is extracting meaning from text (Chall, 1967). They reason that there are strong links between reading acquisition and oral language acquisition, and further reason that when reading is accented, its meaning and purpose should be emphasized. That is, they argue that the purpose of reading is for meaning and that it is counterproductive to focus primarily on individual letters and sounds.

The implications of this debate are manifested in areas of reading and writing. In the area of reading comprehension, some approaches emphasize accurate word recognition, either through segmented phonetic analysis or whole-word contextual procedures (Lovett, Ransby, Hardwick, Johns, & Donaldson, 1989), while other approaches emphasize cognitive strategies focusing on student-generated sentences (generative learning) and teacher-student dialogue (reciprocal teaching related to

getting the gist of a passage, summarization, and inference from text (Palincsar & Brown, 1984).

Central auditory processing skills and speech perception are foundational skills for the emergence of phonemic awareness and in the broader sense phonological awareness. These skills are important building blocks to literacy. Many children with CAPD are slow and inaccurate at processing phonemic information which means that they are working harder to interpret what they hear.

In addition to language and metacognitive strategies, specific skills underlying listening comprehension must also be targeted for remediation. For example, chunking (i.e., grouping individual items into superordinate, functional or perceptually salient categories), mnemonics, and verbal chaining strategies (i.e., constructing meaningful sentences or stories from individual items) may be emphasized to improve memory (Wilson & Moffat, 1984).

Similarly, using context to derive word meaning, thereby expanding vocabulary and enhancing message comprehension, should be included in a comprehensive management approach. Context clarifies word meaning and motivates children to learn the association between a word and its meaning (Miller & Gildea, 1987). Indeed, a derivational approach to vocabulary development in which word meaning is deduced from context is more effective than consulting a dictionary (Miller & Gildea, 1987). Given the robust correlation between vocabulary and reading comprehension, focus on deducing word meaning from context should enhance both listening and reading comprehension (Wiig, Semel, & Crouse, 1973).

According to ASHA (2005a); Chermak and Musiek (2007) recommendations for intervention should employ both bottom-up and top-down treatment approaches.

Bottom-up treatments focus on access to and acquisition of the auditory signal and include auditory training as well as environmental modifications to improve the listening environment and enhance access to the acoustic signal. Top-down approaches address higher level central resources such as language, cognitive, memory, and related functions, along with environmental modifications to instructional, communicative, and other methods of imparting and learning information.

Central resources training also referred to as Compensatory strategies, are designed to assist individuals in overcoming residual dysfunction and to address secondary motivational or related deficits by strengthening higher order, top-down cognitive, language, and related abilities (ASHA, 2005a; Bellis, 2003a; Chermak, 1998, 2007). Through the use of these strategies, individuals with (C)APD learn to become active rather than passive, listeners and learners and are encouraged to take responsibility for their own listening and learning successes. These strategies do not directly target deficient central auditory processes, but instead enhance the benefit provided by direct remediation and other interventions by addressing functional deficits and promoting improved listening and spoken language comprehension (Chermak, 1998, 2007). Activities include training in utilization of metalinguistic and metacognitive (including memory and attention) strategies to aid listeners in actively monitoring and self-regulating their own auditory comprehension and retention abilities, as well as in developing general problem-solving skills.

Aim of the study

The present study primarily aimed to develop a resource manual in English for children with learning disability with CAPD based on the central resource training suggested by Chermak and Musiek (1997).

CHAPTER 3: Method

The primary aim of the study was to develop a resource manual which is based on the central resources training, given by Chermak and Museik (1997). The study also attempted to administer the developed manual in the clinical population of children with LD with CAPD. The study was divided into 3 phases which are as follows

Phase 1: Development of the resource manual

Phase II: Administration of developed material on clinical population and

Phase III: Scoring and analysis.

Participants

Participants included 5 children with Learning Disability with CAPD (in the age range of 8-14 years).Table 3.1 shows details of the participants in the present study. None of the children enrolled for treatment had any known or reported history of hearing, neurological, developmental or emotional problems.

Table 3.1: *The demographic data of the participants*

Participants	Pl	P2	P3	P4	P5
Age (in years)	11	9	12	9	9
Gender	Male	Male	Male	Female	Female
Grade	V	III	V	IV	IV
Prior Therapy details	Attended therapy for 2 months (15 sessions)	Attended therapy for 2 months (14 sessions)	Attended therapy for 2 months (16 sessions)	Attended therapy for 3 weeks (9 sessions)	Attended therapy for 3 weeks (9 sessions)
Visual problem	Absent	Absent	Absent	Absent	Absent
Intelligence	Above average	Above average	Above average	Above average	Above average
Familial incidence	Present	Present	Absent	Present	Present
Consanguinity	Absent	Absent	Absent	Absent	Absent

Participant selection criteria:

- All the children with learning disability (CWLD) were diagnosed based on "Descriptive Analysis of the Sequential Progression of English reading Skills (ERS) among Indian Children" (Loomba, 1995).
- Native language of all the participants was Kannada with English as the medium of instruction in school.
- All the participants were assessed by a clinical psychologist for their intelligence reported average or above average intelligence in the children.
- All the participants were confirmed cases of central auditory processing disorders (CAPD) confirmed through audiological tests.

The audiological evaluation included routine tests like Pure Tone Audiometry (PTA), Imittance Evaluation (Tympanometry), Speech Recognition Threshold (SRT), Speech Identification Scores (SIS), and tests for CAPD such as Speech In Noise (SPIN) test, Dichotic Digit Test (DDT), Duration Pattern Test (DPT) and Binaural Masking Level Difference (BMLD). The children were diagnosed as CAPD based on these test results.

Phase I: Development of the resource manual

The resource manual was prepared incorporating the 3 domains of central resources training suggested by Chermak and Musiek (1997) for top-down processing. The domains were

1. Metalinguistic skills
2. Metacognitive skills
3. Cognitive skills

Each of the above mentioned domains had several other sub sections (see Appendix 1) arranged in the hierarchical order of difficulty.

Section 1*:* Metalinguistic skills

This domain consists of the following sub-sections:

1.1 Phonologic Awareness

Phonemic analysis and phonemic synthesis provide two reciprocal approaches to phonologic awareness and segmentation training (Chermak & Musiek, 1997). The primary goal of phonemic analysis is to develop phonemic encoding and decoding skills using either multisyllabic nonsense sequences (Lindamood & Lindamood, 1975) or single syllable and multisyllabic words (Sloan, 1986). The listener identifies which sound is heard and its position in the syllable or word. Other programs targeting phonemic synthesis stress the blending of discrete phonemes into the correctly sequenced, coarticulated sound patterns. The activities included under this section are as follows:

1.1.1 Identification of the sound heard in a given word

Instructions given to the client was that the clinician would say a sound and also show few pictures and name the pictures for the child. The participants were instructed to point at the picture of the word which has the sound that the clinician said. A score of 1 was given for the correct response.

Eg: the Phoneme selected is /ʃ /. And the words given were shoe, sheep, and baby. The clinician read out the words and showed the pictures and asked the participants to point to the word or picture which has sound /ʃ /**.** The participants were asked to listen

carefully while doing the task and once they are able to point at ‘shoe’ and ‘sheep’ the clinician can score 1 for all correct scores.

1.1.2 Identification of the number of syllables in the words

The clinician has to say the given words loud and the participants were asked to count the number of syllables in each word. A score of 1 is given for correct response. Eg: the word was ‘table’ and the number of syllables will be 2 syllables, so client has to say ‘2’ to get correct score.

1.1.3 Phoneme deletion activity

Instruction given to the participants was that the clinician will say a word and participants were asked to listen to the word and later clinician will delete a phoneme from the word and participant has to say what will be the word after the phoneme deletion. A score of 1 is given for each correct response. Eg: the word will be ‘Cup’ and /k/ sound is deleted and now what will be the word? A score of ‘1’ was given if the response was ‘up’.

1.1.4 Blending of syllables activity

The clinician asked the participant to join the syllables and say it as a word. A score of ‘1’ is given for each correct response. Eg: the word is ‘/va-ki-ŋ/ and clinician says it as syllables and participant was taught to combine the syllable and say it as a word.

1.1.5 Fast/Slow game

Clinician says a word in fast and slow way and participants were asked to do it same way. A score of 1 is given for each correct response. Eg: the word is Football (*fast way)* and f-oo-t-b-a-ll (slow way).

1.2 Vocabulary Building

Deficits in word knowledge have been reported in individuals with (C) APD and learning disabilities, including limited vocabulary, restrictions in word meaning, difficulties with multiple meaning words, difficulties with comprehension of conjunction, and deficits in interpreting figurative language (Snider, 1989; Mann, 1991). Context derived vocabulary building, word derivation, flexibility with multiple meaning words, and inferencing are among the procedures recommended for extending the breadth and depth of vocabulary knowledge.

The activities which come under this section are as follows:

1.2.1 Context derived vocabulary building

The participants were instructed that he will be given one word embedded in a phrase or sentence context. They are asked to find out the meaning of the word by using the contextual cues. The clinician helped the child by providing cues and once they were able to say an approximate meaning clinician provided the actual meaning and made the child read it once again. A score of 1 was awarded for each correct response. The activity is given in 2 levels (phrase and sentence). It starts with phrase level and move on to sentence level. For eg: the target word is 'nature'. And it is given in a phrase "The boy who is the topper is very smart. His *nature* is very good. He helps all with their work. Because of this *nature* everybody loves him". Participants have to say the meaning of nature from the context.

1.2.2 Flexibility with Multiple Meaning Words

The participants were informed that the words given will sound alike but it has different meanings (homophones). They were asked to fill up the blank with the appropriate word. When the participants were not able to do it by themselves the

clinician provided the meaning of the two words given and then asked the participants to fill up the blank. Correct responses were given a score of 1.

1.2.3 Find Out The Meaning

The participants were informed that the choice words will have different meanings even though it has same spelling (Homographs). The participants were asked to say the meaning of the sentence first and then they were asked to say the other meaning of the same word. When the participants were not able to do it by themselves then the clinician provided the meaning of the two words given and then asked the participants to interpret the meaning. Correct responses were given a score of 1.

1.3 Schema Induction And Discourse Cohesion Devices

Individuals with (C) APD and learning disabilities may experience difficulty processing schemata and other discourse cohesion devices (Liles, 1985). Exercises that emphasize recognizing and interpreting formal schemata should benefit individuals with (C) APD (Chermak & Musiek, 1992).

A schema is defined as "a structured cluster of concepts, set of expectations, and an abstract and generic knowledge structure stored in memory that preserves relations among constituent concepts and generalized knowledge about a text, event, message, situation, or object, thereby providing a framework to guide interpretation (Chermak & Musiek, 1997). Schemata operate at 2 levels, content and form. Content schemata provides a generalized interpretation of the content of experience (Dillon, 1981) helping listeners interpret spoken messages and Formal schemata are linguistic markers that promote cohesive and coherent messages (Chermak & Musiek, 1997), they organize, integrate, and predict relationships across propositions and thereby

foster the cohesiveness and coherence of messages (Dillon, 1981). It influences listening comprehension.

Discourse cohesion devices are linguistic forms that connect propositions into more complex messages. These devices allow speakers and listeners to more efficiently formulate and resolve messages. Cohesion devices establish relationships between ideas (eg: causal relationships denoted by because or so) and build cohesive chains through the use of devices that are explicit (eg: pronouns and conjunctions) or must be inferred (Chermak & Musiek, 1997). Listeners must grasp precisely the relationships signaled by the cohesive devices to discern subtle semantic differences.

Each sub section has different activities.

Scoring: Each question is awarded a score of '1' if answered correctly and '0' if not correct.

The activities which come under this section are as follows:

1.3.1 Conjunction Activities

The participants were asked to join the phrases with appropriate conjunctions. Each correct response was scored 1.

1.3.2 Identify and make the child produce the causal conjunction, temporal conjunction etc

The clinician audio recorded the participants sample and played back to them and asked them to listen to their speech and identify the conjunction and answer clinician's questions. Clinician can use any topic and they have to make the child

aware of the conjunctions what they have used to build the sentence. A score of 1 was awarded when participants could give correct answer.

***Section 2**:* Cognitive skills

2.1 Mnemonics

Mnemonics are artificial or contrived memory aids for organizing information that operate through the application of basic learning principles (eg association, organization, meaningfulness, attention), Harris, 1992. Mnemonics can employ acronyms, rhymes, verbal mediators, visual imagery etc. they are consciously learned and used, and the majority are language based.

The activities which come under this section are as follows:

Chunking

A set of words were given and the participants were asked to recall the items which were read to them. They were also asked to arrange the words according to functional categories and each set carried a score of 1.

2.2 Mind mapping

It is a visual based approach involving drawing of the picture, usually supplemented by words as an alternative to note taking or outlining (Margulies, 1991). It fosters retention and comprehension through the concurrent interplay of auditory, visual, somatic, and motor modalities. Use of visual and auditory input for better comprehension is central to academic success.

The activities which come under this section are as follows:

The client has to make drawing of what he has to do for eg: when they have to write

about the ‘things to do’ they were asked to make a list and convert it into a drawing and associate the drawing with the following context and make it meaningful. Each activity was awarded a score of 1.

Section 3*:* Metacognitive skills

3.1 *Self instruction*

It trains clients to formulate adaptive and self directing verbal cues before and during a task or a situation (Chermak & Musiek, 1997). Self instruction is particularly helpful in addressing academic difficulties including reading comprehension problems (Wong, 1993).

The activities which come under this section are as follows: Solving a math problem

While teaching, the clinician followed the steps in the given hierarchy.

1. The clinician performs the task while self- verbalizing aloud
2. The client performs the task while the clinician verbalizes
3. The client performs while self-instructing aloud
4. The client performs while whispering
5. The client performs while self-instructing covertly

Each step is awarded a score of 1.

3.2 Cognitive style and reasoning

Flexibility in reasoning and cognitive style is essential to meet the variety of processing demands and listening tasks we face (Chermak & Musiek, 1997). This is sepecially true for individual’s wth CAPD whose deficient auditory processes leave them less able to cope with degraded acoustic signals and imprecise and ambiguous messages. While the clients with CAPD are encouraged to take advantage of

information revealed through bottom up processing (eg phonemic distinctions), they must also be encouraged to employ top- down processing to read between the lines, recognize conceptual nuances, achieve auditory and grammatic closure (Chermak & Musiek,1997).

