VERBAL WORKING MEMORY AND DISCOURSE LEVEL LISTENING COMPREHENSION IN CHILDREN WITH LEARNING DISABILITY

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ALL INDIA INSTITUTE OF SPEECH AND HEARING

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April, 2018

Certificate

This is to certify that this dissertation entitled "**Verbal working memory and discourse level listening comprehension in children with Learning Disability**" is a bonafide work in part fulfillment for the Degree of Master of Science (Speech-Language Pathology) of the student (Registration No. 16SLP003). 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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This dissertation entitled **"Verbal working memory and discourse level listening comprehension in children with Learning Disability"** is the result of my own study under the guidance of Dr. Jayashree C. Shanbal, Reader in Language Pathology, HOD, Department of Speech-Language Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier in any other University for the award of any Diploma or Degree.

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April, 2018

Dedicated to

GOD** and my **FAMILY

WHEN DOUBTS FILLED MY MIND

YOUR PRESENCE GAVE ME HOPE

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CHAPTER 1: Introduction

Language is a special human property, which helps in communication and to create societal interactions. According to Elliot (1999) language development occurs as a result of interaction with the sensory systems and motor systems. But in the course of development many children face some problems either as delay in speaking, or problems related to clarity etc. Listening, speaking, reading and writing are considered as the four most important language skills, of which listening is always interrelated with the other three skills. Learning to listen improves language ability. Berninger (2000) reported that listening, speaking, reading, and writing development has overlapping phases in childhood.

Listening is considered as a pre requisite for language learning. Listening is a process which is different from hearing in terms of selection, organization and interpretation of ideas. But for listening, hearing is very important. Listening starts when the sound waves are carried to ear, travelled through outer, middle and inner ear structures, then via auditory nerve to brain. Then the brain processes the message which is heard, tries to relate it to the previous knowledge and recall facts and tries to interpret it. Listening also requires evaluation, acceptance or rejection, internalization and appreciation of the ideas (Varghese, 2000). The processes of listening include receiving, interpreting, recalling, evaluating and responding (Jones, 2016). In the process of receiving, he/ she must take in the stimuli through the senses, which primarily happen through auditory mode (Jones, 2016). During the stage of interpretation, information will be combined and an individual attempts to make meaning out of that information.

According to American Speech - Language and Hearing Association, listening skills in children develop sequentially through different ages. By the end of kindergarten,

children will be able to follow small conversations, age appropriate stories and 1 -2 step simple commands. By first grade children will follow more 2-3 step sequential commands and remember information. By second grade children can follow 3-4 directions presented sequentially, they start understanding direction words such as location, space and time words. By this age children will be able to answer questions regarding the grade level stories presented. Children of third grade will be able to listen in group situations attentively and understand grade level material. By fourth grade they can make their own opinions based on evidences. Fifth graders can draw conclusions from learning materials. Parallel to these developmental changes in listening, speaking, reading and writing also develops.

Listening comprehension is a very important skill which assists in linguistic and academic development. Listening comprehension involves various cognitive and linguistic processes (Hogan, Adolf & Alonzo, 2014).Children with Specific language impairment (Bishop & Adams, 1992), autism (Norbury & Bishop, 2002), and attention deficit hyperactivity disorder (Mclinnes, Humphries, Hogg-Johnson& Tannock, 2015) manifest impairment in listening comprehension skills, and these groups of children are also found to encounter issues in academic achievements.

Children with learning disability (LD) often show problem with language components and cognitive components required for discourse level listening comprehension. Children with LD are often present with difficulty with word identification skills, forgetting assignments and homework, difficulty in understanding narrative discourse, difficulty in reading comprehension, answering question, problem with critical thinking to derive logical answers, have difficulty with word associations, categorizing and classifying, have difficulty in taking notes, have difficulty with listening for long period, exhibit difficulty in paying attention etc. They usually ask for multiple

repetitions. Such children watch other children while doing a task and often fail to do it when the instructions are given orally. All these can be manifestations of listening comprehension deficit in children with Learning disability.

As mentioned above, there are various cognitive and linguistic processes important for listening comprehension. The ability to recall information is often important for a complete understanding of the message. This depends on individual's memory. Human memory has various "storage units", including sensory storage, short term memory, working memory and long term memory (Jones, 2016). According to Baddeley (1986) working memory is a temporary storage of information necessary to perform tasks such as learning, reasoning, and comprehension. It is a multi-component capacity limited system. In the model of working memory given by Baddeley and Hitch (1974), there are three main components; the central executive, the articulatory loop, and the visual-spatial scratch pad. The central executive is the controlling system where as the articulatory loop and the visual-spatial scratch pad deals with the verbal and visual information respectively. The function of articulatory loop is to store verbal input temporarily, especially fresh phonological input (Baddeley, Gathercole, &Papagno, 1998), while other cognitive tasks such as auditory comprehension take place. A fourth component of this model has been included later, the episodic buffer, which is responsible for binding information across informational domains and memory subsystems into integrated chunks (Baddeley, 2000). Verbal working memory is defined as a set of verbal processing resources that can be devoted to all verbal tasks (Just & Carpenter, 1992).

Impaired working memory skills are found to be a common feature of a wide range of developmental disorders and specific learning difficulties, including ADHD, dyslexia, Specific Language Impairment and reading and mathematical difficulties (Archbald & Gathercole, 2007; Holmes, Gathercole, Hilton, Place, Alloway & Elliott,

2012; Swanson & Sachse-Lee, 2001). Because working memory is used to process and store information during complex and demanding activities, it supports various tasks that children routinely engage in at school such as following verbal directions given by teachers, remembering details of stories and character names, paying attention, memorizing poems, prayers etc.. The major signs of working memory deficits in children include: poor academic progress, difficulties following multistep instructions, failing to complete common classroom activities that require large amounts of information to be held in mind and high levels of inattentive and distractible behavior (Gathercole, Alloway, Kirkwood, Elliot, Holmes & Hilton, 2008; Gathercole, Lamont &Alloway, 2006).

CHAPTER 2: Review of Literature

Language learning is an ongoing and active process in humans, and its development is not restricted to preschool years. From the stage of cooing and babbling, children progress through stages of proto words, true words, phrases, short simple sentences, long complex sentences and will demonstrate narratives, extended conversations with family and friends, by the age of six years (Nippold, 1998), but there still is a great amount of language development to be completed during the later years. Language develops through the interactions of cognitive, neurological, and environmental subsystems. In school years, children's language abilities continue to increase in terms of metalinguistic, cognitive and social development.

Learning language primarily happens through listening to language. By the time children acquire literacy, reading also contributes to further language development (Nippold, 2006). As listening and speech are the first modalities through which language is learned and expressed respectively, these are considered as the primary language modalities (Varghese, 2000), which is followed by the reading and writing modalities.

2.1 Listening comprehension

The processes of listening include receiving, interpreting, recalling, evaluating, and responding (Jones, 2016). In the process of receiving, the authors have reported that an individual must take in stimuli through the senses. It was observed that this part of the listening process is more physiological compared to other parts, which include cognitive and relational elements (Varghese, 2000). Primarily the information is taken from listening is through auditory channel (Jones, 2016).

Listening comprehension can be conceptualized as a person's ability to understand what he/she hears. In psycholinguist's view, listening comprehension involves the conversion of sound sequences associated with the utterance produced, into

meaning, which is the most abstract form in the working memory system (Garrod, 1995).

During the interpreting stage of listening, it has been proposed that the information will be combined and an individual attempts to make meaning out of that information using schema. The interpreting stage engages cognitive and relational processing as we take in informational, contextual, and relational cues. It is through the interpreting stage that one may begin to understand the stimuli that were heard. When we understand something, we will try to correlate it with past experiences. Through the comparing novel information with past information, updating or revising particular schema can also happen, if we find the novel fact relevant and credible. The ability to recall and compare information is dependent on how the memory works (Jones, 2016). The ability to recall such information depends on individual's memory (Jones, 2016).

Listening comprehension involves various cognitive and linguistic processes (Hogan, Adolf & Alonzo, 2014). Linguistic influences include vocabulary (Braze,Tabor, Shankweiler, & Mencl, 2007; Cromley & Azevedo, 2007; Muter, Hulme, Snowling, & Stevenson, 2004; Storch & Whitehurst, 2002), background knowledge (Rosenblatt, 1985), inferencing (Cain, Oakhill, Barnes, & Bryant, 2001) etc. Inferencing is the process of filling in the missing information of a discourse to create a complete mental representation (Bowyer-Crane & Snowling, 2005).There are reports suggesting importance of comprehending factual information, inference making and self-monitoring of comprehension in successful comprehension of language in academic situations (Westby, 1991). Some researchers also found that inferencing is associated with memory and narrative recall ability (Cain et al, 2001; Johnson-Laird &Bethell-Fox, 1978; Paris & Upton, 1976).In case of inference making in reading comprehension, it has been reported that the skilled readers have the capacity to integrate the elements of the text to draw inferences.

According to Cain and Oakhill (1999) poor comprehenders tend to have less

effective inferencing skills than skilled comprehenders. And this helps to form more cohesive mental models of the discourse. Good comprehenders can comprehend words and sentences in a story or discourse, and can recall and integrate the current information to the background knowledge and construct a cohesive mental model(Kintsch&Kintsch,2005). Listening comprehension and reading comprehension shares the same language processes, wherein for listening comprehension cognitive demands needed for decoding orthographic form is absent (Gough & Tunmer, 1986).According to the simple view of reading (Gough &Tunmer, 1986) reading comprehension is the product of two primary factors: word recognition, and listening comprehension. These two components are necessary for reading comprehension to take place. That is when text decoding skills are controlled; reading comprehension and listening comprehension should be equal.

According to Bishop (1997) spoken language comprehension requires competence in phonology, semantics, syntax and pragmatics. He stated that in order to comprehend spoken language, available information should be encoded into phonological representation. Further this would interact with the long term representations in mental lexicon and helps in associating a given sound pattern with meaning. Listening comprehension is a very important skill which assists in linguistic and academic development. Stojanovik and Riddell (2008) stated that a child's weakness in ability to comprehend spoken language is the cause of early learning difficulty.

2.2 Working memory and listening comprehension

Human memory consists of multiple "storage units," including sensory storage, short-term memory, working memory, and long-term memory (Jones, 2016).Working memory can be defined as a short-duration, capacity limited memory system which can simultaneously store and manipulate information to complete a task (Baddeley, 1995). Verbal working memory is a set of verbal processing resources that can be devoted to all

verbal tasks (Just &Carpenter, 1992).