The activities which come under this section are as follows:

3.2.1 & 3.2.2 Few small stories and passages were given with relevant questions for the participants to give reasons. The participants were asked to give reasons for the questions after each story and have to summarize the story. The participants were instructed to read the passage and give reason and answer the following questions under each story and passage. Each correct answer to the questions was given a score of 1 mark.

Once the manual was developed, it was given for rating (for picture quality, picture and target word relevance, contents adequacy etc). The rating scale was given to 3 SLP's who has prior experience with learning disabilities. Based on the suggestions given by the raters changes have been incorporated in the resource manual.

Phase II: Administration of the resource manual.

A ten session treatment of 60 minute was planned and carried out for five children with LD with CAPD using the above prepared manual and pre and post test measures were done using "Descriptive Analysis of the Sequential Progression of English reading Skills (ERS) among Indian Children" (Loomba, 1995), and a pre post comparison of each subsection of the manual was done for these children.

Procedure

Before enrolling the subjects for therapy a Pre-therapy evaluation was done using ERS (Loomba. 1995). All the subjects were sent for audiological evaluation for CAPD evaluation and diagnosis. The subjects were given training on a daily basis for 10 sessions of 60 minute duration. In each of the sessions the 3 domains were, i.e. Metalinguistic skills, Metacognitive Skills and Cognitive skills were taken up. The progression from one activity to the next was done only after attaining 75% accuracy.

The Scores on all tasks of Test of Early Reading Skills by all participants before therapy (pre-therapy) are given below in the table:

Table: 3.2: *Pre therapy percentage score of all participants on ERS*

	Sub tests	Max score	P1	P2	P3	P4	P5
I.	Alphabetic test		pre	Pre	Pre	pre	Pre
	Identification level Upper case Lower case	 26 26	 100 96.15	 88.46 92.30	 100 100	 100 100	 100 100
	Recall level Upper case Lower case	 26 26	 84.61 100	 100 96.15	 100 100	 100 100	 100 100
11	Visual Discrimination Level I Level II	 16 17	 93.75 82.35	 100 82.35	 93.75 100	 93.75 82.35	 93.75 94.11
111	Auditory Discrimination	30	96.66	76.66	80	90	93.33

IV	PGC Test PART I A B PART II A B C D: long vowels :short vowels	 30 30 18 15 20 10 10	 96.66 76.66 66.66 33.33 70 100 90	 83.33 66.66 88.88 66.66 70 100 100	 100 100 94.44 60 70 40 50	 93.33 96.66 94.44 80 95 100 100	 96.66 96.66 94.44 86.66 85 70 100
V	Structural Analysis Test Level I Level II Level III	 10 27 10	 0 0 0	 0 0 0	 40 33.33 0	 0 0 0	 0 0 0
VI	Oral Reading	16	0	18.75	12.5	40.62	59.37

Given below in the table are the Audiological test results and CAPD test scores for all the participants involved in the study.

Table: 3.3: *Audiological test results*

Tests administered	P1	P2	P3	P4	P5
PTA Right ear: Left ear:	 11. 6 dB 13.3 dB	 10 dB 8.33 dB	 8.33 dB 10 dB	 10dB 10dB	 10 dB 10 dB
SRT Right ear: Left ear	 10 dB 15 dB	 10 dB 10 dB	 5 dB 10 dB	 15dB 10dB	 15 dB 15 dB
SIS Right ear: Left ear	 100 % 100 %	 100 % 100 %	 100 % 100 %	 100 % 100 %	 100 % 100 %
Immitance Right ear: Left ear	 A type A type	 A type A type	 A type A type	 As type As type	 A type A type
SPIN Right ear: Left ear	 60 % 68 %	 68 % 60 %	 64 % 60 %	 80 % 68 %	 78 % 60 %
DDT Right ear: Left ear: Double correct score	 17 20 0	 08 10 2	 16 14 3	 9 17 3	 16 12 2
DPT Right ear: Left ear:	 13.3 % 16.6 %	 20 % 16 %	 3.33 % 10 %	 63.3 % 26.6 %	 53.3 % 40 %
BMLD	Not done	Not done	500 Hz- 18 dB 1KHz- 11 dB	Not done	Not done

Before beginning each session a pre therapy measure of all the skills to be worked upon was obtained, and similar measures were also obtained post session on a daily basis.

Table: 3.4: *Pre therapy scores of resource manual.*

Skills	Sub sections	Sub skills	P1 Pre therapy	P2 Pre therapy	P3 Pre therapy	P4 Pre therapy	P5 Pre therapy
1. Metalinguistic skills	1.1. PA	1.1.1	44.44	39.68	34.92	77.77	68.25
		1.1.2	36.0	28.0	20.0	36.0	44.0
		1.1.3	40.0	33.33	40.0	46.66	60.0
		1.1.4	26.666	40.0	26.66	53.33	46.66
		1.1.5	70.0	55.0	60.0	70.0	75.0
	1.2. VB	1.2.1a	0.0	10.0	10.0	30.0	40.0
		1.2.1b	0.0	0.0	6.66	13.33	20.0
		1.2.2	13.33	20.0	13.33	20.0	26.66
		1.2.3	20.0	20.0	13.33	13.33	33.33
	1.3. Schema	1.3.1	13.33	26.66	6.66	20.0	20.0
		1.3.2	0.0	0.0	0.0	0.0	0.0
2. Cognitive skills	2.1 Mnemonics		0.0	10.0	0.0	20.0	40.0
	2.2 Mind Mapping		0.0	0.0	0.0	0.0	0.0
3. Metacognitive skills	3.1 Self Instruction		20.0	20.0	20.0	20.0	20.0
	3.2 Cohnitive Style and reasoning	3.2.1	13.33	26.66	13.33	26.66	20.0
		3.2.2	10.0	10.0	6.66	16.66	20.0

Note: P1 (Participant 1), P2 (participant 2), P3 (participant 3), P4 (Participant 4), P5 (Participant 5), PA (phonologic awareness), 1.1.1 (Identification of the sound heard in a given word) , 1.1.2 (Identification of the number of syllables in the words), 1.1.3 (Phoneme deletion activity), 1.1.4 (Blending of syllables activity), 1.1.5 (Fast/Slow game), VB (Vocabulary Building), 1.2.1a (Context derived vocabulary building, level 1), 1.2.1b (Context derived vocabulary building, level 2), 1.2.2 (Flexibility With Multiple Meaning Words), 1.2.3 (Find Out The Meaning), schema (Schema Induction And Discourse Cohesion Devices), 1.3.1 (Conjunction Activities), 1.3.2 (Identify and make the child produce the causal conjunction, temporal conjunction etc), 3.2 (Cognitive style and reasoning), 3.2.1 (Cognitive style and reasoning level 1), 3.2.2 (Cognitive style and reasoning level 2).

After ten sessions of therapy a post therapeutic assessment was carried out by administering ERS. A pre – post scoring was done for the subsection in manual as well. The obtained measures were subjected to statistical analysis and the results are discussed in the following section.

Phase III: Scoring and analysis

Pre therapy and Post Therapy scores for all the sub sections in the manual were obtained. The raw scores were converted into percentage scores. Pre therapy and Post therapy comparison after ten sessions were made for all the subsections of manual using Wilcoxon Signed Rank test to determine the significance. Same measure was done for pre- post comparison of ERS scores.

CHAPTER 4: Results

The present study primarily aimed to develop a resource manual for children with learning disability with CAPD based on the central resource training suggested by Chermak and Musiek (1997). The resource manual was applied on five children with LD with CAPD. A non-parametric test, Wilcoxon Signed Rank test was employed to compare the pre therapy and post-therapy scores of children with CAPD. For all the domains pre therapy and post therapy scores were obtained and raw scores were converted into percentage scores. The children with CAPD underwent ten sessions of therapy of 45 minutes session each. The skills that were worked on were metalinguistic skills, metacognitive skills and cognitive skills as part of top-down processing strategies suggested by Chermak and Musiek (1997). *Metalinguistic skills* included activities for phonologic awareness, vocabulary building and schema induction and discourse cohesion devices. *Cognitive skills* included activities for mnemonics and mind mapping. *Metacognitive skills* included activities for self instruction and cognitive style and reasoning.

The results of the present study are explained in the following sections.

4.1 Performance of children on the resource manual for CAPD

4.2 Comparison of performance on pre-post test of children on ERS

4.1 Performance of children on the resource manual for CAPD

Table 4.1 shows the overall performance in terms of mean and standard deviation (SD) scores for pre-therapy and post therapy performance of the children on resource manual for LD with CAPD.

Table 4.1: *Mean and SD of performance on the resource manual for pre post therapy comparison*

Domains	Pre-therapy		Post-therapy	
	Mean	S.D	Mean	S.D
Metalinguistic	36.44	9.49	84.16	7.02
Cognitive	11.66	13.94	66.66	17.67
Metacognitive	13.08	5.045	69.80	12.08

The analysis of overall scores revealed that the performance on the resource manual of all the children was better on post-therapy compared to pre-therapy for all the domains. An improvement in the performance was observed for metalinguistic skills from pre-therapy (Mean=36.44; SD=9.49) to post-therapy (Mean=84.16; SD= 7.02) performance. Wilcoxon signed rank test showed a statistical significant difference for pre- and post-therapy performance on metalinguistic skill (/z/= 2.023, $p< 0.05$). An improvement was also observed in the performance of all the children for cognitive skills from pre therapy (Mean= 11.66; SD= 13.94) to post therapy (Mean= 66.66, SD= 17.67). Wilcoxon signed rank test showed a statistical significant difference for pre- and post-therapy performance on cognitive skill (/z/=2.041, $p< 0.05$). An improvement was also observed in the performance of all the children for metacognitive skills from pre therapy (Mean= 13.08, SD= 5.04) to post therapy (Mean= 69.80; SD= 12.08). Wilcoxon signed rank test showed a statistical significant difference for pre- and post-therapy performance on metacognitive skill (/z/= 2.023, $p< 0.05$). However, when the pre therapy and post therapy mean percent scores difference were compared for performance of children across domains, it was found

that children showed better performance on metacognitive domain (pre= 13.08 and post= 69.80) than the other domains, followed by cognitive skills (pre= 11.66 and post= 66.66) and metalinguistic skills (pre= 36.44 and post= 84.16).

In order to find out which participant performed better on post therapy, a total score of each participant was calculated for both pre and post therapy. The scores were converted to percentage scores. Table 4.2 shows the total percentage score for the performance of each participant on pre therapy and post therapy comparison on the resource manual.

Table.4.2: *Total Pre Post therapy scores in percentage of all participants on resource manual*

	P1	P2	P3	P4	P5
	% score	% score	% score	% score	% score
Pre therapy	26.25	26.25	21.58	40.28	42.44
Post therapy	73.74	77.33	73.02	89.20	89.56

Analysis of results for comparison of performance during pre therapy for total scores across participants revealed that the performance of P3 (21.58%) was poorer than other participants followed by P1 (26.25%) and P2 (26.25%) followed by P4 (40.28%) and P5 (42.44%). All the participants showed improvement in the post therapy condition. However, the performance of P5 (89.56%) was better than P4 (89.20%) followed by P2 (77.33%) followed by P1 (73.74%) and less for P3 (73.02%). From the above table it is clear that P3 and P2 showed better improvement followed by P4, P5 and P1.

Analysis of performance of children for pre- post therapy comparison was done for each of the domain of resource manual. Table 4.3 shows the overall scores in percentage for the pre post comparison of performance on the resource manual.

Table 4.3: *Overall percent scores of resource manual*

Skills	P1		P2		P3		P4		P5	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Metalinguistic	32.22	77.25	30.80	82.93	26.54	77.72	47.39	91.46	49.28	91.46
Cognitive	0.0	50.0	8.33	66.66	0.0	50.0	16.66	75.0	33.33	91.66
Metacognitive	9.09	65.45	12.72	58.18	7.27	60.0	18.18	83.6	18.18	81.81

Analysis of the performance of children on the resource manual for each skill of the resource manual was done. Comparison of performance of children on metalinguistic skills for pre therapy- post therapy scores across participants revealed that the performance of P3 (26.54%) was poor on the pre therapy but all the participants showed improvement on post therapy scores. P2 (82.93%) showed better improvement followed by P3 (77.72%), P1 (77.25%), P4 (91.46%) and P5 (91.46%). On cognitive skills P1 and P3 performed poorly on pre therapy scores but showed improvement on post therapy. Participant P4 (75.0%) showed better scores, followed by P2 (66.66%) and P5 (91.66%), and showed similar improvement but lesser improvement by P1 (50.0%) and P3 (50.0%). On metacognitive skill P3 performed poorly on pre therapy condition but all participants scored better on post therapy

condition. Participant P4 (83.6%) had better scores followed by P5 (81.81%), P1 (65.45%), P3 (60.0%) and P2 (58.18%).

Analysis of the performance of children on the resource manual for each participant and for each sub skills for pre post therapy of the resource manual was obtained. Table 4.4 shows the pre-post therapy performance of children in percentage on each sub skills of the resource manual.

Table 4.4: *Pre –Post therapy percentage scores of each sub skill on resource manual*

Domains	Sub sections	Sub skills	P1		P2		P3		P4		P5	
			Pre	Post	Pre	Post	Pre	post	pre	Post	pre	post
1. Metalinguistic skills	1.1. PA	1.1.1	44.44	92.06	39.68	95.23	34.92	88.88	77.77	96.82	68.25	100
		1.1.2	36.0	76.0	28.0	80.0	20.0	76.0	36.0	88.0	44.0	92.0
		1.1.3	40.0	86.66	33.33	80.0	40.0	73.33	46.66	93.33	60.0	86.66
		1.1.4	26.66	93.33	40.0	86.66	26.66	80.0	53.33	93.33	46.66	100.0
		1.1.5	70.0	100.0	55.0	100.0	60.0	90.0	70.0	100.0	75.0	100.0
	1.2 VB	1.2.1a	0.0	70.0	10.0	80.0	10.0	90.0	30.0	100.0	40.0	90.0
		1.2.1b	0.0	40.0	0.0	66.66	6.66	60.0	13.33	80.0	20.0	86.66
		1.2.2	13.33	53.33	20.0	53.33	13.33	66.66	20.0	73.33	26.66	80.0
		1.2.3	20.0	53.33	20.0	66.66	13.33	60.0	13.33	86.66	33.33	73.33
	1.3 SCHEMA	1.3.1	13.33	53.33	26.66	80.0	6.66	66.66	20.0	93.33	20.0	80.0
		1.3.2	0.0	66.66	0.0	66.66	0.0	33.33	0.0	66.66	0.0	66.66
2. Cognitive skills	2.1 Mnemonics		0.0	40.0	10.0	70.0	0.0	60.0	20.0	80.0	40.0	90.0
	2.2 Mind Mapping		0.0	0.0	0.0	50.0	0.0	0.0	0.0	50.0	0.0	50.0
3.Metacognitive skills	3.1 Self Instruction		20.0	60.0	20.0	70.0	20.0	50.0	20.0	60.0	20.0	80.0
	3.2 Cognitive Style & Reasoning	3.2.1	13.33	73.33	26.66	73.33	13.33	66.66	26.66	93.33	20.0	86.66
		3.2.2	10.0	63.33	10.0	53.33	6.66	60.0	16.66	86.66	20.0	80.0

Note: P1(Participant 1), P2 (participant 2), P3 (participant 3), P4 (Participant 4), P5 (Participant 5), PA (phonologic awareness), 1.1.1 (Identification of the sound heard in a given word) , 1.1.2 (Identification of the number of syllables in the words), 1.1.3 (Phoneme deletion activity), 1.1.4 (Blending of syllables activity), 1.1.5 (Fast/Slow game), VB (Vocabulary Building), 1.2.1a (Context derived vocabulary building, level 1), 1.2.1b (Context derived vocabulary building, level 2), 1.2.2 (Flexibility With Multiple Meaning Words), 1.2.3 (Find Out The Meaning), schema (Schema Induction And Discourse Cohesion Devices), 1.3.1 (Conjunction Activities), 1.3.2 (Identify and make the child produce the causal conjunction, temporal conjunction etc), 3.2 (Cognitive style and reasoning), 3.2.1 (Cognitive style and reasoning level 1), 3.2.2 (Cognitive style and reasoning level 2).

Analysis of the performance of children on the resource manual for each participant and for each sub skills of the three domains for pre post therapy of the resource manual was done. The results of the pre post comparison of resource manual are described in detail for metalinguistic skill, cognitive and metacognitive skills.

Performance of children on metalinguistic skills

Under metalinguistic skills there were three sub skills which included phonological awareness, vocabulary development and schema induction and discourse cohesion device. Pre therapy and post therapy scores for each subskill were calculated and compared across participants. Table 4.4 shows pre –post therapy percentage scores of each sub skill on resource manual. Figure 4.1 shows performance of all participants on metalinguistic skills.

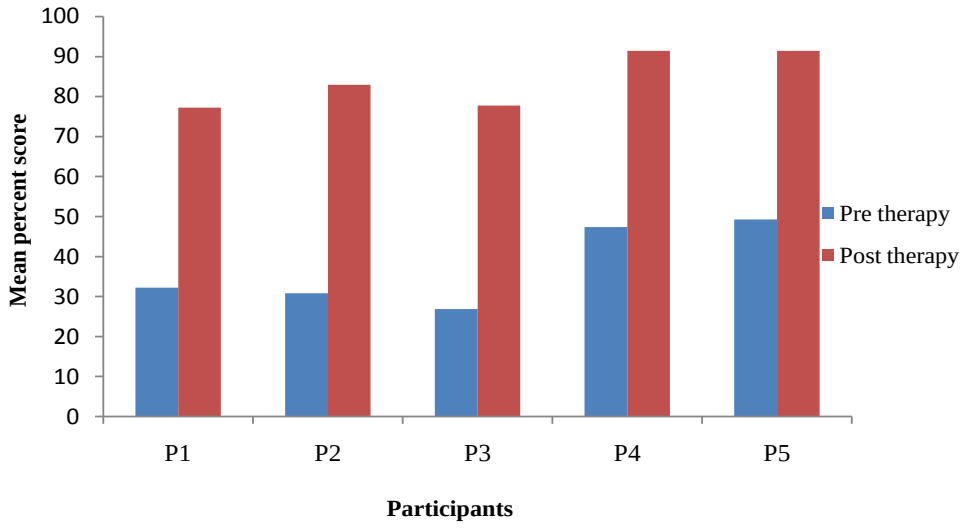

Figure 4.1: Performance of all participants on metalinguistic skills

All the participants showed poorer performance on pre therapy condition and showed improved scores on post- therapy for the metalinguistic skills domain. Figure 4.1 shows the improvement seen in all the participants on post therapy scores. Analysis of the performance of children on each sub section of the resource manual has shown improvement on the post therapy scores and was found to be statistically significant as per Wilcoxon signed rank test. A statistically significant improvement was noticed on all the subskills. The scores are described according to the subsections of each domain. On phonologic awareness, it was found that for pre therapy condition P3 showed poor performance (35.50%) followed by P2 (39.13%), followed by P1 (44.20%)) and P4 (63.04%) and P5 (61.59%) performed better when compared to other participants. All the participants showed improvement on post therapy condition. P5 showed better performance on post therapy (97.10%) followed by P4 (94.92%), followed by P2 (90.57%), followed by P1 (89.85%) and P3 (84.05%). The pre post therapy comparison of phonologic awareness showed statistically significant difference (/z/= 2.023,$p<0.05$). On vocabulary development, it was found that for pre therapy condition P1 showed poor performance (9.09%), followed by P3 (10.90%), followed by P2 (12.72%), and P5 (29.09%) and P4 (18.18%) performed better when compared to other participants. All the participants showed improvement on post therapy condition. P4 showed better performance on post therapy (83.63%) followed by P5 (81.81%), followed by P3 (67.27%), followed by P2 (65.45%) and P1 (52.72%). The pre post therapy comparison of vocabulary building showed statistically significant difference (/z/= 2.023,$p<0.05$). On schema induction and discourse cohesion device, it was found that for pre therapy condition P3 showed poor performance (5.55%), followed by P1 (11.11%), followed by

P4 (16.66%), and P5 (16.669%) and P2 (22.22%) performed better when compared to other participants. All the participants showed improvement on post therapy condition. P4 showed better performance on post therapy (88.88%), followed by P5 (77.77%) and P2 (77.77%), followed by P3 (61.11%), followed by P1 (55.55%). The pre post comparison of schema induction and discourse cohesion device showed statistically significant difference (/z/= 2.023, $p<0.05$).

Performance of children on cognitive skills

Under cognitive skills there were two sub skills which included Mnemonics and Mind mapping were used. Pre therapy and post therapy scores for each sub skill were calculated and compared across participants. Table 4.4 shows Pre –Post therapy percentage scores of each sub skill on the resource manual. Figure 4.2 shows performance of all the participants on cognitive skills across all participants.

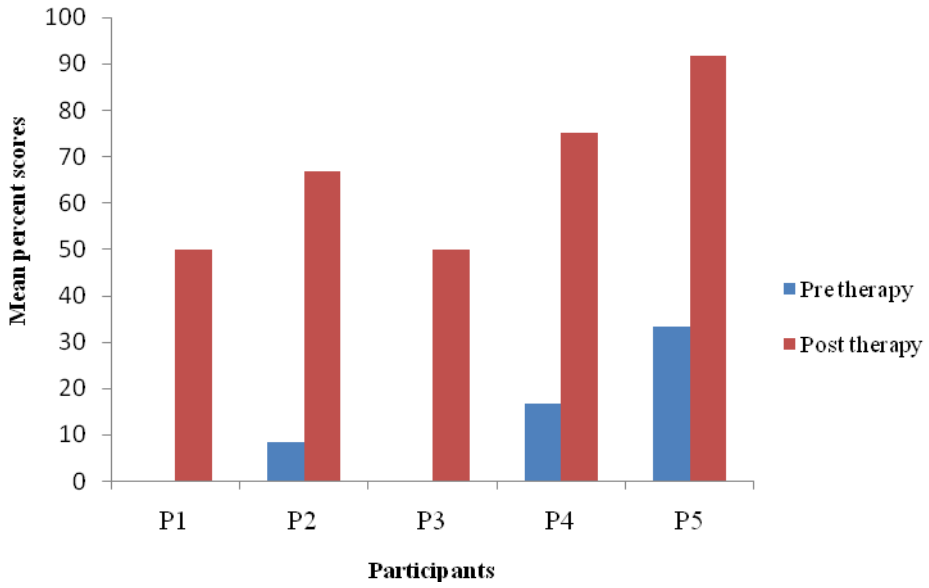

Figure 4.2: Performance of all participants on cognitive skills

All the participants showed poorer performance on pre therapy condition and showed improved scores after therapy for the cognitive skills domain. Figure 4.2 shows the improvement seen in all the participants on post therapy scores.

Analysis of performance of the children on each sub section of the resource manual showed improvement on post therapy and was found to be statistically significant as per Wilcoxon signed rank test. On mnemonics, it was found that for pre therapy condition P1 (0%) and P3 (0%) showed poor performance followed by P2 (10%), followed by P4 (20%) and P5 (40%) performed better when compared to other participants. All the participants showed improvement on the post therapy condition. P5 (90%) showed better performance on post therapy, followed by P4 (80%), followed by P2 (70%), followed by P3 (60%) and P1 (40%). The pre post therapy comparison of mnemonics showed statistically significant difference ($|z| = 2.060$, $p<0.05$) after therapy. But the mind mapping skill did not show any statistically significant changes. The post therapy scores showed similar pattern for mind mapping skill across participants.

Performance of children on metacognitive skills

Under metacognitive skills there were two sub skills which included self instruction and cognitive style and reasoning were used. Pre therapy and post therapy scores for each sub skill were calculated and compared across participants. Table 4.4 shows Pre –Post therapy percentage scores of each sub skill on resource manual. The Figure 4.3 shows Mean percent score of all participants on metacognitive skills.

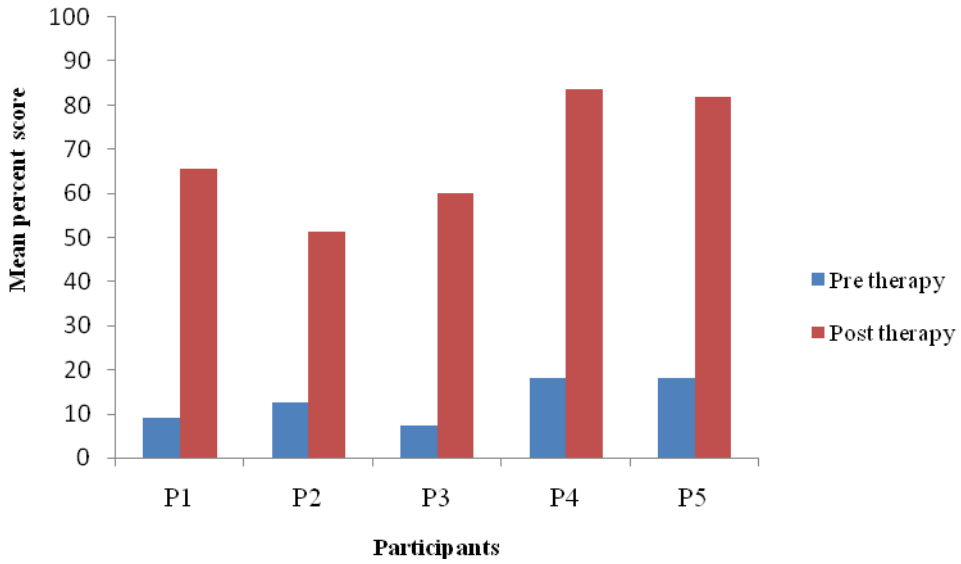

Figure 4.3: Performance of all participants on metacognitive skills

Analysis of performance of all the participants had poorer score in pre therapy condition and showed improved scores after therapy for the metacognitive skills domain. Figure 4.3 shows the improvement seen in all the participants on post therapy performance.

Analysis of performance of children on each sub section showed improvement on post therapy condition and was found to be statistically significant as per Wilcoxon signed rank test. On self instruction, it was found that for pre therapy condition all the participants scored (20%). All the participants showed improvement on post therapy condition. P5 (80%) showed better performance on post therapy followed by P2 (70%), followed by P1 (60%) and P4 (60%), followed by P3 (50%). The pre post therapy comparison of self instruction showed statistically significant difference (/z/= 2.041, $p<0.05$). On cognitive style and reasoning, it was found that for pre therapy condition P3

(8.88%) showed poor performance followed by P1 (11.11%), followed by P2 (15.55%) and P4 (20%) and P5 (20%) performed better when compared to other participants on pre therapy condition. All the participants showed improvement on post therapy condition. P4 (88.88%) showed better performance on post therapy followed by P5 (82.22%), followed by P1 (66.66%), followed by P3 (62.22%), followed by P2 (60%). The pre post therapy comparison of cognitive style and reasoning showed statistically significant difference (/z/= 2.023, $p<0.05$).

Analysis of performance of children on all the domains showed statistical significant improvement on post therapy except mind mapping of cognitive skills. The participants were able to perform better on post therapy sessions and the scores also showed statistically significant difference. But the participants did not reach maximum score in any of the skills worked during therapy.

4.2 Comparison of performance on pre-post test of children on ERS

In order to check whether there was any improvement seen on post therapy, all the children were assessed on "Descriptive Analysis of the Sequential Progression of English reading Skills (ERS) among Indian Children" (Loomba, 1995), as pre test and post test comparison with therapy. Analysis of results on the test revealed significant difference on few sub tests on pre post test comparison. The results are discussed under the following sections. Table 4.5 shows overall mean percent and standard deviation (SD) scores for performance of children on ERS (Loomba, 1995) on pre- post comparison.