Baddeley (1986) proposed that short term memory or the working memory is composed of three separate units such as central executive, phonological loop and visuo-spatial sketch pad. The phonological loop plays an important role in everyday life. The phonological loop may play a key role in the acquisition of vocabulary, particularly in the early childhood years. It may also be vital for learning a second language. The phonological loop (or "articulatory loop") deals with sound or phonological information. Simple model of the phonological loop (Baddeley, 1986), a component of working memory, has proved capable of contributing for the development. However, the role of this subsystem in everyday cognitive activities was unclear. Therefore in the review article by Baddeley, Gathercole, and Papagno (1998), the authors reviewed studies of word learning. In learning new phonological sequences and patterns for the purpose language development, the phonological loop plays an inevitable role. The authors proposed that the chief use of the phonological loop is to store unfamiliar sound patterns while more permanent memory records are being constructed. It is also said that it is used in retaining sequences of known words. Visuo-spatial sketch pad is specialized for storing visual and spatial information. Here the visual imaginary tasks are performed. Sketch pad also stores visual information that has been encoded from verbal stimuli. It is used for the brief storage and operation of spatial and visual information. The central executive is considered as the workhorse and instigator of human cognition. It assigns attention to a task and helps to store the particulars and computational functions of a given task.

Literature suggests that verbal working memory is an important skill in comprehending complex and lengthy spoken information, as it keeps important information while the processes for comprehension take place. It is proposed that mental representations of both explicit and implicit information are shaped during listening, andthese will be maintained in working memory and repetitively modified as novel

information is processed (Kintsch, 1998; Zwaan & Radvansky, 1998). It is also reported that discourse level listening comprehension tends to be more taxing on working memory abilities. For example, listeners are usually unable to control the rate of speech, which makes rapid decay of information during listening tasks (Molloy, 1997).

Working memory capacity often influence the predictive inference generation from discourse (Lehman-Blake & Tompkins, 2001; St. George, Mannes, & Hoffman, 1997). Many authors proposed that working memory is utilized to construct, maintain, and update detailed mental representations of both factual and inferential information during listening and reading (Zwaan & Radvansky, 1998). More in-depth comprehension and better ability in recalling details and deriving inferences are associated with more sophisticated mental images.

Polisenka, Chiat and Roy (2015) conducted a study to find out the efficacy of sentence repetition tasks, where they had several linguistic conditions one of which was non-word embedded sentence repetition and they reported that immediate sentence repetition in 4 to 5 year old children tap phonology and morpho-syntactic abilities of children

Swanson and Beebe-Frankenberger (2004), conducted a study on elementary school grade children. They reported that in typically developing children, of first, second and third grades, younger children performed poorer on working memory task. And they also reported that working memory predicted precision of clarification while doing word problems. This was found to be independent of measures of fluid intelligence, reading ability, math ability, and skill of algorithms, phonological processing, semantic processing, rapidity, short term memory, and inhibition. The results support the opinion that the executive system is a key forecaster of children's problem solving.

Kim (2016) studied effect of cognitive skills (working memory and attention), language skills (vocabulary and grammatical knowledge), and higher-order cognitive

skills (inference, theory of mind, and comprehension monitoring) on listening comprehension in children of Grade 1. The author reported that that listening comprehension can be directly predicted by cognitive processes such as working memory, grammatical knowledge, inference, and theory of mind and it can also be indirectly predicted by attention, vocabulary, and comprehension monitoring skills. The results highlighted the direct and mediated nature of relations among skills involved in listening comprehension. A study by Florit, Roch, Altoe and Levorato (2009) analyzed the developmental path of the relationship between memory skills and listening comprehension in the age range of 4-6 years and the results obtained showed that both short-term and working memory predicted listening comprehension, the predictive ability of memory skills was found to be steady through the selected age range.

Adams, Bourke, and Willis (1999) examined the relationship between listening comprehension, and short-term and working memory in children aged between 4.6 years and 5.6 years. In this study also the authors could propose a relation between listening comprehension and working memory measures. The influence of working memory on spoken language comprehension was studied by Daneman and Merikle (1996) and they claimed that procedures that utilize the combination of processing and storage capability of working memory (e.g., reading span, listening span) predicts spoken language comprehension better than the measures which activates only the storage capability (e.g., word span, digit span).

Daneman and Blennerhassett, (1984) analyzed short-term, working memory and their relationship to oral language comprehension in children between 3 and 5 years of age. They found that short-term memory was a poor predictor of listening comprehension in preschool children, when compared to the predictive power of working memory. Nation, Adams, Bower-Crane, and Snowling (1999) also showed a direct relation is

present between memory and listening comprehension. According to him only verbal working memory is related to listening comprehension, and he excluded the role of visuo-spatial memory in listening comprehension. Listening comprehension also plays an important role in reading comprehension, and this has been supported by many studies (Hoover & Gough, 1990; Tunmer & Greaney, 2010; Vellutino, Tunmer, Jaccard, & Chen, 2007).

Cain, Oakhill, and Bryant (2004) aimed at investigating the relationship between working memory capacity and reading comprehension skills. The study included participants of age range 8, 9, and 11 years. The authors tested children's reading ability, vocabulary and verbal skills, performance on two working memory tasks that is sentence-span and digit span. The component skills of comprehension were also assessed (i.e., inference making, comprehension monitoring and story structure knowledge). The authors observed that working memory and component skills of comprehension predicted unique reading comprehension .The authors also found that relations between reading comprehension and both inference making and comprehension monitoring were not totally influenced by working memory.

It has been reported that the working memory capacity improves with age (Alloway, Gathercole, Willis, & Adams, 2004). The performance seems to improve till teenage years and reaches a steady state similar to adults. Then as the age increases a decline in working memory capacity is also observed by different authors.

2.3 Working memory and listening comprehension in children with Learning disability

Deficits in working memory are found to be a widespread feature of a wide range of developmental disorders and specific learning difficulties. Swanson and Berninger (1996) stated that children with all types of learning disabilities display poor working

memory performance, especially in verbal and executive working memory. Siegel and Ryan (1989) found that children with Learning disability have poor verbal working memory. They reported that the developmental trends of verbal working memory and the deficits shown by children with Learning disability suggests the importance of verbal working memory in learning. Swanson (1993) also suggested that children with learning disability suffer verbal and visuo-spatial working memory deficits.

Daneman and Carpenter (1980) conducted a study on 20 college students to find out the correlation between working memory and reading and listening comprehension. He proposed a reading span task and modified span task (listening) span as a measure of VWM. The span measures were collected and compared with the reading and listening comprehension tasks. The results suggested that the reading span task correlated with reading comprehension. And both the span measures were correlated with listening comprehension. They reported that the span tasks tap the working memory capacity, which is essential for comprehension. This reported that a good comprehender will have a better working memory capacity. Baker (1985) replicated the Daneman and Carpenter's study and reported similar results, where the reading span tasks correlated well with comprehension skills.

Gathercole, Brown and Pickering (2003) reported that complex memory span tasks are good predictors of later scholastic achievements. It is also reported to be predictive of different measures such as literacy (Gathercole & Pickering, 2000; Swanson, 1994), mathematics (Gathercole & Pickering, 2000; Siegel & Ryan, 1989), and language comprehension (e.g., Cain, Oakhill, & Bryant, 2004; Nation, Adams, Bowyer Crain, & Snowling, 1999). Low working memory scores are reported to be related to poor performance on mathematic word problems (Swanson & Sachse-Lee, 2001) and poor computational skills (Bull & Scerif, 2001; Geary, Hamson & Hoard, 2000). Working memory capacity also has a significant impact on learning in various developmental

disorders such as reading disabilities (Alloway, Gathercole, Willis, & Adams, 2004), language impairments (Alloway & Archibald, 2008), and motor difficulties (Alloway, 2007).

Alloway(2010)conducted a study to investigate the contribution of IQ and working memory to academic attainment in young school going children. They assessed children at five years of age and then at eleven years of age. They reported that at younger age the children have few knowledge resources to supplement learning and hence working memory is highly associated with learning abilities in children at younger ages. Whereas when children get older, the knowledge base increases and the role of working memory in learning seems to reduce and factors such as vocabulary starts to contribute to learning outcomes. Hence they proposed that working memory is a more influential predictor of upcoming scholastic achievement than IQ during the initial years.

Pickering and Gathercole (2004) found that children with troubles of a behavioral or emotional nature had a normal performance on all of the memory tasks whereas children identified as having general learning difficulties that included both literacy and mathematics performed poorly in all working memory tasks. Many children identified by as having of reading and mathematical learning difficulties have noticeable reduction of working memory capacity (Siegel& Ryan, 1989; Swanson, 1994; Swanson et al., 1996).

Swanson and Berninger (1996) conducted a study which correlated several working memory and phonologic short term memory tasks with writing and reading and they stated that in verbal and executive working memory tasks, children with all types of learning disabilities had poor performance.

McLean and Hitch (1999) aimed at investigating the working memory deficit in 9 year old children with specific arithmetic difficulties. They used a battery of 10 tasks to assess different aspects of working memory, including subtypes of executive function.

The results revealed that children with poor arithmetic skills had normal phonological working memory but were impaired on spatial working memory and some aspects of executive processing. Such students were also impaired on aspects of executive processes for storing and manipulating information in long-term memory. Therefore these deficits in executive and spatial working memory are reported to be key factors in poor scholastic achievements.

Literature suggests that children with Learning disability (LD) often show problem with language components and cognitive components required for discourse level listening comprehension**.** Children with LD are also found to have poor reading comprehension along with listening comprehension. "Simple view reading model" of reading given by Gough and Tunmer (1986) opined the necessity for reading comprehension for overall language comprehension. According to this model reading comprehension is the outcome of two crucial factors. First factor is word recognition that is the ability to translate orthography into pronounceable words. Second factor is linguistic comprehension that is the ability to understand the text if it is heard instead of read. The model also says that just with these two factors achievement in reading comprehension is not possible. Therefore during text decoding along with reading comprehension even listening comprehension is required. In other words skilled reading needs improvement of the processes by which recognition and understanding of words occur(i.e., word recognition processes). It also requires the development of language comprehension processes which helps in comprehending spoken language as well. Learning to read involves setting up of the processes. That is words are recognized and understood and the language comprehension processes continue to develop for both written and spoken language comprehension. Swanson and Alexander (1997) found that when children with learning disabilities within the age range of 8-12 years were matched

with control group for IQ, the experimental group showed deficits in aspects of working memory. They claimed that working memory best predicts the reading comprehension abilities.