Table 4.5: *Mean and SD of ERS on pre post comparison*

Domain	Pre		Post	
	Mean	S.D	Mean	S.D
Alphabet test	97.88	2.91	99.42	0.86
Visual discrimination	91.50	3.95	98.17	2.71
Auditory discrimination	87.00	8.37	95.33	6.50
PGC	84.65	7.75	92.02	3.85
Structural analysis test	5.53	12.36	10.20	10.78
Oral reading	26.24	23.65	52.49	12.77

Analysis of performance of children on ERS showed improvement on post test scores. The performance of children on the structural analysis test (Mean= 5.53, SD= 12.36) had the least scores in pre therapy condition followed by oral reading (Mean= 26.24, SD= 23.65). Performance of children on other sub tests was comparatively better in pre test condition, the pre test scores on alphabet test (Mean= 97.88, SD= 2.91) was better and followed by visual discrimination (Mean= 91.50, SD= 3.95), followed by auditory discrimination (Mean= 87.00, SD= 8.37) and PGC (Mean= 84.65, SD= 7.75). The post therapy scores showed improvement in all the sections (see table 4.5). Performance on alphabet subtest (Mean= 99.42, SD=0.86) was better followed by, visual discrimination (Mean=98.17, SD= 2.71), followed by auditory discrimination (Mean= 95.33, SD= 6.50), followed by PGC (Mean= 92.02, SD= 3.85), followed by structural analysis subtest (Mean=10.20, SD= 10.78) and oral reading (Mean= 52.49, SD= 12.77). However Wilcoxon signed rank test revealed a statistical significant difference on visual discrimination sub test (/z/=2.023,$p<0.05$), PGC sub test (/z/=2.023 $p<0.05$)and oral

reading sub test (/z/=2.032, $p<0.05$). There was no statistically significant difference found for alphabet sub test and structural analysis test.

In order to compare the performance of each participant on post therapy, a total score of each participant was calculated for both pre and post test. Table 4.6 shows total pre - post scores of all the participants on ERS.

Table 4.6: *Total pre- post score of participants on ERS*

Pre / post Test ERS	P1	P2	P3	P4	P5
	% score	% score	% score	% score	% score
Pre test	71.34	71.34	78.23	80.30	81.12
Post test	82.50	78.09	84.02	84.29	84.02

Analysis of performance of children revealed that, the performance of P1 (71.34%) and P2 (71.34%) was poorer than other participants followed by P3 (78.23%), P4 (80.30%) and P5 (81.12%) better in pre test condition. All the participants showed improvement in the post test condition. The post test performance of participants are as following P1 (82.50%), P2 (78.09%), P3 (84.02%), P4 (84.29%) and P5 (84.02%). From the above table 4.6 it is clear that P1 has shown better improvement when compared to other participants followed by P2, P3, P4 and P5.

Analysis of performance of children for pre post comparison was done for each of the sub test of ERS. Table 4.7 shows overall percent scores on the sub tests of ERS (Loomba, 1995)

Table 4.7: *Overall percent scores on subtests of ERS*

Domains	Participants									
	P1		P2		P3		P4		P5	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Alphabetic test	95.19	99.03	94.23	98.07	100.0	100.0	100.0	100.0	100.0	100.0
Visual discrimination	87.87	96.96	90.90	93.93	96.96	100.0	87.87	100.0	93.93	96.96
Auditory discrimination	96.66	100.0	76.66	86.66	80.0	90.0	90.0	100.0	93.33	100.0
PGC	76.69	92.48	78.94	86.46	81.95	90.22	93.98	96.24	91.72	94.73
Structural analysis test	0.0	12.76	0.0	0.0	27.65	27.65	0.0	6.38	0.0	4.255
Oral reading	0.0	34.375	18.75	59.37	12.5	50.0	40.62	50.0	59.37	68.75

Post test analysis of ERS was obtained for each participant for each skill on ERS. On alphabetic subtest of ERS for pre therapy it was found that P2 performed poorer than other participants. However on post test it was found that the performance of P1 (99.03%) was better than P2 (98.07%) and P3, P4 and P5 retained their 100% scores. On visual discrimination sub test the performance of P1 (87.87%) was poorer on pre therapy however on post therapy the performance of P4 (100%) showed better improvement when compared to pre therapy, followed by P1 (96.96%) and other participants P2 (93.93%), P3 (100%), P5 (96.96%) showed lesser improvement when compared with their pre therapy scores. The performance of participant P2 (76.66%) was poorer on

auditory discrimination on pre therapy and in post therapy condition participants P2 (86.66%), P3 (90%) and P4 (100%), followed by P5 (100.0%) and P1 (100%). On PGC sub test the performance of P1 (76.69%) was poorer than other participants on the pre therapy however on post therapy P1 (92.48%) showed more improvement followed by P3 (90.22%) followed by P2 (86.46%) but less improvement was seen for P4 (96.24%) and P5 (94.73%). On structural analysis test four of the participants (P1, P2, P4 and P5) performed poorly (0.0%) on the pre therapy condition. However the improvement noted was minimal in this section for all the participants and P1 showed better performance (12.76%) on post therapy followed by P4 (6.38%) followed by P5 (4.25%). Participants P2 are (0%) and P3 (27.65%) did not show any improvement and had same scores as on pre therapy. On oral reading, the performance of P1 (0%) was poorer but all the other participants showed improvement on post therapy condition. The performance of P2 (59.37%) was better followed by P3 (50.0%) followed by P1 (34.37%) with minimal improvement for P4 (50.0%) and P5 (68.75%).

Qualitative analysis of the performance of children on the resource manual

A qualitative analysis of the performance was done for all the participants. Analysis of performance on pre therapy condition showed that P1 had problems in phonologic awareness (e.g.: the child was unable to segment words into syllables such as ‘sunny’, ‘voyage’ etc. into its constituents could not identify /p/ sound in the medial position, blending error where P1 could not blend the target word /bʌ-n i/), reduced reading fluency and reading comprehension (was not able to answer to the questions related to critical and inferential reasoning asked in cognitive style and reasoning section). The participant was asked to follow segmentation strategy to improve

participant's spelling and reading skills. Analysis of performance on post therapy showed improvement on reading comprehension and was able to answer to many questions in story level (except question related to inferential reasoning such as 'what is the moral of the story?'), and phonologic awareness on the material which was used in the manual. P1 showed improvement on reading comprehension subtest of ERS also. Analysis of performance on pre therapy for P2 showed similar error patterns as P1 (showed problems in identifying /t/ sound, segmentation errors and tell the number of syllables, poor performance on phoneme deletion task etc. were seen), but P2 did not have word reversal error, the participant also showed poor performance on auditory discrimination. Analysis of performance on post therapy for the resource manual for P2 revealed improvement on phonologic awareness and reading comprehension of the passages used. Minimal improvement was seen on reading fluency. The participant P3 had problem with phonologic awareness (was seen in all the activities), and participant also had guessing of word and read word from rote memory, and showed poor reading fluency and reading comprehension. Analysis of performance on post therapy showed improvement on reading comprehension, phonological awareness. The word guessing errors were persisting. Participants P4 and P5 also had problems in phonologic awareness, but when compared to other participants it was less impaired, and showed better reading skills than the other participants. Analysis of performance on post therapy showed significant improvement on phonologic awareness and reading comprehension.

CHAPTER 5: Discussion

The present study incorporated metalinguistic skills, cognitive skills and metacognitive skills for the resource manual for children with LD with CAPD. Analysis of the results of the present study revealed that overall the results on the resource manual showed improvement on post therapy. This improvement was observed across all the three skills- metalinguistic skills, cognitive skills and metacognitive skills.

On metalinguistic skills sub skills such as phonologic awareness, vocabulary building and schema induction and discourse cohesion device were taken up for therapy. It was observed that all children showed improvement in their performance on post therapy. But the performance varied across participants. P3 showed poor performance on phonological awareness especially in the segmentation activity on pre therapy. For example P3 could not segment the word 'school' and give correct answer as '1 syllable'. But performance on post therapy after applying the strategies on phonologic awareness activities it was found that P3 performed better on post therapy. However the strategy transfer for phonologic awareness to reading fluency was not observed in P3. All the other participants (P2, P4, and P5) showed similar trend on phonologic awareness. These participants also performed poorly on segmentation task. But P1 showed comparatively better performance on segmentation and P1 showed poor performance on blending (e.g.: participant could not blend the item /pɛ-bə-l/) activity. All the participants showed better scores on the 'fast and slow' activity on pre therapy condition. All the participants performed better and reached the maximum score on this activity, except P3 who had slightly less score. The strategy transfer for phonologic awareness to reading fluency was seen in P5, P4 and P1. Inclusion of phonologic awareness in treatment of CWLD has

been emphasized by researchers since ages. Many studies concluded that phonological awareness training is beneficial for beginning readers starting as early as age 4 years (Bradley & Bryant, 1985; Byrne & Fielding-Barnsley, 1991). Effectiveness of phonemic awareness intervention in older children with dyslexia and specifically for bilingual children having English as their second language has been emphasized by the findings of Swanson et al., (2005), in their study on Spanish-English older bilingual children (7^{th} grade). In the present study all the children showed significant improvement in phonologic awareness. But except for the identification level and fast and slow activities none of the participant scored maximum score, may be the children need more therapy session to perform accurately. But the results are in agreement with the literature which says treating phonological awareness can lead to better reading skills.

In relation to this vocabulary building was found to show improvement on post therapy. P3 performed similarly for context derived vocabulary on passage level and sentence level. P3 showed accurate response to only one item ('construct') and rest of the items were made wrong in the pre therapy condition. However all the activities showed improvement on post therapy condition. Except P4 and P5 all the other subjects showed one or two accurate responses on the context derived vocabulary section. All participants experienced poor performance on multiple meaning word and find out the meaning section. However all the participants showed good improvement on the vocabulary building section. Previous studies done showed that children LD failed to use context as a medium to learn meaning of a new word through appropriate strategies. In a study Orlando et al., (1979) studied children with LD who studied in junior high and high school found that they failed to read ahead and use context as strategies for identifying

missing words in text. The most critical obstacles to vocabulary development for children with learning disabilities seem to be poor ability in the amount of independent reading, lack of strategies to learn words from context, and diffuse word knowledge (Stahl & Shiel, 1999). Because they have problem in learning vocabulary during independent reading, vocabulary and word learning skills seem to be essential components of training children with LD with CAPD. In the present study an improvement in the performance of children was observed on vocabulary building section when vocabulary in terms of context was taught through productive approaches such as teaching words from context, word parts (decomposing words to examine affixes and roots) or through semantic mapping. Vocabulary taught through productive approaches which include teaching students to learn words from context, word parts or semantic mapping has been found to be effective in children (Baumann & Kame'enui, 1991). Learning through context derived vocabulary has been found to show its application in listening comprehension and reading comprehension in children. This has been found to be of particular relevance in the present study when children learned to use the context derived vocabulary to answer questions especially related to analytical and critical reasoning on cognitive style and reasoning subsection. The present study used context derived vocabulary to attain reading comprehension. Another sub skill chosen in metalinguistic skills was schema induction and discourse cohesion device. On this section none of the participants scored more than five correct answers on pre therapy. On observation it was found that all the conjunctions which were common and familiar (e.g.: and, but, because) were scored correctly on pre therapy condition. This could be due to the inability of children with LD with CAPD to use formal schemata like (and, then, because) in their language or by far and large due to

their lack of awareness of spatial, temporal and causal relationships. French and Nelson (1985) concluded in a study that children as young as two to three years demonstrate the use of formal schemata (e.g. and, then, because) in their language as they develop awareness of spatial, temporal, and causal relationships. This awareness seems to be lacking in these children who were from 8-14 years of age in the present study. Participants like P4 and P5 scored better on other conjunctions as well on post therapy condition. P1 and P3 did not score for unfamiliar conjunctions like (therefore, even though, unless etc). However overall there was an improvement noticed in the section. On the second activity i.e. to identify the causal conjunction from the participants own utterance, none of the participants could identify the causal conjunction. On post therapy all the participants identified the causal conjunction 'because' which is comparatively simple. Participant P1 could identify only one conjunction on the post therapy.

On cognitive skills, sub skills such as mnemonics and mind mapping were taken up for therapy. It was observed that all the participants showed significant improvement in the performance on mnemonics n post therapy. It was found that the participants P1 and P3 showed poor performance on pre therapy and could not recall one item of the activity. Participant P5 recalled four item of the manual on pre therapy with two to three repetitions. P5 was able to recall the first four of the list which were five words item. Performance of all the participants was better on post therapy, and P5 could score maximum on the section. The participants P1 and P3 could recall the small word set on post therapy. But for all the participants the key word (which helps to recall the list based on the functional category) was given by the clinician. None of the participants could make the key word from the list given even after providing cues. Literature also talks

about the usage of different activities like chunking (i.e., grouping individual items into superordinate, functional or perceptually salient categories), mnemonics, and verbal chaining strategies (i.e., constructing meaningful sentences or stories from individual items) to improve memory (Wilson & Moffat, 1984). According to Swanson (1999) and Forness, Kavale, Blum, and Lloyd (1997), the use of mnemonic strategies have helped students with learning disabilities significantly improve their academic achievement. According to Levine (1993), mnemonic instruction is useful for students across a wide age range. A well researched and validated area for students with high incidence disabilities, particularly students with learning disabilities is mnemonic instruction, as well as for general education students in elementary and middle school (DLD/DR Current Practice Alerts). Two recent studies on using mnemonics for social studies instruction showed that not only on test improvement among all students but also marked improvement among students with learning disabilities (Mastropieri, Sweda, & Scruggs, 2000; Uberti, Scruggs, & Mastropieri, 2003). In the present study the activity selected for mnemonics had a list of names which the participants had to recall based on their semantic relations. Once these children were taught the semantic relation they were able to recall better. One observation seen in the present study was that, the participants could recall the words based on the semantic relations but could not give a semantic relation by themselves. But studies also say that students who may benefit from the use of mnemonic instruction may not be able to construct their own mnemonics effectively. One study by Hwang and Levin (2002) found that the students had difficulty using mnemonic strategies independently; that is, they were unable to effectively apply them and create mnemonics on their own.

On mind mapping all the participants performed poorly on pre therapy and did not show any significant improvement when compared to the pre therapy. Participant P3 scored zero even on post therapy condition. Other participants performed in a same way, all of them could score for the item one (which was to make a mind map of things to do) on post therapy. it helps the students in academics for note taking and it needs the combined input of auditory and visual modality. Children with CAPD already have a compromised auditory function, so integrating both auditory and visual i.e. listening and writing or drawing, needs division of attention and may lead to confusion (Chermak & Musiek, 1997). For the activity used here summation of these skills are required and this skill may require more training to show some improvement. In the present study only ten sessions was given and may be this was insufficient to show some improvement. And probably the mind mapping skills need more cognitive capacities than others because in this activity the children should first organize what they need to add, then make it into drawings and then read it. Such cognitive abilities need more training to show significant improvement. Mind mapping training was done using software in some studies showed improvement. But in the present study no software was used.

On metacognitive skill sub skills such as self instruction and cognitive style and reasoning were taken up. It was observed that all the children showed improvement on post therapy condition. On self instruction sub skill, the participants were asked to perform the activities using a five step instruction given by Meichenbaum and Goodman (1971). All the participants performed poorly on the pre therapy condition, the score what they have obtained is for the first step (The clinician performs the task while self-verbalizing aloud), which does not require the participation of the participants. None of

the participants were able to follow the other steps. But with progression of therapy all the participants made improvement, fourth step being the maximum they could perform and was performed by P5. Participant P3 performed poorly when compared to other participants. On observation it was found that all the participants' required repeated instruction to follow the steps and the post therapy testing was carried out immediately after the tenth therapy session. So probably that could be a reason for the improvement in the scores. The self instruction skill has been widely studied on mathematical abilities of children. Schunk and Cox (1986) studied the effects of self-instruction on learning-disabled (LD) children's mathematics skills. Their findings revealed that continuous self-verbalization aids math performance and produces higher self-efficacy in LD children than discontinuous or no self-verbalizations. A study done by Steve and Karen (1989) investigated the viability of self-instructional strategy training among learning disabled (LD) students exhibiting composition deficiencies on 22 LD subjects and 11 normally achieving students in the 5th and 6th grades. And the results of the study indicated that meaningful and lasting effects on subject's composition skills and a significantly heightened sense of self-efficacy was seen after self-instructional strategy training.

On cognitive style and reasoning there were two levels, a story level and a phrase level. All the participants performed better on the story level on pre therapy condition when compared to the phrase level. The same was seen on post therapy condition as well. Participant P4 performed better on story level and phrase level when compared to other participants. P5 also performed similarly. All the participants were able to perform better on story level. P3 showed less performance on phrase level. The questions that the participants had to answer included four types of reasoning (analytical, literal, critical and

inferential reasoning). An observation made from the qualitative results of the study (from the story level) is that none of the participants were able to answer the question "moral of the story" on all the three stories. This shows that the ability to infer and give answer to a question has not shown much progress. Participants showed improvement on analytical reasoning and literal reasoning.

In the present study it was observed that the participants showed poor expressive language deficits, including semantics and syntax. They also showed difficulty with whole language concepts. They showed difficulty comprehending information of increasing linguistic complexity. These children showed writing difficulties especially using grammar while writing. They also showed difficulty with reading comprehension. Some children had problems with multiple meanings or synonyms on the resource manual. It was found that training through metalinguistic and cognitive strategies benefitted these children as they showed better performance on post-therapy. The improvement was also observed on reading comprehension which could be attributed to the improved performance on metalinguistic skills, cognitive and metacognitive skills, not just any one skill. In order to understand a text we need to understand the meaning of individual words and how they are connected and what can we understand from that text, once the individual is able to do this we can say that the person can comprehend the written text. Studies have reported that increased vocabulary knowledge can lead to better comprehension. One remediation technique which can be used to improve vocabulary building is context derived vocabulary. Context clarifies word meaning and motivates children to learn the association between a word and its meaning (Miller & Gildea, 1987). Given the robust correlation between vocabulary and reading comprehension, focus on

deducing word meaning from context should enhance both listening and reading comprehension (Wiig, Semel, & Crouse, 1973). Vocabulary should be taught through productive approaches that optimize word learning (Snow, 2002) for example, rather than focusing on a set of targeted words, instruction might focus on one word with multiple semantic connections to other words (Stahl & Shiel). Productive approaches might include teaching students strategies to learn words from context, word parts (e.g., decomposing words to examine affixes and roots), or semantic mapping (Baumann & Kame'enui, 1991).

Top-down factors in auditory processing or concept driven factors can have deleterious effect on the individual's ability to process and ultimately comprehend spoken language. Important ones among these factors include attention, memory, cognition and language. The findings of the present study indicated that working on children with LD with CAPD require top-down strategies of processing especially involving cognitive language resource training of metalinguistic, cognitive and metacognitive strategies.

Summary and Conclusion

The aim of the present study was to develop a resource manual for LD with CAPD using the Central Resource Training given by Chermak and Musiek (1997). Another goal of the study was to administer this developed resource manual on clinical population. Most of the children with LD exhibit CAPD. The present study was conducted in three phases with the first phase involving the preparation of the resource manual. The domains and the sub-sections included in the manual were taken up based on the central resource training given by Chermak and Musiek (1997). The resource manual thus prepared consisted of three skills which included metalinguistic skills, cognitive skills and metacognitive skills. The activities for each sub skill within these skills were designed. In the second phase of the study, the field testing of the resource manual was done on five children with learning disability with CAPD. They were enrolled for a treatment of ten sessions, each of 60 minute duration. Pre therapy scores were obtained in the first session for all the skills worked upon. A post therapy score was also obtained in the same sub-skills at the end of 10^{th} sessions. The third phase of the study included the scoring and analysis of the obtained data. Wilcoxon signed rank test was done for a pre-therapy and post-therapy comparison of performance of children on the resource manual.

The results of the study showed an improvement across all the participants and the trend was similar for all the participants. The post-therapy scores of all participants showed improvement in all the domains worked upon in comparison to their pre therapy scores. However on mind mapping, a sub section of cognitive skills, statistical analysis (Wilcoxon Signed Rank Test) failed to show any significant difference in the post

therapy score of all participants across the task. However qualitative analysis revealed an improvement in scores in some of the participants (P2, P4 and P5) following therapy which is indicative of the treatment being beneficial to some extent. The pre and post test comparison using ERS also showed improvement on few sub tests (visual discrimination, auditory discrimination, PGC and oral reading). More number of sessions is required to make significant changes in the performance of pre post test on ERS. Though the domains which were included in the resource manual have shown improvement with training in the present study along with these skills maintenance and generalization need to be established which could have indicated whether the techniques were effective or not. However, the present study did not evaluate on the generalization of these techniques. Future studies are warranted to evaluate generalization of these techniques and their effectiveness to treatment of LD with CAPD.

Implications of the study

The resource manual for children with LD with CAPD was developed, incorporating all the three domains of central resource training given by Chermak and Musiek (1995) which are very important for a child with CAPD. Most of the children with learning disability have shown problems in auditory processing of information. This would serve as an important tool for the clinicians in clinical setting when working with children with learning disability with CAPD. The sensitivity of the present manual needs to be tested across many subjects.

Limitations of the study

In the present study the field testing was done only on a small population (five) having LD with CAPD. However, for testing the sensitivity of the current resource manual, testing on a larger population is essential. This will serve the purpose of evidence based practice in Speech-Language Pathology and Audiology for effective use of the resource manual amongst the clinicians for children with LD with CAPD.

The present study developed a resource manual for children with LD with CAPD, but generalization could not be addressed during the therapy program. Hence, future studies are warranted to evaluate generalization of these techniques and their effectiveness to treatment of selected clinical population.

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Appendix 1

A RESOURCE MANUAL FOR LEARNING DISABILITY WITH CAPD

I. ACTIVITIES FOR METALINGUISTIC RESOURCES

1.1 Phonologic awareness

1.1.1 Identify the sound heard in a given word

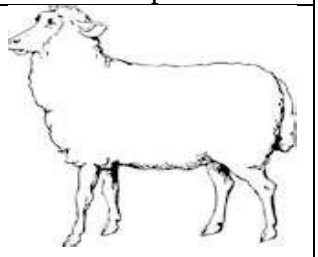
Instructions: The clinician will have to follow the instructions below.

The clinician should say a sound. The clinician should also show few pictures and name the pictures for the child. The clinician should instruct the child to point at the picture of the word which has the sound that the clinician said." Few sounds are given in the manual and the clinician can use the same activity with other sounds as well. Score 1 for the correct response.

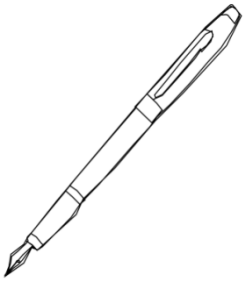
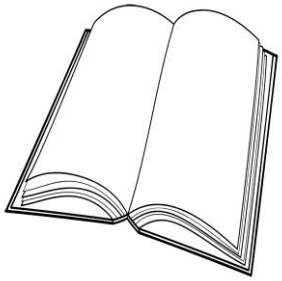
Trial

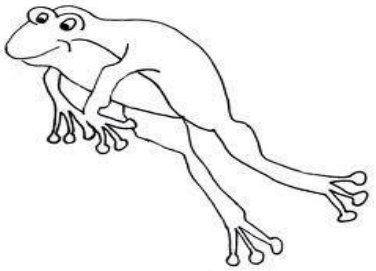
Phoneme /ʃ /. The clinician will read out the words and show the pictures and ask the client to point to the word or picture which has sound /ʃ **/.** The client should listen carefully while doing the task and once he is able to point at 'shoe' and 'sheep' the clinician can start with the activity sound list.

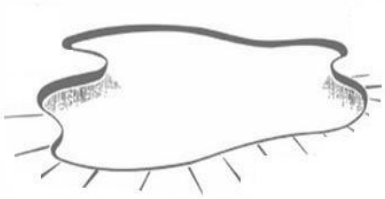
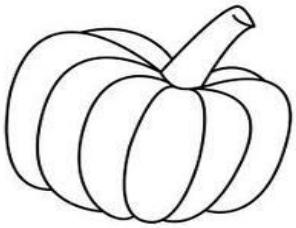
Words: shoe, sheep, baby

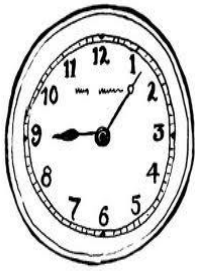
1. Shoe	2. Baby	3. Sheep
		

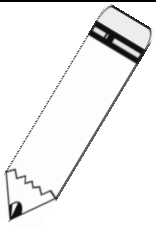
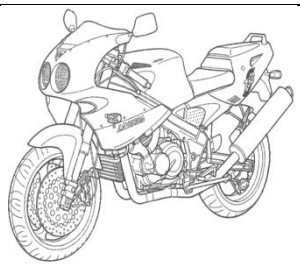
/p/

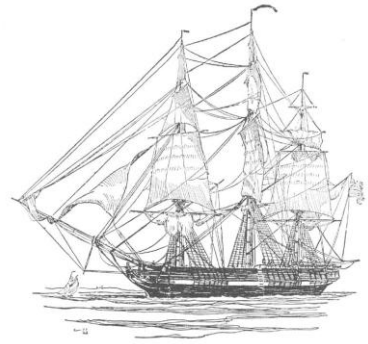
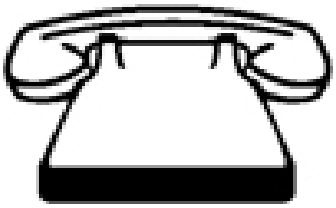
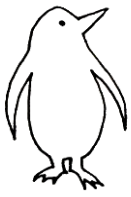
4. Pen	5. Book	6. Cot
		

7. Hop	8. Run	9. Stand
		

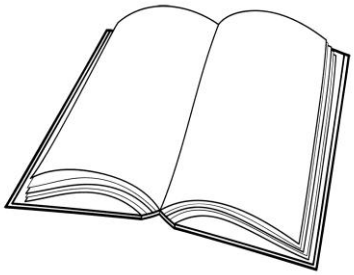
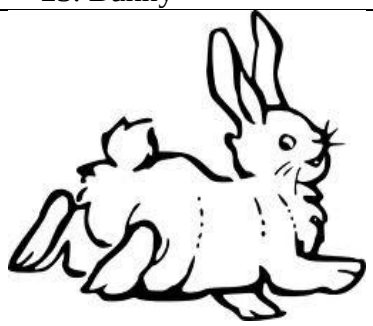
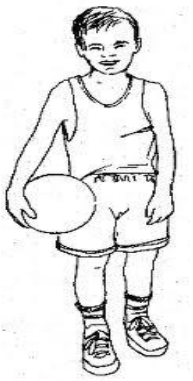
10. Pond	11. Pumpkin	12. Table
		

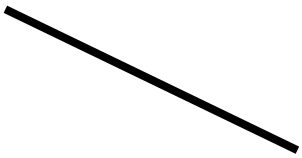
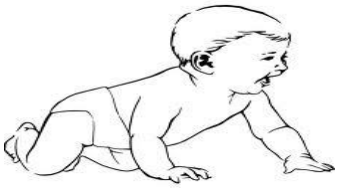
13. Sleep	14. Kitten	15. Clock
		

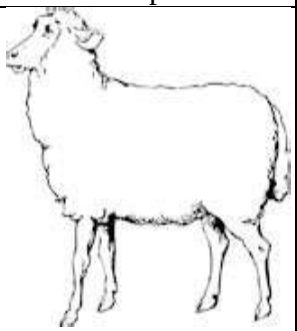
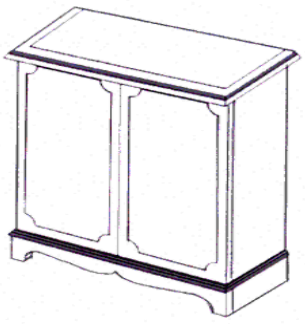
16. Cub	17. Pencil	18. Bike
		

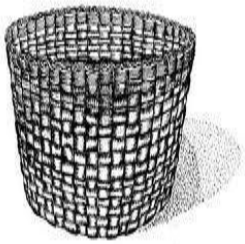
19. Ship	20. Telephone	21. Penguin
		

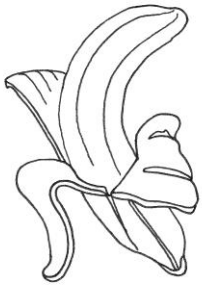
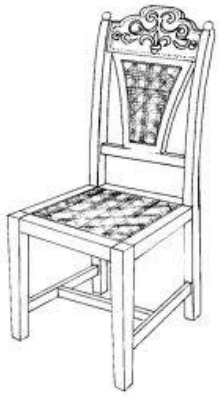
/b/