Because working memory is used to process and keep information during complicated and challenging activities, it supports many activities that children routinely engage in school. The major signs of working memory deficits in children include: poor academic progress, difficulties following multistep instructions, failing to complete common classroom activities that require large amounts of information to be held in mind and high levels of inattentive and distractible behavior (Gathercole, Alloway, Kirikwood, Elliot, Holmes & Hilton, 2008; Gathercole, Lamont & Alloway, 2006). Often these difficulties are observed in children with Learning disability (Miles, 1982; Augur, 1985; McLoughlin, Fitzgibbon & Young, 1994). Some of these difficulties as reported in the literature indicate that children showing such signs of poor working memory seem to have deficits in listening comprehension as well. Listening comprehension is reported to be highly predictive of academic achievement (Bishop & Snowling, 2004) and the cause of early learning difficulty is reported to be due to child's inability to comprehend spoken language (Stojanovik & Riddell, 2008).

Alloway (2009) reported that in children with learning difficulties , along with the developmental lag, the working memory deficit cannot made up as the age increases and will continue to follow the same pattern and capacity throughout years of school life, which further reduces the children's ability to overcome learning difficulties over time and compromise their academic success. So it is very crucial to assess children at risk for learning disabilities for working memory impairments and give early intervention in order to help children overcome their academic difficulties. It is reported that the working memory impairments are often undetected and misdiagnosed as attention problems and

impairment of working memory are closely associated with learning deficits, as well as daily classroom activities (Alloway, et al., 2006).

Literature suggests that verbal working memory is a fundamental factor in comprehending complex and lengthy spoken information, as it keeps important information while the processes for comprehension take place. It is proposed that mental representations of both explicit and implicit information are formed during listening, which are maintained in working memory and repetitively adapted as novel upcoming information is processed (Kintsch, 1998; Zwaan & Radvansky, 1998). It is also reported that discourse level listening comprehension tends to be more taxing on working memory abilities. For example, listeners are usually unable to control the rate of speech, which makes rapid decay of information during listening tasks (Molloy, 1997).

Swanson (1993) also suggested that children with learning disability suffer verbal and visuo - spatial working memory deficits. These limitations in verbal working memory can also be demonstrated as listening comprehension deficits in children with learning disability as they are not able to store and process large amount of information needed for discourse level listening comprehension. Hence there is a need to study the verbal working memory and listening comprehension in children with learning disability.

Aim and Objectives of the study

The aim of the present study is to study verbal working memory (VWM) and discourse level listening comprehension (DLC) of children with Learning disability in the 3rd and 4th grades.

Objectives of the study

The objectives of the study are

- To study the performance of typically developing children in the 3rd and 4th grades on VWM and DLC.
- To compare the performance of typically developing children and children with Learning disability in the 3rd and 4th grades on VWM and DLC.
- To study the relationship between VWM and DLC in children with Learning disability in the 3rd and 4th grades.

Hypotheses

- There is no significant difference in the performance of typically developing children in the 3rd and 4th grades on VWM and DLC.
- There is no significant difference in the performance of typically developing children and children with Learning disability in the 3rd and 4th grades on VWM and DLC.
- There is no significant correlation between VWM and DLC of children with Learning disability in the 3rd and 4th grades.

CHAPTER 3: Method

The primary aim of the present study was to study verbal working memory and discourse level listening comprehension in children with Learning Disability (LD) in the 3rd grade and 4th grade. A standard two group comparison research design was used to compare the verbal working memory and discourse level listening comprehension in typically developing children, TDC (i.e., control group) and children with learning disability, LD (i.e., clinical group).

3.1 Participants

The participants were divided into two groups, the clinical group and the control group. The clinical group included a total of 10 children with LD. The control group included a total of 20 TDC. All the participants were further subdivided into groups of 3rdgrade (8yrs ≤ A ≤ 9.0 years) and 4th grade (9.0 ≤ A ≤ 10.0 years), children, where 'A' is the age of the child).

Participant Selection Criteria

The participants in the two groups were selected based on the following criteria:

a) Children attending regular English medium school in 3rdand 4th Grades with Malayalam as the mother tongue.
b) Participants who had no sensory, motor issues according to ICF CY checklist(WHO work group,2003)
c) Children with average or above average academic performance were included in the control group (as per the reports of the teachers). These children had no history of any speech and language problems.
d) Children identified as Learning disability by a qualified Speech-Language Pathologist and Clinical Psychologist was included in the clinical group.

An informed consent was obtained from participants and / or caretakers before the testing. The study followed the 'AIISH Ethical Guidelines for Bio-Behavioral Research Involving Human Subjects'.

3.2 Test material

The test material included stimuli for assessing verbal working memory (VWM) and discourse level listening comprehension (DLC) tasks. The stimuli for assessing VWM included 15 sentences in Malayalam, each of them had one three syllabic non word in it (See Appendix I).The rules used to construct the non-words were based on the rule followed in the Early Repetition Battery (Seef-Gabriel, Chiat & Roy, 2008), and Word and Non-word repetition test for children in Kannada (Swapna, 2011). These non-words were embedded in meaningful sentences of different word lengths. The sentences were arranged in the order of increasing number of words, from three word sentences to seven word sentences, and the position of the non-words in sentences were randomized.

E.g.: '/ɲɑːn ɖarumam kaʃɪtʃʊ/', where '/ɖarumam/' is a non-word which is derived from the Malayalam word '/maɖʊram/'. The sentence means 'I ate /ɖarumam/'.

The DLC was assessed using five stories followed by questions (see Appendix II). The stimuli for assessing listening comprehension included 5 stories in Malayalam, which were the translated version of stories selected from Reading acquisition profile in Kannada given by Prema (1997) and modified by Divyashree (2017). For each story there were 6 questions, where in 3 questions were based on content and information that are explicitly provided in the passage (factual questions), E.g: /ɑːrkkɑːn̪ə nɑːjɑ ʊnda:jirʊnnaṭə?/ which means 'who had dog?' And the next 3 questions were used for measuring the participant's comprehension of implicit information that could be inferred from the passage (Inferential questions) e.g.: /na:ja ko:ʒɪkkuɲɲɪnə ṭɪnnɪla:jɪrʊnnənkɪl enṭʊ

sambavɪtʃəːnə?/ (which means If the dog didn't eat chicken , what would have happened?)

The factual questions were followed by a multiple-choice task, where the participants were provided with the multiple-choices in the form of line drawings which were adapted from Divyashree (2017) (see Appendix III).

The sentences, stories, questions (factual questions and inferential questions), and pictures were validated by three Speech Language Pathologists (SLPs). The SLPs were expected to rate the stories and questions using the Likert scale given based on two criteria for each grade (Grades 3rd and 4th). The rating was done for two aspects which included -appropriateness and difficulty of stories for each grade and appropriateness of questions for each grade.

Following Likert scales were used to rate score stories and questions. Level of Appropriateness: 1–Absolutely inappropriate; 2–Inappropriate; 3– Slightly inappropriate; 4– Neutral; 5– Slightly appropriate; 6– Appropriate; 7–Absolutely appropriate. Level of difficulty: 1– Very difficult; 2 – Difficult; 3 – Neutral; 4 – Easy; 5 – Very easy. The SLPs were also asked to rate the level of appropriateness and level of difficulty using same Likert scale for pictures, they were asked to rate the parameters like size and appearance of the pictures, iconicity, stimulability and clinical relevance as very poor, poor, fair, good and excellent. The sentences, stories and questions which are rated slightly appropriate to absolutely appropriate and neutral to very easy, by at least 2 SLPs were used for the present study. Similarly the pictures which are rated as fair, good or excellent in all the parameters given are selected for the study.

Linguistic profile test in Malayalam (Asha, 1997) was used to assess for language ability, where in the phonological, syntactical and semantic ability of the participants was assessed.

3.3 Procedure

The participants were tested individually in quiet room. After the administration of the screening test, the language ability of the participant was assessed using the Linguistic profile test in Malayalam (Asha, 1997). After that the sentence repetition task was carried out to assess VWM. Experimenter played the sentences one at a time and the participants were asked to repeat them back correctly. Then the stories were played to the child one at a time. Then the child's comprehension was assessed by 6 multiple-choice questions (3 factual questions and 3 inferential questions). After playing the factual questions, the experimenter read the possible answers while pointing to the corresponding pictures. The child was then asked to choose the correct answer. Then the experimenter read the inferential questions and asked the child to answer.

3.4 Scoring and analysis

The responses were recorded on a response sheet and scored.

Sentence repetition: A score of '1' was given for the correct repetition of sentence and a score of '0' for any errors present. The responses of the participants were transcribed for further qualitative analysis. Then the score for each level (out of 3) and the grand total (out of 15) was calculated.

Listening comprehension: Each passage consisted of 6 questions (3 factual questions and 3 inferential questions), each questioncarried 2 points. For factual questions the score of '0' was given for incorrect answer and the score of '2' was given for correct response. For inferential question the score of '0' was given for incorrect response, the score of '1' was given for incomplete correct response and the score of '2' was given for correct response.The total score for factualquestions (score out of 6) and the total score for inferential questions (score out of 6) was obtained for each passage. Then the total for factual questions, inferential questions (each score out of 30) and the grand total (out of 60) were calculated. The data was further analyzed using SPSS software (Version 20.0)

CHAPTER 4: Results

The primary aim of the present study was to investigate verbal working memory and discourse level listening comprehension in children with LD in the 3rd grade and 4th grade. A standard two group comparison research design was used to compare the VWM and DLC in typically developing children, TDC (i.e., control group) and the children with learning disability, LD (i.e., clinical group). The task for assessing verbal working memory was sentence repetition and for assessing listening comprehension five stories, each followed by six questions were used.

Descriptive statistics was used to compute mean, median and standard deviation values (SD) for typically developing children and children with Learning disability. Shapiro-Wilk's test was administered to check for normality, and the results revealed that the data did not follow normal distribution. Also there was ceiling effect in the scores of listening comprehension for factual questions. So Non-parametric tests were carried out to infer the performance of TDC and children with LD on LPT, VWM and DLC, to compare the performance of children across grades and across groups and also to infer about the correlation between VWM and DLC.