22. Book	23. Bunny	24. Stand
		

25. Line	26. Clip	27. Baby
		

28. Ambulance	29. Sheep	30. Cupboard
		

31. Pen	32. Basket	33. Cub
		

34. Banana	35. Boots	36. Chair
		

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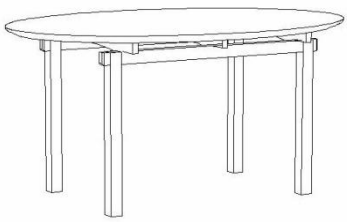
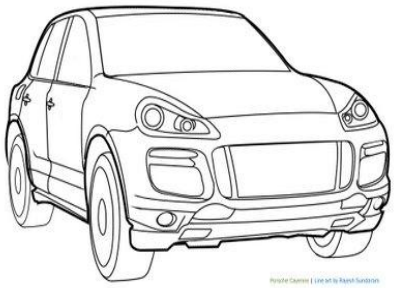
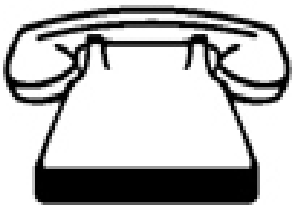
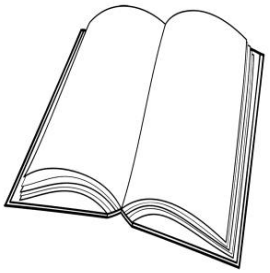
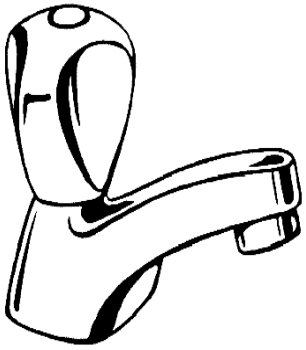
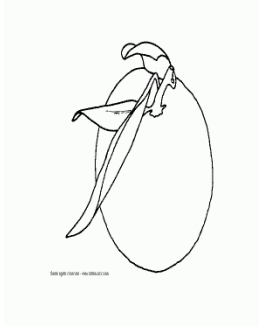
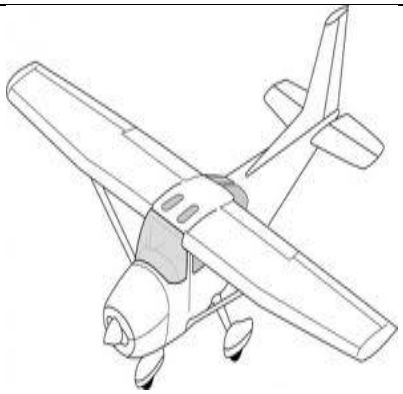
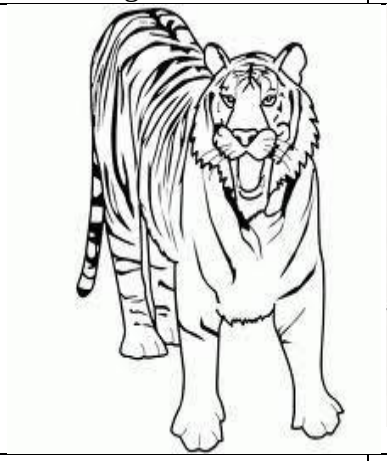
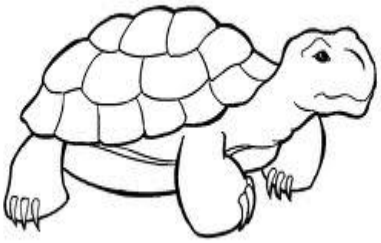
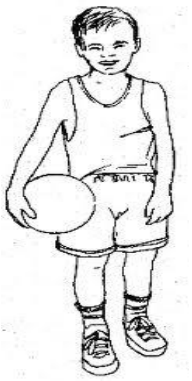
37. Table	38. King	39. Tree
		

40. Car	41. Telephone	42. Book
		

43. Tap	44. Orange	45. Boat
		

46. Plane	47. Tiger	48. Boots
		

49. Cot	50. Tortoise	51. Stand
	 	

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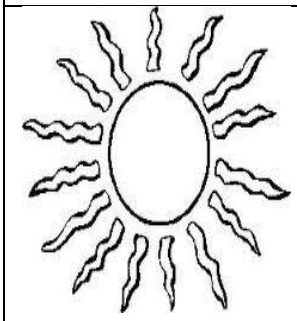
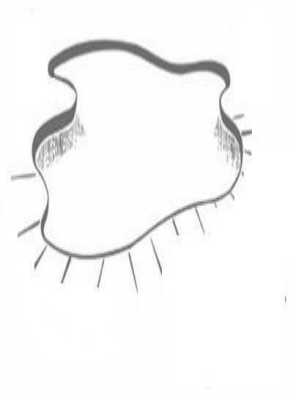
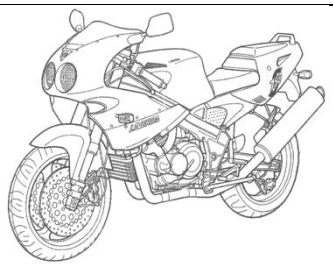
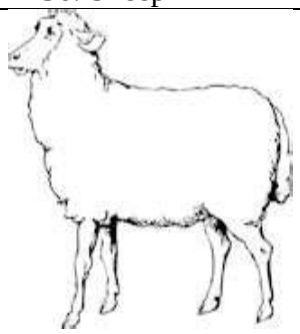
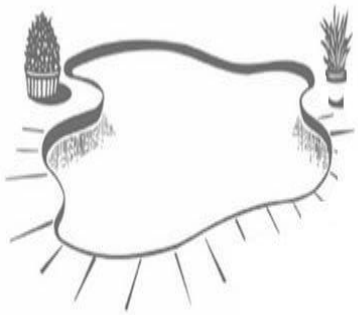
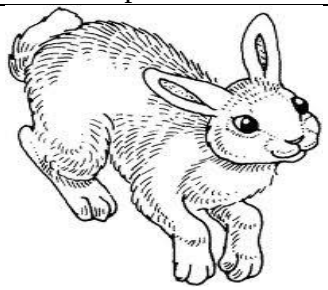
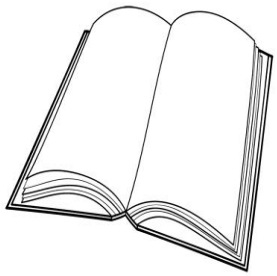
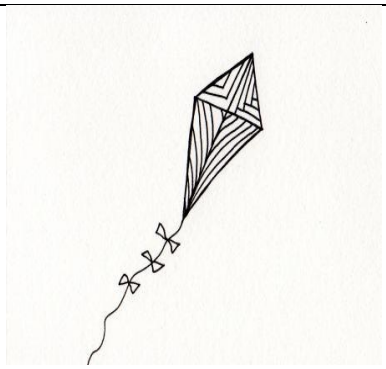
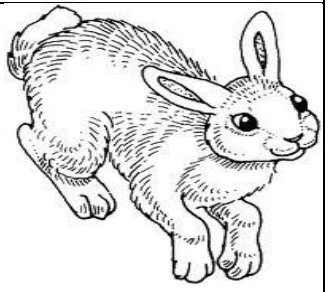
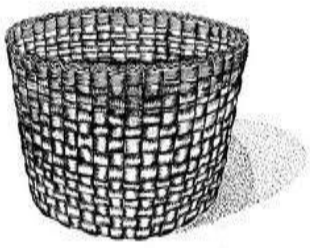
52. Sun	53. Pond	54. Bike
		

55. Cub	56. Sheep	57. Gift
		

58. Lake	59. Hop	60. Book
		

61. Bull	62. Kite	63. Rabbit
		

64. Basket	65. Orange	66. King
		

Total score: --------

1.1.2 Segmentation activities: Identify the no: of syllables in the following words

Instruction: The clinician has to say the word loud and the client should count the number of syllables in each word. Initially you can use the trial word and make him understand how to do it.

Trial: ask the child to listen carefully. Clinician will say the word and client has to count the number of syllables in the word. The trial word is 'table' and the number of syllables will be 2 syllables. Score 1 for each correct response.

Test Stimuli	**IPA**	**Target response**
1. Plough	/plaːΩu/	1
2. School	/Sk^{h} uːl/	1
3. Clubbed	/klΛbd/	1
4. Shine	/ʃaIn/	1
5. Horse	/hoːrs/	1
6. Building	/bIl-dIŋ/	2
7. Sunny	/sΛ-nI/	2
8. Voyage	/voː-jɛʤ/	2
9. Revenge	/rI-venʤ/	2
10. Gangster	/gæŋg-stər/	2
11. Cloudy	/klau-di/	2
12. Singer	/sIŋ-gər/	2
13. Mustard	/mΛs-tərd/	2
14. Vivid	/vI-vId/	2
15. Mayer	/meː-jΛr/	2
16. Ruby	/ruː-bi/	2
17. Shooter	/ʃuː-tΛr/	2

18. Seashore	/sI-ʃo:r/	2
19. Spinster	/spin-stər/	2
20. Funny	/fʌ-ni/	2
21. Sentence	/sen-t^{h}ens/	2
22. Corporate	/K^{h}o-pə-re:t/	3
23. Minister	/mI-nI-stər/	3
24. President	/prɛ-sI-dɛnt/	3
25. Buttermilk	/bʌ-Tʌ-milk/	3

Total score: ----------

1.1.3 Phoneme deletion activity:

Instruction: Clinician will say a word and client is asked to listen to the word and later clinician will delete a phoneme from the word and client has to say what will be the word after deletion. The phoneme in bold and italics has to be deleted. Score 1 for each correct response. Clinician can use their own words which are required for individual clients following the same step.

Trial:

Cup- /k/ sound is deleted and now what will be the word? Clinician should make the child say ‘up’. Once the child can say few words correctly you can start with the following words.

Sl no:	Test stimuli	Deleted sound	Correct response
1	***S***chool	/s/	/ko:l/
2	***M***oon	/m/	/U:n/
3	See***m***s	/m/	/si:s/
4	***P***layed	/p/	/lajd/
5	***L***ater	/l/	/aetər/
6	S***k***in	/k/	/sin/
7	Crie***d***	/d/	/krai/

8	***H***orse	/h/	/aus/
9	Mi***n***e	/n/	/mai/
10	S**w**eet	/w/	/sI:t/
11	Co**l**d	/l/	/co:d/
12	Festi**v**al	/v/	/fəstiəl/
13	Si**s**ter	/s/	/sitər/
14	P**r**ayer	/r/	/pəjar/
15	T**r**ees	/r/	/ti:s/

Total score: ----------

1.1.4 Blending of syllables activity:

Instruction: the clinician should say the syllables as given and the child is asked to join the syllables and say it as a word. Score 1 for each correct response. Once the child is able to do these words clinician can include more complicated words and do the activity.

Trial: the word is '/va-ki-ŋ/ and clinician will say it as syllables and client is taught to combine the syllable and say it as a word. So once the child can say the trial word correctly you can start with the activity.

Sl. No.	**Test stimuli (in IPA)**	**Target response**
1.	/pɛ-b ə-l/	/pɛb əl/ (Pebble)
2.	/bʌ-n i/	/bʌn i/ (bunny)
3.	/b-ʊk/	/bʊk/ (book)
4.	/brʌ-ð ər/	/brʌð ər/ (brother)
5.	/paɪ-næ-p əl/	/paɪnæ-p əl/(pineapple)
6.	/sɪ-s- tər/	/sɪs tər/(sister)
7.	/pɛ-n- s-əl/	/pɛn s-əl/ (pencil)
8.	/bɪ-s- kɪt/	/bɪs kɪt/(biscuit)
9.	/kɪ-l o-græm/	/kɪl ogræm/(kilogram)
10.	/gʌ-v ərn- mənt/	/gʌv ərn mənt/ (government)
11.	/ʃʌ-f əl/	/ʃʌf əl/(shuffle)
12.	/pɪ-k əl/	/pɪk əl/ (pickle)
13.	/bɒ-ð ər/	/bɒð ər/(bother)
14.	/ʃɛ-l- tər/	/ʃɛl tər/(shelter)
15.	/maɪ- tə-kɒn- dr-ia/	/maɪ təkɒn dria/(mitochondria)

Total score: ----------

1.1.5 Fast/Slow game:

Instruction: Clinician should Say a word in fast and slow way and tell the child that this is the *fast way* to say the word, and give an example of the *slow way.* Score 1 for each correct response.

Trial:

Clinician: Football (*fast way)* and f-oo-t-b-a-ll (slow way). Give the child another word eg. *Bed* and ask if they can say it in the *slow way* (b-e-d). You can also use words depending upon child's language level. Some examples for this exercise are given below.

Sl.No	Test stimuli	Sl.No	Test stimuli
1.	Tiger	11.	Meaning
2.	Little	12.	Motivate
3.	Copper	13.	Torture
4.	Label	14.	Pillar
5.	Singer	15.	Passion
6.	Drunk	16.	Sculpture
7.	Shiver	17.	Tribal
8.	Classes	18.	Sugar
9.	Trees	19.	Shutter
10.	Kingdom	20.	Construction

Total score: ----------

1. 2 Vocabulary building

1.2.1 Context derived vocabulary building:

Instruction: The client will be given some words in a phrase or sentence context. The client is asked to find out the meaning of the word in italics by using the contextual cues. The clinician can help the child by providing cues and once he is able to say an approximate meaning clinician can provide the actual meaning and make the child read

once again. Score 1 for each correct response. The activity is given in 2 levels (phrase and sentence). Start with phrase level and move on to sentence level.

Trial: word is ‘nature’.

The boy who is the topper is very smart. His *nature* is very good. He helps all with their work. Because of this *nature* everybody loves him.

1.2.1a Passages/phrase level:

1. Anticipate:

   There are many people who will *anticipate* problems and try to avoid taking risks. Another group of people *anticipate* what could lead to problems and solve it early and live happily.
2. Construct:

   The government is planning to *construct* a multi-specialty hospital in the city. The people who are going to *construct* the hospital have submitted the blue-print and the hospital will be constructed soon.
3. Pedestrian:

   The *pedestrians* should walk on the side of the roads and should not walk on the roads. If the *pedestrians* walk on the road then it can lead to accidents. There is a traffic sign for the *pedestrians* to cross the road; they should cross the road only when the signal is shown.
4. Conquer:

   Ancient times the kings used to *conquer* their neighboring countries to increase their wealth. The kings who *conquer* more number of countries were considered the strongest during that time. Now most of the countries are democratic the number of *conquers* are very less and is almost nil.
5. Besides:

   Besides Maria, all my classmates had come for the birthday party. *Besides* the food they all enjoyed the party.
6. Rehabilitation:

There is a *rehabilitation* centre near to my house. Lot of kids goes there for various therapies and even old aged people go there when they can't walk and talk.