The results are discussed under the following subsections

4.1 Performance of TDC in the 3rd grade and 4th grade on LPT, VWM and DLC

4.2 Comparison between TDC and children with LD on LPT, VWM and DLC.

4.3 Relationship between VWM and DLC in children with Learning disability in the 3rd and 4th grades.

4.1 Performance of TDC in the 3rd grade and 4th grade on LPT, VWM and DLC

The results of the study are explained under following subsections.

4.1.1 Performance of TDC in the 3rd grade and 4th grade on LPT.

Descriptive statistics was used to compute mean, median and SD for scores of LPT, VWM, and Listening Comprehension components. The scores for Listening comprehension included total score for Factual questions (LCF), total score for Inferential questions (LCI) and total discourse level listening comprehension scores (DLC) for TDC. Table 4.1.1 shows mean, median and SD scores of 3rd and 4th grades TDC on LPT, VWM and DLC.

Table 4.1.1

Mean, median and SD scores of 3rd and 4th grades TDC on LPT, VWM and DLC.

	Grade	Mean	Median	SD
LPT	3	278.90	278.25	2.68
	4	283.35	283.50	1.42
VWM	3	7.70	8.00	1.25
	4	8.50	9.00	0.97
LCF	3	30.00	30.00	0.00
	4	29.60	30.00	0.84
LCI	3	20.20	20.50	2.35
	4	23.20	22.50	1.69
DLC	3	50.20	50.50	2.34
	4	52.80	52.50	2.25

Note: LPT-Score of Linguistic Profile Test, VWM-Total score of verbal VWM task, LCF- Score of factual questions, LCI-score of inferential questions, DLC- Total score of LC task.

Analysis of results on Mann Whitney U test showed that there was a significant difference between 3rd and 4th grade TDC on LPT scores (/z/=3.04, p<0.01).Results as shown in table 4.1.1 revealed that on LPT, 4th graders showed a better performance (Median=283.50, SD=1.42) than the 3rd graders (Median=278.25, SD=2.68).The results indicated a developmental trend showing an improvement in the performance of children from 3rd grade to 4th grade on LPT.

4.1.2 Performance of TDC in the 3rd grade and 4th grade on VWM.

On VWM, it was found that there was no significant difference between the performance of3rd and 4th graders (/z/=1.56. p>0.05). The results of VWM as in table 4.1.1 revealed that the performance of TDC in 4th grade (Median= 9.00, SD=0.97) was better than that of the children in 3rd grade (Median=8.00, SD=1.25). The results indicated a developmental trend showing an improvement in the performance of children from 3rd grade to 4th grade on VWM.

Further, Friedman test was carried out to compare the five levels of VWM task that is sentence repetition, which had sentences having three words at the first level to sentences having seven words at the fifth level, each level had three sentences. On Friedman test, there was a significant difference found between different levels of VWM, hence Wilcoxon Signed rank test was carried out. The descriptive statistics was done to find out mean, median and SD of five levels of VWM task. Table 4.1.2 shows mean, median and SD for five different levels of VWM task for TDC in 3rd and 4th grade.

Table 4.1.2

Mean, median and SD for five different levels of VWM task for TDC

Grades	Parameter	Mean	Median	SD
3	VWML 1	2.70	3.00	0.48
	VWML 2	2.60	3.00	0.52
	VWML 3	2.65	3.00	0.49
	VWML 4	0.50	0.50	0.53
	VWML 5	0.30	0.00	0.48
4	VWML 1	2.60	3.00	0.52
	VWML 2	2.70	3.00	0.48
	VWML 3	2.20	2.00	0.63
	VWML 4	0.80	1.00	0.42
	VWML 5	0.20	0.00	0.42

Note: VWML 1- verbal working memory Level 1, VWML 2- verbal working memory Level 2, VWML 3- verbal working memory Level, VWML 4- verbal working memory Level 4, VWML 5- verbal working memory Level 5

Analysis of results on Friedman test revealed that there was a significant difference between different levels of VWM TDC in both 3rd(χ^2=33.52, p<0.01) and 4th grade(χ^2=34.39, p<0.01), hence Wilcoxon Signed rank test was carried out to find out which all levels of VWM task have significant difference between them.

For children in 3rd grade, a significant difference was found between VWM Level 1and VWM Level 3 (/z/=2.40, p<0.05), VWM Level 1 and VWM Level 4 (/z/=2.84, p<0.01), VWM Level 1 and VWM Level 5(/z/=2.86, p<0.01),VWM Level

2 and VWM Level 3 (/z/=2.41, p<0.05), VWM Level2 and VWM Level 4 (/z/=2.85, p<0.01), VWM Level 2 and VWM Level 5 (/z/=2.88, p<0.01), VWM Level 3 and VWM Level 4 (/z/=2.06, p<0.05) and VWM Level 3 and VWM Level 5 (/z/=2.22, p<0.05).The results as shown in table 4.1.2, suggested that the performance on VWM Level 1 (Median=3.00, SD=0.48), VWM Level 2 (Mean=3.00, SD=0.52) and VWM Level 3 (Median=3.00, SD=0.49) showed a similar performance, and were better than the performance on VWM Level 4 (Median=0.05, SD=0.53) followed by the performance on VWM Level 5 (Median= 0.00, SD=0.48).

For children in grade 4, a significant difference was found between VWM Level 1 and VWM Level 4 (/z/=2.88, p<0.01),VWM Level 1 and VWM Level 5 (/z/=2.87, p<0.01), VWM Level 2 and VWM Level 4 (/z/=2.85, p<0.01), VWM Level 2 and VWM Level 5 (/z/=2.88, p<0.01), VWM Level 3 and VWM Level 4(/z/=2.74, p<0.01),VWM Level3 and VWM Level 5 (/z/=2.87, p<0.01) and VWM Level 4 and VWM Level 5 (/z/=2.45, p<0.05).The results as shown in Table 4.1.2 suggested that the children performed similarly on VWM Level 1 (Median=3.00, SD=0.48) and VWM Level 2 (Median=3.00, SD=0.52), followed by performance on VWM Level 3 (Median=2.00, SD=0.49) which were better than the performance on VWM Level 4 (Median=1.00, SD=0.53) followed by the performance on VWM Level 5 (Median=0.00, SD=0 .48).

Thus, the results showed that the performance of TDC in 3rd and 4th grade on VWM task was better at the initial levels and reduced gradually as the level increased i.e., children performed better on sentence repetition task when the length of the sentences to be repeated was shorter.

Qualitative analysis of performance of children on VWM task was also carried

out. For this the responses on sentence repetition were transcribed and were analyzed. For the error analysis, the following terminologies were used, that are primacy error (when the child repeated only the last words of a sentence presented at a particular level), recency error (when the child repeated only the first words of a sentence presented at a particular level), Non word errors (omission and substitution of syllables in the non-word, and the conversion of non-word into a word) and others (no response, repetition of words, addition of words etc).

While analyzing the sentence repetition task to assess VWM, most of the TDC of both 3rd and 4th grade were able to repeat the sentences correctly at least till level 3, whereas most of the TDC of both 3rd and 4th grade found it difficult at VWM level 4 and VWM level 5, where the sentence length were six and seven words respectively.

The error analysis showed that for TDC in both grade 3 and grade 4, primacy error, recency error and non-word errors were prominently observed especially at VWM level 4 and level 5. Eg: For the sentence '/vəːnalil ʊn̥naŋɪja maram *ʈajipə* pʊːkaɭ̊ kɔnʈ̪ə nɪɾaŋʊ/' which means 'The tree that was drying during summer started to fill with flowers *ʈajipə*', |*ʈajipə*| is a non-word derived from the Malayalam word 'paʈijə' which means slowly. In case of recency error, the children expressed it as /vəːnalil ʊn̥aŋɪja maram ʈajipə pʊːv/ which means 'The tree that was drying during summer *ʈajipə* flower'. Primacy errors were comparatively less in TDC in both the grades. In case of primacy error, while considering the above stated sentence, the children expressed the sentence as /maram pʊːkaɭ̊ kɔnʈ̪ə nɪɾaŋʊ/ which means 'The tree filled with flowers'. In case of non-word errors, the most prominent errors were substitution of phonemes or syllables in non-words (eg: /ʈajipə/ which means slowly as /ʈajikə/). Omission of syllables (eg: /ɾɪjɑnə/ as / ɾ̥ɪnə /), rearrangement of syllables in non-word which created a true word (eg: /ɾɪjɑnə/ as / nɪrajə/ which means full, from

which the non-word was derived), and omission of non-word while repeating the sentence (Eg: '/vəːnalil ʊn̥aŋɪja maram t̪ajipə pʊːkal̪ kɔnt̪ə nɪr̥aɳʊ/' was repeated as '/vəːnalil ʊn̥aŋɪja maram pʊːkal̪ kɔnt̪ə nɪr̥aɳʊ/' which means 'The tree that was drying during summer started to fill with flowers') were also observed in TDC. The rearrangement of syllables in the non-word and formation of a true word were mostly observed at VWM level 2 and above. In any of the levels 'no response' was not obtained.

4.1.3 Performance of TDC in the 3rd grade and 4th grade on DLC.

While considering the listening comprehension components, A significant difference was found between the performance of 3rd and 4th grade TDC in DLC (/z/=2.21, p<0.05). For DLC, the performance of children in 4th grade (Median= 52.50, SD=2.25) was better than children in 3rd grade (Median=50.50, SD=2.348). No significant difference was found between the performance TDC in 3rd and 4th grade on LCF (/z/=1.45, p>0.05). For LCF, as shown in Table 4.1.1, 4th graders (Median=30.00, SD= 0.84) and 3rd graders (Median=30.00, SD=0.00) showed a similar performance, there was no developmental trend observed on LCF from 3rd to 4th grade. A significant difference was found between the performance of 3rd and 4th grade TDC in LCI (/z/=2.79, P<0.01). For LCI, the performance of children in 4th grade (Median= 22.50, SD=1.69) was better than that of children in 3rd grade (Median=20.50, SD=2.35).

Thus the results showed a developmental trend through the improvement of scores from 3rd graders to 4th graders for the parameters analyzed that are LPT, VWM and DLC in TDC.

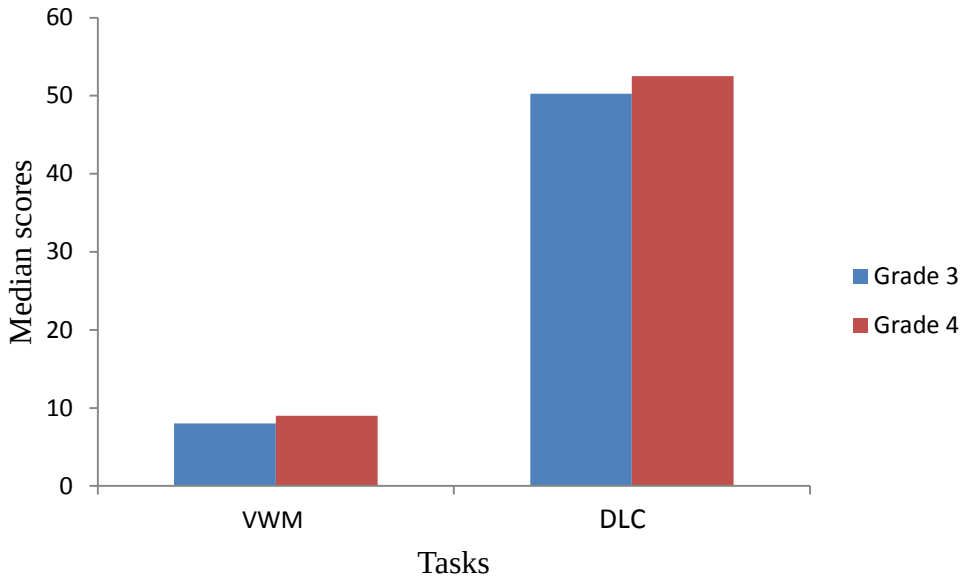


*Figure 4.1.1.*Performance of TDC in 3rd and 4th grades on VWM and DLC

The comparison between total score of factual questions and inferential questions for DLC task was also carried out for 3rd and 4th grade TDC using Wilcoxon signed ranks test. Descriptive statistics was carried out to find the mean, median and SD of the total score of factual and inferential questions. Table 4.1.3a shows mean, median and SD of the total score of factual and inferential questions for 3rd and 4th grade TDC.

Table 4.1.3a

Mean, median and SD of the total score of factual and inferential questions for 3rd and 4th grade TDC

	Parameter	**Mean**	**Median**	**SD**
Grade 3	LCF	30.00	30.00	0.00
	LCI	20.20	20.50	2.35
Grade 4	LCF	29.60	30.00	0.84
	LCI	23.20	22.50	1.69

Note- LCI- Listening comprehension for inferential questions, LCF- Listening comprehension for factual questions

The analysis of results on Wilcoxon signed rank test indicated that there was a significant difference between total score of factual questions and inferential questions in both 3rdgrade (/z/=2.81, p<0.01) and 4th grade (/z/=2.82, p<0.01) in TDC. For TDC in grade 3, the performance was better for LCF (Median=30.00, SD=0.00), than for the performance on LCI (Median= 20.50, SD=2.35). Similarly for TDC in 4th grade the performance was better on LCF (Median= 30.00, SD=.84) than on LCI (Median=22.50, SD=1.69).The performance on factual questions was better than the performance on inferential questions for both 3rd and 4th grade TDC.

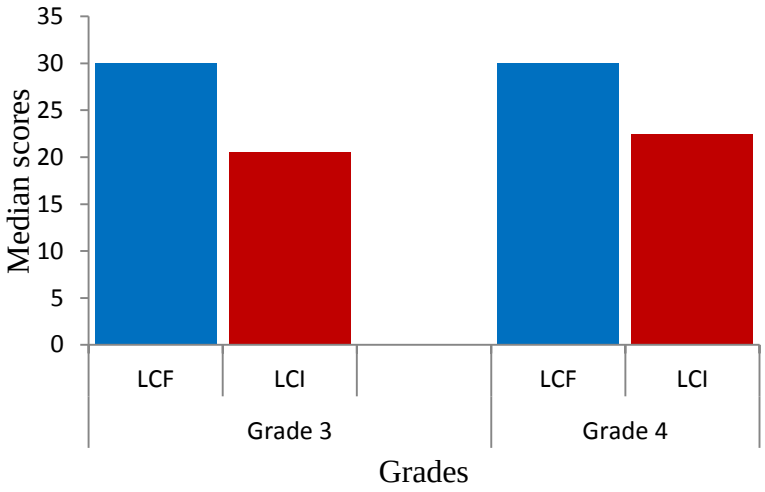


Figure 4.1.2 Performance of TDC in 3rd and 4th grades on total scores for LCF and LCI.

Further, comparison between different levels of DLC task in terms of the scores of factual and inferential questions were also carried out. Friedman test was carried out to see whether there is a difference between five levels of factual questions. The mean, median and SD for different levels of factual questions for TDC and children studying in 3rd and 4th grade were calculated using descriptive statistics.

Table 4.1.3b shows the mean, median and SD for different levels of factual questions in 3rd and 4th grade TDC.

Table 4.1.3b

Mean, median and SD for different levels of factual questions in 3rd and 4th grade TDC.

Grades	Parameters	Mean	Median	SD
3	LCF1	6.00	6.00	0.00
	LCF2	6.00	6.00	0.00
	LCF3	5.80	6.00	0.63
	LCF4	6.00	6.00	0.00
	LCF5	6.00	6.00	0.00
4	LCF1	6.00	6.00	0.00
	LCF2	6.00	6.00	0.00
	LCF3	6.00	6.00	0.00
	LCF4	5.60	6.00	0.84
	LCF5	6.00	6.00	0.00

Note- LCF- Listening comprehension for factual questions. The numerical value along with, represents the story number

Analysis of the results on Friedman test revealed that there was no significant difference between different levels of factual questions in TDC of both 3rd(χ^2=4.00, p>0.05) and in 4th grades (χ^2=8.00, p>0.05). The results as shown in Table 4.1.3b revealed that the performance of children in both 3rd and 4th grade were similar through different levels of factual questions.

The responses of TDC for factual questions were qualitatively analyzed. For factual questions, the answers were explicitly stated in the story itself. Most of the

TDC in 3rd and 4th grade correct responses to the factual questions asked. Most of them could answer even before presenting the multiple choices through cue cards. For example, /na:jaenṭınə a:n̥ʊ ṭınnaṭə?/ Which means 'What did the dog eat?' Most of the TDC gave complete and correct answers. That were /na:ja kɔ:zhikkʊŋŋınə ṭınnʊ/ or /kɔ:zhikkʊŋŋınə ṭınnʊ/ which means 'dog ate the chicken'.

Comparison between five levels of inferential questions was also carried out.Friedman test was used to see whether there is a difference between 5 levels of inferential questions in 3rd and 4th grade TDC. Table 4.1.3c shows the mean, median and SD for different levels of inferential questions for TDC in 3rd and 4th grade.

Table 4.1.3c

Mean, median and SD for different levels of inferential questions for TDC in3rd and 4th grade.

Grades	Parameters	Mean	Median	SD
3	LCI1	3.90	4.00	0.74
	LCI2	4.20	4.00	0.79
	LCI3	4.50	4.50	1.08
	LCI4	3.50	4.00	0.71
	LCI5	4.20	4.00	0.63
4	LCI1	4.80	5.00	0.79
	LCI2	4.40	4.00	0.52
	LCI3	4.40	4.00	0.52
	LCI4	4.60	5.00	0.52
	LCI5	5.00	5.00	0.67

Note- LCI- Listening comprehension for inferential questions. The numerical value along with, represents the story number

The analysis of results on Friedman test indicated that there is no significant difference between five levels of inferential questions in children studying in both 3rd grade (χ^2= 5.86,p>0.05)and 4th grade (χ^2=7.19, p>0.05).The results as shown in Table 4.1.3c revealed that the performance of children in both 3rd and 4th grade was similar through different levels of inferential questions.

The responses of TDC for inferential questions were qualitatively analyzed. For inferential questions, the answers were not explicitly stated in the stories. Inorder to answer such questions the children have to listen to the story carefully and infer the details. In case of TDC, at initial levels children performed comparatively better and as the length of the passage increased the performance slightly reduced in both 3rd and 4th graders. The children often gave complete and correct answers, incomplete correct answers and also few incorrect answers. For example, for the question /ənt̪ɪna:n̥ʊ a:t̥t̥ɪt̥ajan kar̥ʃakar̥ə nɔ:kkɪ tʃɪrɪtʃat̪t̥ə?/ which means 'Why did the boy laughed at the farmers?', few of the TDC answered 'because he thought that they believed the lie and came running' (which is a complete and correct answer), whereas few of them answered 'because the farmers believed' (which is incomplete correct answer), and some of them also answered, 'because fox came' (which is an incorrect answer) and none of them answered 'I don't know' and neither 'no response' was obtained.

Comparison between factual and inferential questions for each stories using Wilcoxon signed ranks test were carried out. Descriptive statistics was used to find the mean, median and SD for different levels of factual and Inferential questions for TDC studying in 3rd and 4th grade. The results are provided in Table 4.1.3b and 4.1.3c for 3rd and 4th grade TDC.

The analysis of results on Wilcoxon signed ranks test indicated that there was a significant difference in the scores of LC for factual questions (LCF) and LC for inferential questions (LCI) of each story for both 3rdgrade and 4th grade TDC. For children in grade 3 significant difference was found between LCF story1 and LCI story 1 (/z/= 2.85, p<0.01). The performance of 3rd graders on LCF story 1(Median=6.00, SD=0.00) was better than that of LCI story 1(Median=4.00, SD=0.74).A significant difference was found for LCF story2 and LCI story 2 (/z/=2.84, p<0.01) in children in grade 3 , where the performance on LCF story 2(Median=6.00, SD=0.00) was better than that of LCI story 2(Median=4.00, SD=0.79).There was a significant difference found between the performance on LCF story3 and LCI story 3 (/z/=2.39, p<0.05) of 3rd graders, where the performance of LCF story 3(Median=6.00, SD=0 .63) was better than performance of LCI story 3(Median=4.50, SD=1.08). A significant difference was obtained between scores of LCF story 4 and LCI story 4(/z/= 2.88, p<0.01) where the performance was better on LCF story 4(Median=6.00, SD=0.00) than on LCI story 4(Median=4.00, SD=0.71). A significant difference was also obtained between the scores of LCF story 5 and LCI story 5(/z/= 2.88, p<0.01), where the performance of LCF story 5 (Median=6.00, SD=0.00) was better than that of LCI story 5(Median=4.00, SD=0.67). The results suggested that at all the levels performance of LCF was better than that of LCI in TDC in 3rd grade.