7. Startles:

   My niece was sleeping peacefully and the loud road drilling sound made her *startle*. At times the T.V sound will also *startles* her. She will not get up from her sleep even though she *startles*.

8. Abstract:

   When Leena was a child she couldn't understand most of the things what elders said, because most of those were *abstract*. Now being in college she is able to understand what others say even if it is *abstract*.

9. Indelible:

   The influence of a great teacher in my school has been *indelible*. All my school memories are *indelible*. I miss my school because of my great teachers and friends.

10. Neglect:

    Most of the people who do not succeed in life *neglect* the mistakes what they make but people who succeed in life never *neglect* their tiny mistakes. We should not *neglect* our mistakes because finding out the mistakes can help us to correct it and later we can succeed in life.

1.2.1b Sentence level:

Sl. No:	Test stimuli sentences
1.	Even though he was young he could *comprehend* what his mother said.
2.	The driver *averted* an accident by turning his car sharply to the left.
3.	The life of Mahatma Gandhi is always *inspiring*.
4.	The girl who dressed beautifully got *compliments* from her friends.
5.	*Expectation* from others hurt when you are not able to live up to their demands.
6.	The Supreme Court is the highest *authority* for law.
7.	The dates for exam are announced but they say that it is *tentative.*

8.	The reason for her anger was so *obvious* because they didn't wish her for birthday.
9.	The builder wanted to *demolish* the old house.
10.	The police *intruded* into the party and spoilt the fun of party.
11.	The Japanese company *collaborated* with the Indian company for the production of a car.
12.	The old man was lying on the roadside in a *pathetic* condition.
13.	They could *persuade* the teacher to get good marks.
14.	There are so many *refugees* in India from other countries.
15.	The grand procession *fascinated* the children

. **Total score: ----------**

1.2.2 Flexibility with multiple meaning words:

Instruction: The client should be informed that the choice words will sound alike but it has different meanings (homophones). The client is asked to fill up the blank with the appropriate word. If the client is not able to do it by himself the clinician should provide the meaning of the two words given and then ask the child to fill up the blank. Correct response should be given a score of 1.

Sl. No:	**Sentences and the choice**	**Answer key**
1.	Prasad ---------- his son to go out. (Allowed, Aloud).	Allowed
2.	She ------- food and went to school (ate, eight).	Ate
3.	They --------- using mobile phone in the campus. (band, banned)	Banned
4.	Grandma went to temple with -------- foot (bare, bear).	Bare
5.	The -------- place of Jesus is Nazareth. (Berth, birth).	Birth
6.	She was -------- and went for a movie. (Board, bored).	Bored

7.	The bike didn't have -------- (brake, break).	Brake
8.	--------- Breakfast is very good for health. (Cereal, serial).	Cereal
9.	She was asked to --------- her bag. (check, cheque)	Check
10.	She was offered a --------- after the dinner. (desert, dessert)	Dessert
11.	They were once my ------- and near ones. (dear, deer)	Dear
12.	The girl had a ------- reason to quit the job. (Fair, fare).	Fair
13.	The eye colour is in our --------- (genes, jeans).	Genes
14.	When I entered the room there was a ------- smell. (Foul, fowl).	Foul
15.	His house in the 4th --------. (lain, lane)	Lane

Total score: ----------

1.2.3 *Find out the meaning*

Instruction: The client should be informed that the words in italics will have different meanings even though it has same spelling (Homographs). The client is asked to read and say the meaning of the sentence first and the client is asked to say the other meaning of the same word. If the client is not able to do it by himself then the clinician should provide the meaning of the two words given and then ask the child interpret the meaning. Correct response should be given a score of 1. The child has to say the meaning of the sentence and the word in italics.

Sl. No	Sentence with the target word
1.	He said that he is ***close*** to Sindhu.
2.	The ***show*** was held in an auditorium.
3.	He ***left*** the place as soon as his uncle came.
4.	The lady was tired and she just wanted to ***lie*** down somewhere.
5.	He used the ***nail*** to hang the picture on the wall.
6.	The girl who lost the ***watch*** is my cousin.

7.	He always talked about the ***current*** issues in Politics.
8.	Both of them had the same ***marks*** on the arm.
9.	The conclusions what the officer made him ***lead*** nowhere.
10.	The girl who made the ***minute*** things in the class is a genius.
11.	The problem with Joe was that he could never live in ***present***.
12.	Our class leader could never ***project*** his voice.
13.	The girl wished to ***tear*** her marks card because she failed.
14.	His speech was ***abstract*** and most of us could not make out anything.
15.	He could never ***address*** the pubic after he was arrested.

Total score: ----------

1.3 Schema induction and discourse cohesion devices

1.3.1 Conjunction activities:

Instruction: the client is asked to join with appropriate conjunctions. Each correct response will get a score of 1.

Sentence	**Answer key**	**Target sentence**
1. The exams were graded. Scores were posted.	(after/ and)	The exams were graded and the scores were posted. After the exams were graded the scores were posted.
2. He did study for exam. He failed.	(but)	He did study for the exam but he failed.
3. Joe went. Got the goggles.	(and)	Joe went and got the goggles.
4. I will come. You will come	(if)	I will come, if you come.
5. The dog barked. The boy dropped his ice cream.	(and)	The dog barked and the boy dropped his ice cream
6. Raju took his umbrella. It was raining.	(because)	Raju took his umbrella because it was raining.
7. The man was thirsty. He drank water.	(so)	The man was thirsty so he drank the water.
8. I have to attend a family function. I will not go to school.	(as)	As I have to attend a family function I will not go to school.
9. He has committed a crime. He must be punished	(therefore)	He has committed a crime therefore he has to be punished.
10. John was weak. He was fat.	(although)	John was weak although he was

		fat.
11. It was hot. She was wearing a sweater.	(even though)	Even though it was hot she was wearing a sweater.
12. He said he will talk. He is the best	(as though)	He said he will talk as though he is the best.
13. You finish your work. You cannot sleep.	(unless)	Unless you finish your work you cannot sleep.
14. Do it. It is possible	(whenever)	Do it whenever it is possible.
15. He should attend class. Going for a movie.	(rather than)	He should attend classes rather than going for a movie.

Total score: ----------

1.3.2 Identify and make the child produce the causal conjunction, temporal conjunction etc

Instructions: The clinician will have to audio record the child's sample and play back to them and ask them to listen to their speech and identify the conjunction and explain it to them. Clinician can use any topic and they have to make the child aware of the conjunctions what they have used to build the sentence.

Illustration: (audio or video record the session)

Clinician: It was raining yesterday. Your school was cancelled. Why do you think your school was cancelled?

Client: because it was flooded. And if roads were full of water, it can cause accidents.

Clinician: so tell me which words tells you 'why' your school was cancelled.

So the client has to listen and identify the causal conjunctions like because, if. If he is not able to come up with the response clinician can provide cues and help the child to identify the causal conjunctions.

Activities: ask the following questions and elicit response from the client.

1. How did you reach AIISH and why?
2. Who all are your friends and why do you like them?
3. Getting up early in the morning is always good. What is your opinion?

II. ACTIVITIES FOR COGNITIVE RESOURCES

2.1 Mnemonics

Chunking:

Instruction: The clients are asked to repeat the words in the set. Clinician should provide the key words which can aid in recalling the word list. A score of 1 can be given if client can recall all the words in a set. Arrange the words according to functional categories and ask the child to recall:

Sl. No	Word list	Key words
1.	Baby, toy, mango, monkey, sleep.	Baby, monkey
2.	Table, mother, clock, father, desk.	Table, family
3.	Window, church, curtain, temple, door	Room, religion
4.	Chalk, purple, duster, green, teacher.	School, colour
5.	Circle, tree, square, forest, triangle.	Forest, shapes
6.	Burger, paste, cheese, brush, fish, water, soap.	Food, morning
7.	Mysore, pencil, palace, eraser, zoo, book, paper.	Mysore, school items
8.	Cactus, apple, hand, camel, head, desert, banana, stomach.	Desert, body, fruits
9.	Traffic, crime, car, victim, witness, lawyer, block, court.	Traffic, court
10.	Rain, storm, umbrella, sunny, clouds, hot, thirsty, wet, blanket, flood.	Climates

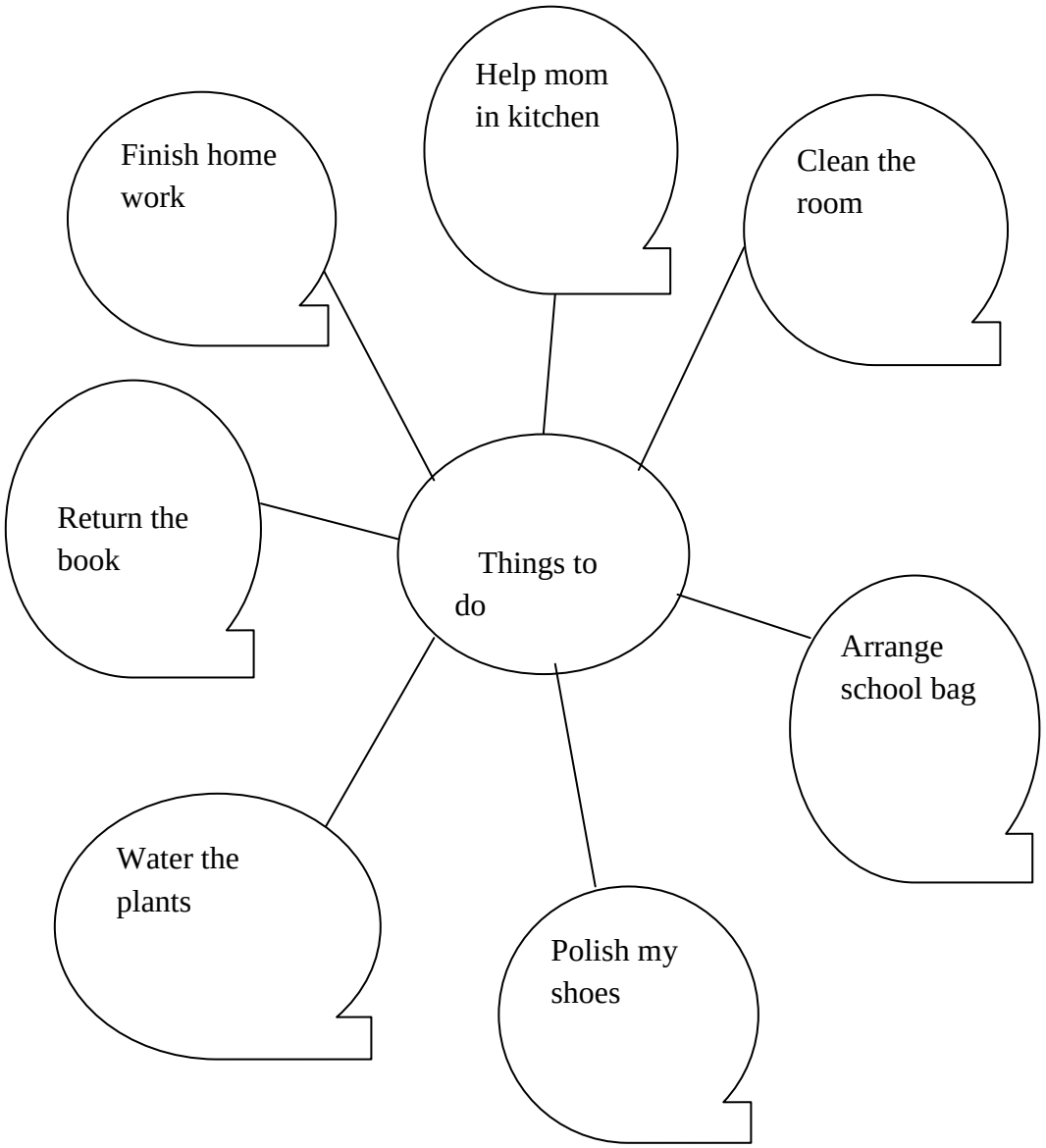
2.2 Mind mapping

The client has to make drawing and associate with the following context and make it meaningful.

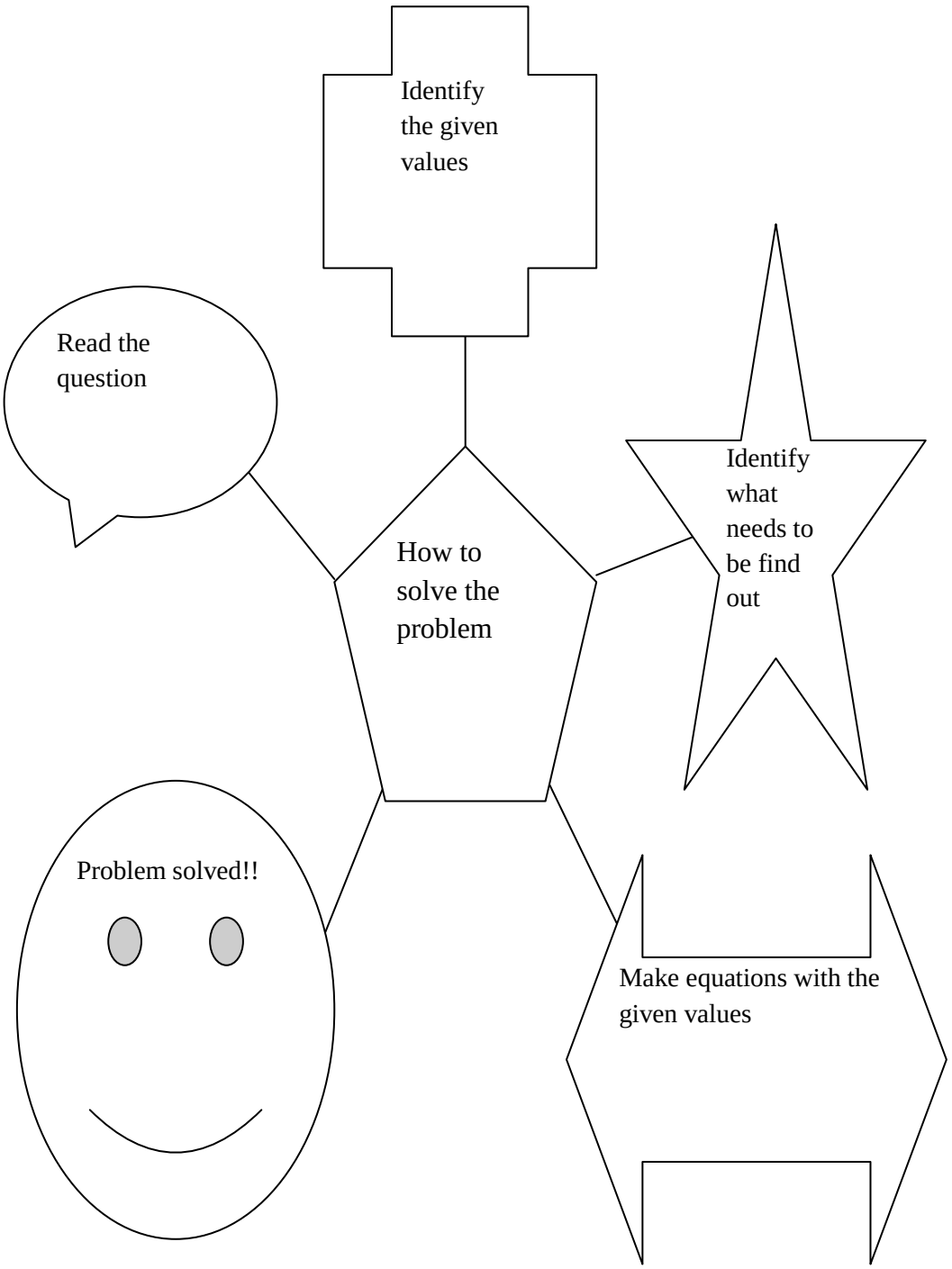
For eg: if he wants to remember the “Things to do” for his next day he can make a chart like this and it will help him/her to remember all the items without forgetting any one.