For children studying in 4th grade a significant difference was found between LCF story1 and LCI story 1 (/z/= 2.58, p<0.05). The performance of 4thgraders on LCF story 1(Median=6.00, SD=0.00) was better than that of LCI story 1(Median=5.00, SD=0 .79). There was a significant difference between the performance on LCF story 2 and LCI story 2 (/z/=2.89, p<0.01), where the

performance was better on LCF story 4 (Median=6.00, SD=0.00) than on LCI story 4 (Median=4.00, SD=0.52). A significant difference was present between scores of LCF story3 and LCI story 3 (/z/=2.89, $p<0.01$)where the performance was better on LCF story 4(Median=6.00, SD=0.84) than on LCI story 4(Median=4.00, SD=0.52).There was a significant difference between the performance on LCF story 4 and LCI story 4(/z/= 2.33, $p<0.05$), where the performance was better on LCF story 4(Median=6.00, SD=0.00) than on LCI story 4(Median=5.00, SD=0.52). A significant difference was found between the performance on LCF story 5 and LCI story 5(/z/= 2.64, $p<0.01$), here also performance of LCF story 5 (Median=6.00, SD=0.00) was better than that of LCI story 5(Median=5.00, SD=0.67). The results suggested that the performance of LCF was better than that of LCI at all the levels in TDC studying in 4th grade.

4.2 Comparison between TDC and children with LD on LPT, VWM and DLC.

Descriptive statistics was used to calculate mean, median and SD of scores of LPT, VWM, and Listening Comprehension components such as total score for Factual questions (LCF) total score for Inferential questions (LCI) and total discourse level listening comprehension scores (DLC) for children with LD. Table 4.2.1 shows mean, median and SD scores of children with LD in 3rd and 4^{th}grades on LPT, VWM and DLC.

Table 4.2.1

Mean, median and SD scores of children with LD in 3rd and 4thgrades on LPT, VWM and DLC

	Class	Mean	Median	SD
LPT	3	256.80	258.50	4.96
	4	261.80	263.00	2.64
VWM	3	4.60	5.00	0.55
	4	5.00	5.00	1.00
LCF	3	26.80	26.00	2.28
	4	28.80	30.00	1.79
LCI	3	15.80	16.00	1.79
	4	17.60	17.00	0.89
DLC	3	42.60	42.00	2.41
	4	46.40	47.00	1.95

*Note:*LPT-Score of Linguistic Profile Test, VWM-Total score of verbal VWM task, LCF-Score of factual questions, LCI-score of inferential questions, DLC- Total score of LC task.

Analysis of results on Mann Whitney U test revealed that there was no significant difference between 3rd and 4th grade children with LD on LPT scores (/z/= 1.68, p>0.05). Results revealed that on LPT, 4th graders showed a better performance (Median= 263.00, SD= 2.64) than the performance of 3rd graders (Median= 258.50, SD= 4.96).On VWM, it was found that there is no significant difference between the performance of 3rd and 4th graders with LD (/z/=0.67. p>0.05). The results of VWM showed that the performance of children with LD in 4th grade (Median= 5.00, SD=1.00) was similar to that of the children in 3rd grade (Median= 5.00, SD= 0.55). The results indicated a developmental trend showing an improvement in the performance of children from 3rd grade to 4th grade in LPT.

While considering the listening comprehension components, there was a significant difference found between the performances of 3rd and 4th grade children with LD on DLC (/z/=2.21, p<0.05). For DLC, the performance of children in 4th grade (Median= 47.00, SD=1.95) was better than children in 3rd grade (Median=42.00, SD=2.41). No significant difference was found between the performance of children with LD in 3rd and 4th grade on LCF (/z/= 1.42, p>0.05). For LCF, 4th graders (Median= 30.00, SD= 1.79) showed a better performance than 3rd graders (Median= 26.00, SD= 2.28). Hence there was a developmental trend observed on LCF from 3rd to 4th grade. There was no significant difference was between the performance of children with LD in 3rd and 4th grade on LCI (/z/= 1.62, P>0.05). For LCI, the performance of children in 4th grade (Median= 17.00, SD=0.89) was better than that of 3rd grade children (Median=16.00, SD= 1.79). Thus the results indicated a developmental trend through the improvement of scores from 3rd graders to 4th graders with LD for LPT and DLC.

Qualitative analysis of DLC and VWM was done for children with LD. The observations on VWM task are discussed below. The children with LD in both grade 3 and grade 4, were only able to perform the task correctly till VWM Level 3, none of the participants were able to do the task at VWM Level 4 and VWM Level 5.

In case of children with LD of 3rd and 4th grade, primacy error, recency error, non-word errors and no responses were present on VWM task. Eg: For the sentence '/vɘ:nalil ʊn̥aŋɪja maram t̪ajipə pʊ:kal̥ kɔnt̥ɘ nɪr̥aɲʊ/' which means 'The tree that was drying during summer started to fill with flowers *ṭajipə*', '*ṭajipə'* is a non-word derived from the Malayalam word 'paṭijə' which means slowly. In case of primacy error, the children expressed it as /pʊ:kal̥ kɔnt̥ɘ nɪr̥aɲʊ/which means 'Filled with flowers'. In case of recency error,the children expressed it as /vɘ:nalil ʊn̥aŋɪja maram

pʊːv| which means ‘The tree that was drying, flower’. Majorly omissions of non-words in the sentences were present. Eg: The sentence ‘/vɪːʈ̪̊ɪl pʊɳɪja *sarəːka* vaːɲɲɪ/’ which means ‘Have brought a new *sarəːka* at home’ where ‘*sarəːka*’ is a non word derived from the word ‘kasəːra’ in Malayalam which means ‘chair’, was expressed as ‘/vɪːʈ̪̊ɪl pʊɳɪja vaːɲɲɪ /’ which means ‘bought new at home’. Substitution and omission of syllables or phonemes in non-words were also present in children of both the grades. None of the children with LD rearranged syllables in non-word and created a true word. And for almost all the children with LD were not responding at VWM level 4 and VWM level 5.

On DLC, for factual questions children with LD showed some incomplete correct and also incorrect responses, and they depended on the multiple choices and cue cards to correctly answer the questions as the difficulty of the passage increased. For example, /aːt̪ʊməːjkaːn pɔːjappɔːl̥ aːʈ̪̊ɪʈ̪̊ajanə ənʈaːn̪̊ʊ ʈɔːnnijaʈə?/which means ‘What did the shepherd thought of doing when herding the sheep?’ Some children with LD answered ‘he felt like fox is coming.’ or ‘he felt like shouting’.

For inferential questions, In case of children with LD most of the answers were ‘incomplete correct’, ’incorrect’, For example, while answering the question /ənʈɪnaːn̪̊ʊ aːʈ̪̊ɪʈ̪̊ajan kaɾ̪̊ʃakaɾ̪̊ə nɔːkkɪʧɪrɪʧaʈ?/ which means ‘Why did the shepherd laughed at the farmers?’, most of the children with LD answered ‘because the farmers ran and came’ (which is incomplete correct answer), and some of them also answered, ‘because fox came’ (which is an incorrect answer) or ‘don’t know’.

Further, descriptive statistics was used to calculate mean, median and SD of LPT, VWM and DLC of children with LD and TDC irrespective of grades. Table 4.2.2 shows mean, median and SD scores for LPT, VWM and DLC of TDC and LD

irrespective of grades.

Table 4.2.2

Mean, median and SD scores for LPT, VWM and DLC of TDC and LD irrespective of grades.

Parameters	Group	Mean	Median	SD
LPT	TDC	281.13	282.25	3.09
	LD	259.30	260.00	4.58
VWM	TDC	8.10	8.00	1.17
	LD	4.80	5.00	0.79
LCF	TDC	29.80	30.00	0.62
	LD	27.80	28.00	2.20
LCI	TDC	21.70	22.00	2.52
	LD	16.70	17.00	1.64
DLC	TDC	51.50	51.50	2.61
	LD	44.50	44.50	2.88

*Note:*LPT-Score of Linguistic Profile Test, VWM-Total score of verbal VWM task, LCF- Score of factual questions, LCI-score of Inferential questions, DLC - Total score of LC task, TDC- Typically developing children, LD- Children with Learning Disability.

Results of Mann Whitney U test revealed that a there was a significant difference between TDC and children with LD on scores of LPT (/z/=4.41, $p < 0.01$), where the performance of children with LD (Median= 260.00, SD= 4.58).was poorer than that of TDC (Median= 282.25, SD=3.09). There was a significant difference between TDC and children with LD on VWM (/z/=4.37, $p < 0.01$), where the performance of children with LD (Median= 5.00, SD= 0.79) was poorer than that of

TDC (Median=8.00, SD=1.17). Thus the results suggested that the performance of LD group was poorer than TDC on LPT and VWM.

On components of DLC, There was a significant difference on DLC (/z/=4.17, p< 0.01) between TDC and children with LD. The performance of children with LD (Median= 44.50, SD= 2.88) were poorer than that of. TDC (Median= 51.50, SD= 2.61) on DLC. A significant difference was found on LCF (/z/=3.06, p<0.01) between TDC and children with LD. On LCF, the performance of children with LD (Median= 28.00, SD= 2.20) was poorer than that of TDC (Median= 30.00, SD= 0.62). A significant difference was found on LCI (/z/=3.909, p< 0.01) between TDC and children with LD. On LCI, the performance of children with LD (Median= 17.00, SD= 1.64) were poorer than that of TDC (Median= 22.00, SD= 2.52). The results showed that the performance of children with LD on LPT, VWM and DLC were poorer than that of TDC.

Further descriptive statistics was used to calculate mean, median and SD scores for LPT, VWM, and DLC for TDC and children with LD of 3rd grade. Mann Whitney U test was used to infer the data. Table 4.2.3 shows the mean, median and SD of TDC and children with LD of 3rd grade on LPT, VWM and DLC.

Table 4.2.3

Mean, median and SD of TDC and children with LD of 3rd grade on LPT, VWM and DLC

	Group	Mean	Median	SD
LPT	TDC	278.90	278.25	2.68
	LD	256.80	258.50	4.96
VWM	TDC	7.70	8.00	1.25
	LD	4.60	5.00	0.55
LCF	TDC	30.00	30.00	0.00
	LD	26.80	26.00	2.28
LCI	TDC	20.20	20.50	2.35
	LD	15.80	16.00	1.79
DLC	TDC	50.20	50.50	2.35
	LD	42.60	42.00	2.41

Note: LPT-Score of Linguistic Profile Test, VWM-Total score of verbal VWM task, LCF- Score of factual questions, LCI-Total score of Inferential questions, DLC- Total score of LC task, TDC- Typically developing children, LD- Children with Learning Disability.

Analysis of results given on Mann Whitney U test showed that, there was a significant difference between TDC and children with LD in 3rd grade on LPT (/z/=3.06, $p<0.01$). For 3rd graders the performance of children with LD (Median=258.50, SD=4.96) were poorer than that of TDC (Median=278.25, SD= 2.68) on LPT. For VWM, it was found that there was a significant difference between the performance of TDC and children with LD (/z/=3.11, $p<0.01$) in 3rd graders, where the performance of children with LD (Median= 5.00, SD=0.55) were poorer than the performance of TDC (Median=8.00, SD=1.25).

While considering the components of discourse listening comprehension;

LCF (/z/=3.15, p<0.01), LCI (/z/=2.66,p<0.01) and DLC (/z/=3.078, p<0.01) showed a significant difference between LD and TDC of 3rd grade. The performance of DLC of children with LD (Mean=42.00, SD=2.41) was poorer than TDC (Median=50.50, SD=2.35). For LCF, performance of children with LD (Mean=26.00, SD=2.28)were poorer than the performance of TDC (Median=30.00, SD=0.00). For LCI also children with LD (Mean=16.00, SD=1.79) performed poorer than TDC (Median= 20.50, SD=2.35).The performance of children with LD in 3rd grade was poorer than that of TDC in 3rd grade on LPT, VWM and DLC.

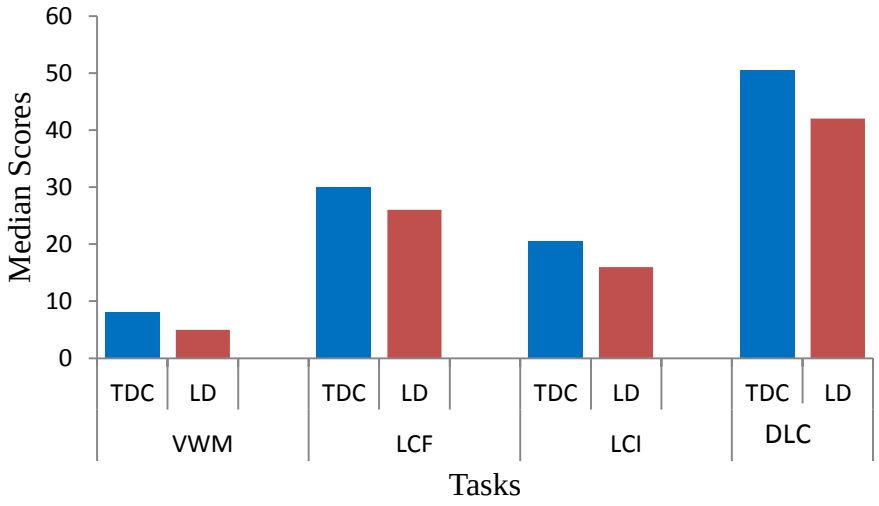


*Figure 4.2.1.*Performance of TDC and children with LD in 3rd grade on VWM and DLC.

Further descriptive statistics was used to calculate mean, median and SD of scores for LPT, VWM, and DLC for TDC and children with LD of 4th grade. Mann Whitney U test was used to infer the data. Table 4.2.4 shows the mean, median and SD of TDC and children with LD in 4th grade on LPT, VWM and DLC.

Table 4.2.4

Mean, median and SD of TDC and children with LD in 4th grade on LPT, VWM and DLC.

	Group	Mean	Median	SD
LPT	TDC	283.35	283.50	1.42
	LD	261.80	263.00	2.64
VWM	TDC	8.50	9.00	0.97
	LD	5.00	5.00	1.00
LCF	TDC	29.60	30.00	0.84
	LD	28.80	30.00	1.79
LCI	TDC	23.20	22.50	1.69
	LD	17.60	17.00	0.89
DLC	TDC	52.80	52.50	2.25
	LD	46.40	47.00	1.95

Note: LPT-Score of Linguistic Profile Test, VWM-Total score of verbal VWM task, LCF- Score of factual questions, LCI-score of Inferential questions, DLC- Total score of LC task, TDC- Typically developing children, LD- Children with Learning Disability.

Analysis of results on Mann Whitney U test showed a significant difference between LPT (/z/=3.09, $p<0.01$) between LD and TDC in 4th grade, where the performance of children with LD (Median=263.00, SD=2.64) in 4th grade were poorer than that of TDC (Median= 283.50, SD= 1.42). On VWM, there was a significant difference between the performances of TDC in 4th grade and LD in 4th grade (/z/=3.13, $p<0.01$). The performance of children with LD in 4th grade (Median= 5.00, SD=1.00) were found to be poorer than that of TDC in 4th grade (Median= 9.00, SD= 0.97).

While considering the components of discourse listening comprehension, Both DLC (/z/=3.02, p<0.01) and LCI (/z/=3.104, p<0.01) showed a significant difference between LD and TDC in 4th grade. On DLC, the performance of the children with LD (Median=47.00, SD=1.95) was found to be poorer than TDC in 4th grade (Median=52.50, SD= 2.25). On LCI, children with LD (Mean= 17.00, SD= 0.894) in the 4th grade performed poorer than TDC (Median=22.50, SD=1.69). There was no significant difference between LCF task of TDC and children with LD in 4th grade (/z/=0.95, p>0.05). The results showed that the performance of TDC in 4th grade (Median= 30.00, SD=0.84) on LCF was similar to that of children with LD in 4th grade (Median= 30.00, SD=1.79).

Overall, the comparison between TDC and children with LD on both 3rd and 4th grades revealed that there was a significant difference in all the parameters tested in the current study, that are LPT, VWM and discourse level listening comprehension (LCI, LCF and DLC). The children with LD performed poorer in LPT, VWM and DLC tasks, than TDC.

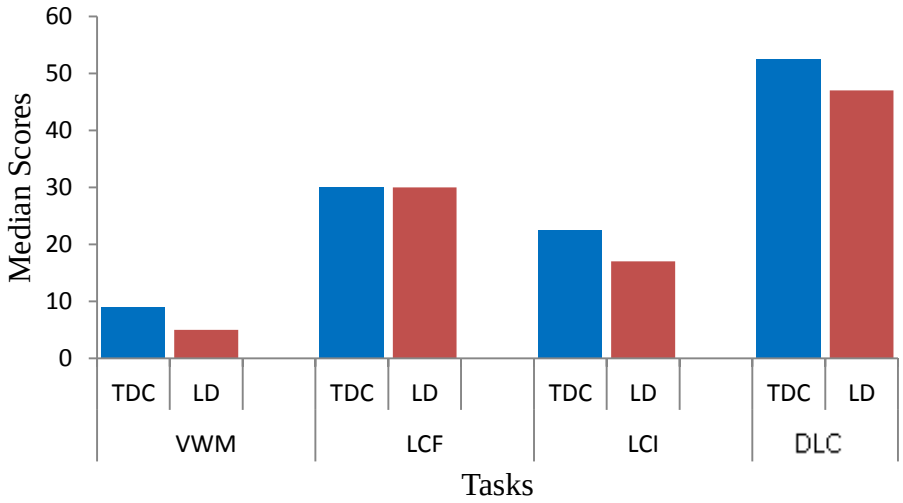


*Figure 4.2.2.*The median scores of TDC and children with LD in 4th grade on VWM and DLC

4.3 Relationship between LPT, VWM and DLC in children with Learning disability in the 3rd and 4th grades

Spearman correlation analysis was carried out to find the relationship between the scores of VWM and discourse level comprehension components that are LCF, LCI and DLC, and the results are discussed below for 3rd graders and 4th graders in both the groups.

For TDC, in 3rd graders there was no significant correlation between VWM and LCI (ρ=0.202, p>0.05), VWM and DLC (ρ=.202,p>0.05). Similarly in 4th graders also there was no significant correlation between VWM and LCF (ρ=.047, p>0.05) VWM and LCI (ρ=0.340, p>0.05), VWM and DLC (ρ=0.314, p>0.05). For children with LD, no significant correlation was found between scores of VWM and LCF (ρ=0.148, p>0.05), VWM and LCI (ρ=0.148, p>0.05) and VWM and DLC (ρ=0.289, p>0.05) in 3rd graders. Similarly in 4th graders with LD also there was no significant correlation present between the scores of VWM and LCF (ρ=0.177, p>0.05), VWM and LCI (ρ=0.177, p>0.05), VWM and DLC (ρ=0.406, p>0.05).

Further, correlation between LPT and VWM was also carried out using Spearman correlation test. The results showed that there was no significant correlation between LPT and VWM (ρ=0.057, p>0.05) in TDC studying in 3rd grade and between 4th grade (ρ=0.054, p>0.05). For children with LD, there was no significant correlation between LPT and VWM (ρ=0.866, p>0.05) for children in grade 3. Whereas a positive correlation was observed for LPT and VWM in grade 4 children (ρ=0.949, p<0.05) .

Correlation between LPT and discourse level listening comprehension task were also carried out. The results showed that, in TDC there was no significant correlation between LPT and LCI (ρ=0.315, p>0.05) and also between LPT and DLC (ρ=0.315, p>0.05) in children studying in 3rd grade. Similarly in 4th graders also there was no significant correlation present between the scores of LPT and LCF (ρ=0.225, p>0.05), between the scores of LPT and LCI (ρ=0.357, p>0.05) and between the scores of LPT and DLC (ρ=0.350, p>0.05).

For children with LD, no significant correlation was found between scores of LPT and LCF (ρ=0.205, p>0.05), LPT and LCI (ρ=0.051, p>0.05) and LPT and DLC (ρ=0.100, p>0.05) in 3rd graders. Similarly in 4th graders also there was no significant correlation present between the scores of LPT and LCF (ρ=0.447, p>0.05), LPT and LCI (ρ=0.224, p>0.05), and between LPT and DLC (ρ=0.667, p>0.05).