1. Things to do
2. How to solve a math problem?

1. Things to do



2. How to solve a math problem?



III. ACTIVITIES FOR METACOGNITIVE RESOURCES:

3.1 Self instruction:

Clinician can use any activity depending upon child's level. But while teaching the following steps should be included and should be in the hierarchy.

1. The clinician performs the task while self- verbalizing aloud
2. The client performs the task while the clinician verbalizes
3. The client performs while self-instructing aloud
4. The client performs while whispering
5. The client performs while self-instructing covertly

Activities:

1. Solving a math problem
2. Solving a puzzle

3.2 Cognitive style and reasoning:

The child will be asked to give reasons for the following questions after each story and have to summarize the story.

Instruction: The client has to read the passage and give reason and answers the following questions under each story and passage. Each question will carry 1 mark.

3.2.1: Level 1 (story level)

1. There lived a mother cat and her kitten on the attic of an old house of a farmer in a village. The farmer and his wife go for work early in the morning and come by evening. The kitten is very naughty and he never listens to the mother cat. The cat never allows the kitten to go out alone. She always made sure that the kitten was safe inside while she goes to get food in the morning. One day she forgot to close the lid of the box and the naughty kitten jumped out from the box and went behind the cat. The cat didn't notice this. While following his mother he saw a big round plate in the court yard. He was surprised to see such a big plate. He moved towards the plate and saw what is in it. In a fraction of second he fell down into

the well. It was summer season so the kitten could sit on a rock and it was scared. It started crying loudly but for a long time but nobody came to that side. After long time the cat came in search of the kitten and hears the whine of the kitten and saw the kitten in the well. The cat started crying and a person from the house came out and saw it. He rescued the kitten and the mother started licking the kitten. Since then the kitten never disobeyed its mother.

Questions:

1. Give a suitable title for this story?
2. What is the moral of the story?
3. How would have the man rescued the kitten?
4. Why didn't the cat drown in the well?
5. Why didn't anyone hear the kitten's cry?

2. There was a little boy named Roshan. On his first birthday, his parents gifted him a soft cuddly brown teddy bear. The little baby boy carried his teddy bear with him everywhere he went, even while sleeping boy kept it in his crib. He took it everywhere he went, to the zoo, the parks, and even to school. Roshan became a teenager was more interested in video games, and going out with his friends. Still he used to sleep with his teddy bear every night. Roshan started camping with his friends. The teddy bear missed his friend a lot on those days. Roshan graduated and his visits were too short and he spent most of his time visiting with his old friends, neighbors, and family. He would go to bed late at night, and often forgot to put the bear in bed anymore. The bear was so sad and missed the nice old days when he got to sleep every night next to Roshan in his bed. He married few years later and had a kid and they often brought him over to his grandparents' house. One day Roshan remembered his favorite teddy bear and thought that his own little baby would love to have it. He ran to his old room, went straight to the shelf and grabbed his old friend the teddy bear. The bear was thrilled that his old friend had come to visit him, but could not imagine the nice surprise that awaited him. When Roshan gave his old bear to his baby boy to play with, the baby was so

happy and he did exactly what Roshan used to do. The teddy bear was so happy. Now he had a new family that loved him. His old friend and his new family loved him just as much as they possibly could.

Questions:

1. What could be the moral of the story?
2. Suggest an appropriate title for the story.
3. Why was teddy bear sad while Roshan went for camping?
4. Did Roshan hate his teddy any time?
5. Will the teddy's happiness stay forever?

3. There was an ant that lived under a big banyan tree in a forest. Usually ants stay in a big colony of ants, but poor thing he stayed all alone. He used to stay with his parents but recently they died. Since then he was alone. He had never seen any other ant and hence he thought that he is the last one in his species. One day he got bored of staying alone and decided to go out to find some good friends. On the way he met various kinds of animals, birds, reptiles, and he was amazed to see all that. He asked all of them to be his friends. But everyone laughed at him and went back to their work and some even tried to harm him. He was very depressed and started sobbing, after some time he said to himself "I will find at least a friend" and started walking. After some time he slept off. When he woke up he was surprised to see many little faces like his in front of him. He got up and sat and looked at everyone and said "so I am not the only one left in our species" and all the other elder ants started laughing. Since then he was not alone and became an important member in that colony.

Questions:

1. What is the moral of this story?
2. Give an appropriate title for this story and why?
3. Why was the ant sobbing?
4. What did he become at the end?
5. Why was the ant staying alone?

Questions	Answer key
Story 1	
1. Give a suitable title for this story and why?	The naughty kitten. Because the story is about a kitten who did not obey its mother and entered into trouble.
2. What is the moral of the story?	Should always obey your parents.
3. How would have the man rescued the kitten?	Since the kitten is in the well he would have put a bucket and rope near the kitten and the kitten would have jumped to the bucket and he pulled it up.
4. Why didn't the kitten drown in the well?	Because it was summer time and water level in well will be very low.
5. Why didn't anyone hear the kitten's cry?	Because the farmer and his wife went for job and come back by evening and even the cat went to get food.
Story 2	
1. What could be the moral of the story?	You should never be sad for your misfortunes; if you wait patiently happiness will come back to you.
2. Suggest an appropriate title for the story and why?	Roshan and the teddy bear. Because the story is about Roshan and his teddy bear and in this they have talked about their life.
3. Why was teddy bear sad while Roshan went for camping?	Because when he is camps he stayed out and the teddy had to sleep all alone.
4. Did Roshan hate his teddy any time?	No. he didn't, but he was busy in life and forgotten his teddy.
5. Will the teddy's happiness stay forever?	No. because the baby will also grow up and will do like Roshan.
Story 3	
1. What is the moral of this story?	You should not lose hope in life to achieve something.
2. Give an appropriate title for this story and why?	A hunt for friends. Because the story talks about an ant's search for new friends.
3. Why was the ant sobbing?	Because other insects laughed at him and tried to hurt him.
4. What did he become at the end?	Very important member of the colony.
5. Why was the ant staying alone?	Because his parents died.

3.2.2: Level 2 (phrase level)

Read the following paragraphs and reason out and answer the questions asked.

1. Maria listened to some of her Spanish tapes while she waited at the gate. "These could come in handy soon", she thought as she boarded her flight.

a) Where Maria might be going?
b) How she might get there?

2. Sarah waited nervously. She knew the nurse would call her next. She looked at the models of healthy teeth. She hoped her own teeth would be healthy.

a) Where could Sarah be?
b) Why is she worried?

3. There was a grasshopper and an ant. During summer the ant worked hard all day long. She was very tired, but was happy at the end of the day. The ant knew she would have food and warm home during the winter. The grasshopper didn't do any work at all. Instead he was singing songs all day.

a) What will happen to grasshopper when winter comes?
b) Why did ant do hard work in summer?

4. Raj hoped to get another letter from his friend Prasad. Raj met Prasad at a hockey tournament in Canada. Prasad promised to send Raj pictures of his friends. It is fun to have a friend from another country. Raj wondered what Prasad did in the summer. Did he play street hockey too? Raj hoped to see his friend again next season.

a) Are the boys of same age?
b) Where does Raj probably live?
c) What word tells you that Raj had gotten other letters from Prasad?
d) Where do you think Raj and Prasad might see each other again?
e) If Raj doesn't get a letter from Prasad, he will probably feel-------

5. Even though Laila lives in a village in Karnataka and Fatima lives in the city of Bangalore, they see each other often. Their moms are sisters. Last summer vacation Fatima visited Laila in her village. They had a wonderful vacation together. Fatima helped Laila in gardening. They planted the flowers in new pots. Fatima was very tired at night, but still she couldn't get good sleep.

a) Who is Laila to Fatima?
b) What could be their age?
c) Why didn't Fatima get good sleep?

6. James stood on the high- dive and looked down to the pool nervously and said to himself. "You wanted to learn how to dive", he told himself sternly. Just jump in. James thought he had never been so scared in his life. But he took a deep breath and jumped in.

a) What kind of person is James?
b) Why was he nervous?
c) What did he do for the first time?

7. Rooney's tail was wagging so hard that his entire body wagged back and forth. He jumped up and tried to lick chandu's face, almost knocking him down. "Well, how are you Rooney" said chandu, laughing. "I guess you missed me". It was a long academic year, wasn't it? I am glad to be home again. Give me a minute I'll unpack my bag and then take you for a long walk.

a) Who all are the characters described here?
b) Why was Rooney very happy?
c) Why both of them didn't see for long time?

8. In every state in the USA, it is a law that children must attend school until a certain age. Unless you attend school, your parents could be taken to court. The law allows that "school" can mean being taught at home by your parents or going to a private school .

a) Does the law say that education is up to the child's decision?
b) Why are parents taken to court?
c) What can happen if parents don't provide schooling for children?

9. Susan and Johny filled the tub with water. Johny got the soap and a brush. Susan went to look for Jake. Jake was nowhere to be found. The only thing Susan found was Jake's empty leash.

a) How is Susan and johny related?
b) Describe what they were trying to do?
c) Who is Jake?
d) Why did Jake disappear?

10. Lisa carefully examined the bug sitting on the leaf. She noticed that it had six legs and a hard shell. Lisa had never seen a bug like this before. She grabbed her magnifying glass and camera.

a) Why did she grab the bug?
b) Is Lisa scared of bugs?
c) What is Lisa's nature?

Questions	Answer key
Passage 1.	
a) Where Maria might be going?	Somewhere Spanish is spoken and used because she listens to the tape and says it will be of use soon.
b) How she might get there?	Probably by flight
Passage 2.	
a) Where could sarah be?	She could be in a dental clinic because there were models of teeth and nurses are also seen in clinics.
b) Why is she worried?	She was worried about her teeth, maybe she had a cavity.
Passage 3.	
a) What will happen to grasshopper when winter comes?	During winter season there won't be any crops and hence no food for the grasshopper. So he may die out of hunger.
b) Why did ant do hard work in summer?	Because in summer there is lot of food available and in winter season no food will

	be available and it will be cold. So if you collect food then you don't have to go out in cold.
Passage 4.	
a) Are the boys of same age?	Probably yes, because they have similar interest.
b) Where does Raj probably live?	Probably in USA, because Canada is a near country.
c) What word tells you that Raj had gotten other letters from Prasad?	"hoped to get *another* letter"
d) Where do you think Raj and Prasd might see each other again?	Next hockey tournament season.
e) If Raj doesn't get a letter from Prasad, he will probably feel------	Bad, because he wanted a friend from another country.
Passage 5.	
a) Who is Laila to Fatima?	She is cousin to Fatima.
b) What could be their age?	Must be of same age because they like to be together while playing.
c) Why didn't Fatima get good sleep?	Fatima would not be familiar with the village life, there may be noises in the night which she may not be familiar.
Passage 6.	
a) What kind of person is James?	James is very determined and courageous person, because even though he got scared of the heights, he still jumped because he wanted to learn the sill.
b) Why was he nervous?	Because of the height.
c) What did he do for the first time?	He tried diving for the first time.
Passage 7.	
a) Who all are the characters described here?	Rooney must be a dog, because dogs usually wag their tail when they see their masters and chandu is a college boy who stays at hostel, because he says that it was a long academic year and he wants to unpack.
b) Why was Rooney very happy?	Because he met his friend after a long time and probably no one would have taken him out for walk like Chandu used to do.

c) Why both of them didn't see for long time?	Because Chandu stays far from home and comes only during vacation times.
Passage 8.	
a) Does the law say that education is up to the child's decision?	No. the law says it is must to educate the children for certain period.
b) Why are parents taken to court?	Because if they are not educated the children will not be of very good to the society.
c) What can happen if parents don't provide schooling for children?	The parents will be taken to court and will be punished.
Passage 9.	
a) How is Susan and johny related?	They could be siblings, and of young age.
b) Describe what they were trying to do?	They were trying to bathe Jake, their dog.
c) Why did Jake disappear?	Generally the dogs don't like bathing, and this wouldn't have been his first time. So he knew what will happen next and escaped from his leash.
d) Who is Jake?	Jake must be their pet dog, because the children were trying to bathe him and he escaped from the leash.
Passage 10.	
a) Why did she grab the bug?	To take a photograph because she had a camera in her hand when she took the bug.
b) Is Lisa scared of bugs?	No. if she was scared then she wouldn't have grabbed it and would have screamed.
c) What is Lisa's nature?	She is very bold and not scared of anything, and very curious person because she wanted to know which bug was that.