Hence, overall the results of the present study revealed that, in TDC, A developmental trend could be observed in LPT, VWM and DLC through an improvement in scores from 3rd to 4th grade. Similarly the results indicated a developmental trend through the improvement of scores from 3rd graders to 4th graders with LD for LPT and DLC. The VWM performance revealed that there is a significant difference between the levels, where the performance reduced as the sentence length increased. There was no significant difference between different levels of factual and inferential questions, whereas between factual and inferential there was a significant difference, the performance on factual questions were better than that of inferential questions.

On comparison of TDC and LD, the study revealed that there was a significant difference found in LPT, VWM and DLC between the groups, where the children

with LD performed poorer than that of TDC. The qualitative analysis of VWM and DLC also showed different patterns of responses in children with LD and TDC, and in general the performance of LD was poorer than that of TDC.

The results of the current study revealed that there was a positive correlation between VWM and DLC, and between LPT and DLC however it was not significant, for both the TDC and LD in both 3rd and 4th graders. Further, the results of the current study revealed that there is no significant correlation between LPT and VWM in TDC of 3rd and 4th grade. Wherein, for children with LD, only 4th graders showed a significant correlation between LPT and VWM.

CHAPTER 5: Discussion

The aim of the present study was to study verbal working memory and discourse level listening comprehension in children with LD in the 3rd grade and 4th grade. The task for assessing verbal working memory (VWM) was sentence repetition and for assessing listening comprehension, five stories each followed by 6 questions was used. The findings of the present study are discussed under the following sections.

5.1 Performance of TDC in the 3rd grade and 4th grade on LPT, VWM and DLC

5.2 Comparison between TDC and children with LD on LPT, VWM and DLC.

5.3 Relationship between VWM and DLC in children with Learning disability in the 3rd and 4th grades.

5.1 Performance of TDC in the 3rd grade and 4th grade on LPT, VWM and DLC.

The findings of the present study showed that there was a developmental trend observed on the measures of LPT, VWM and DLC from 3rd grade to 4th grade. The results on LPT showed a significant difference between the performance of 3rd graders and 4th graders, where 4th graders had a better performance than 3rd graders. This was in line with the findings of Asha (1997), who reported a developmental trend from 6 to 15 years of age in Malayalam speaking school going TDC in all the three subsections of LPT, that are phonology, syntax and semantics. The total score on LPT was found to be significantly different between the age groups till 12 years of age. It has been reported that a great deal of language development occurs even after the age of 5 years, particularly this process is very active during years of formal schooling ,

where children learn more formal use of language through academic instructions. Till school age the language development happens through listening, but later children learn to read which also helps in later language development (Nippold, 2006).

Further the results of the present study also indicated that even though there was no significant difference between the VWM of 3rd and 4th graders, the scores indicated a developmental trend with grade. The performance of 3rd graders was poorer than that of the 4th graders. Seigel and Ryan (1989) reported an increase in verbal working memory of school going TDC through 7 to 13 years of age. They used a sentence based working memory task and counting related working memory task, and found that the working memory capacity increases as a function of age. Bilvashree (2013) also reported that on non-word repetition task to assess working memory performance conducted in 2nd, 3rd and 4th graders showed that even though there was no significant difference in the performance between the groups, a developmental trend could be observed, where the younger children performed poorer than that of the older children. This can be attributed to the difficulty for younger children in keeping memory traces for words and the lack of effective and spontaneous memory strategies which are used by the older children. Also as the age increases, an improvement is seen in the storage and retrieval of verbal information presented to the child which is mediated by the phonological loop of working memory (Baddeley, 1998; Alloway et al., 2004).

The results of the current study also showed that the performance of TDC in 3rd and 4th grades on VWM task was better on sentence repetition task when the length of the sentences to be repeated was shorter. This may be because of the limitations in the memory capacity of younger children in comparison to older children. Longer sentences require more storage capacity and hence the performance

becomes poorer when the sentence length increases. Research has been reported that sentence repetition tasks tap the children's implicit language knowledge (Slobin& Welsh, 1973), but it is also dependent on the sentence length (Marinis & Armon-Lotem, 2015). The effect of sentence length on sentence repetition task is related to age, memory and linguistic knowledge. Longer sentences cannot be passively copied, but it requires processing, analysis and reconstruction of meaning using the children's memory capacity and the grammatical knowledge (Marinis & Armon-Lotem, 2015). As reported in Baddeley's Multicomponent Working memory model (Baddeley, 2000), the phonological loop, the central executive, episodic buffer and the long term memory plays an important role in determining the working memory capacity of a person. Episodic buffer is a system with a limited capacity, which can be related to the constraints in language processing capabilities of a person. As a result when the sentence length increases children tend to perform poorer on sentence repetition task.

Further in the current study, qualitative analysis of the performance on verbal working memory task revealed that TDC in both 3rd and 4th grade children have difficulty in repeating six and seven word sentences embedded with non-word. It has been reported that working memory is a capacity limited system and as the complexity of the sentence increases its constraints on the language processing abilities (Marinis & Lotem, 2015). Miller (1956) stated that the capacity limited memory system can only store 'seven plus or minus two' chunks of information at a time. But as the task used to assess verbal working memory in the current study, taxes the children's working memory capacity in different ways, that is in order to repeat a stimulus sentence the children have to simultaneously process the semantic and syntactic structure of the sentence and also to remember the phonologic representation of the non-word, it could become more difficult for children to perform correctly at

higher levels. The error analysis on VWM task in the current study revealed that TDC showed primacy error (when the child repeated only the last words of a sentence presented at a particular level), recency error (when the child repeated only the first words of a sentence presented at a particular level), Non word errors (omission and substitution of syllables in the non-word, and the conversion of non-word into a word). It was observed that all these errors were observed more at higher levels of VWM task. This can also be attributed to the limited memory capacity of children, as children will be able to correctly process, analyze and reconstruct only small sentences utilizing their memory system. The primacy and recency errors observed in the task may be attributed to the short term retention and subvocal rehearsal of items in memory respectively. The errors present on non-words were as follows: omission and substitution of syllables in the non-word, and the conversion of non-word into a word in TDC. Substitution of consonants was the most frequent error observed. This was in line with the findings of Santoes and Beuno (2003) where they investigated the non-word repetition of four to ten year old children. The most common error observed by them on non-word repetition task was substitution of consonants. TDC tried to analyze the non-word and produce a meaningful word out of it, which is suitable for the sentence and this is observed more at higher levels that is when the sentence length increases. This can be viewed as a memory strategy used by TDC, trying to overcome the limited capacity of the memory system. Limited resources are available on the task currently adopted for the present study, that is the repetition of non-word embedded sentences. Polisenka, Chiat and Roy (2015) used a similar task to find out the efficacy of sentence repetition tasks, where they had several linguistic conditions one of which was non-word embedded sentence repetition and they reported that immediate sentence repetition in 4 to 5 year old children tap phonology and morpho

syntactic abilities of children. It was also reported that non word repetition requires the person to convert the acoustic strings to phonemes and to store it in the phonological working memory (Dollaghan & Campbell, 1998, Baddeley, 1986, Baddeley & Hitch, 1974). Hence the conversion of non-word to a word, could be a strategy used by TDC to eliminate the load on working memory system in terms of storing the phonological representation of non-word.

For total scores of DLC, results of the current study revealed a significant difference between TDC the 3rd and 4th graders, where in the older children performed better than the younger children. Gough and Tunmer (1986) in their simple model of reading stated that, Listening comprehension utilizes the same processes that are used for comprehension of printed text except that of the cognitive demand needed for text decoding. Hence it is also possible that as in development of reading comprehension, children improve through the developmental changes wherein the constructive processes used by younger children are not like that of older children. Younger children are in an active process of developing comprehension, wherein they create mental representations of events in their environment. Since in younger children, these mental representations contain fewer relations, their performance on comprehension tasks seems to be poorer than older children. Kendeou, Kremer,Lynch, Butler, White and Lorch (2005) reported that, as the vocabulary knowledge and the cognitive proficiency improves, the mental representations expand and an improvement in comprehension skill is observed with development of age in children.

Further, the current study revealed that on LCF, there was no significant difference between 3rd and 4th grade TDC. The performances of 3rd and 4th grade

children were similar. This contradicts the study done by Divyashree (2017), where a developmental trend was found between the 3rd and 4th graders on answering factual questions, using the same task as in the current study. She reported that 4th graders performed better than that of 3rd graders on the task. They attributed the finding to working memory model, where the working memory is utilized by children to construct coherent mental representations, which helps them to recall and retrieve information accordingly. In the current study as discussed above, a significant difference was not found between the working memory between 3rd and 4th graders, which may be the underlying reason for the similar performance by children in both the grades on factual questions. The ability to understand factual information from the listening text develops from the age of four years, at the same age comprehension of implicit information also develops but to a lesser extent (Roch, Florit, & Levorato, 2011). According to them receptive vocabulary and verbal intelligence are reported to be significant in understanding explicit information, and from the initial developmental phases itself, linguistic and cognitive processes works together to understand the explicit information. They also reported that the mental processes required for comprehending the explicit information (both constructive and integrative) are lesser than that needed for implicit information.

Further, the present study revealed that there was a significant difference for inferential questions between TDC in 3rd and 4thgraders. It has been reported in literature that older children generate more inferences than younger children (Paris & Upton 1976). The improvement of performance of older children on inferential questions can be explained using the Baddeley's model of working memory (Baddeley, 1986). Comprehension of inferences while listening to the stories would require on-line formation of mental representations during listening. The children

should be able to retrieve and connect the relevant events from their mental representations in order to make inferences. That is in order to answer an inference question the children should be able to maintain and manipulate incoming information simultaneously. As development of working memory is a function of age (Seigel& Ryan, 1989) it could be explained that it could be due to better verbal working memory and the ability to recall and manipulate the information from passage is better in older children when compared to younger children.

The current study also revealed that there was a significant difference between the performance of factual questions and inferential questions at each level of DLC task and also between total score of factual questions and inferential questions. Qualitative analysis of the DLC task also revealed that most of the TDC in 3rd and 4th grade indicated correct responses to the factual questions whereas for inferential questions the children often gave complete and correct answers, incomplete correct answers and also few incorrect answers. The better performance on factual questions than that of inferential questions can be attributed to the cognitive load that the inferencing creates, as it needs the maintenance and manipulation of incoming information simultaneously to a greater extent than needed for understanding explicit information (Roch, Florit & Levorato 2011). Whereas for factual questions the answers are explicitly stated in the passage itself, which doesn't require the children to actively retrieve, recall and manipulate information in their mental representation. A similar finding was reported by Garrod and Sanford (1981) in case of reading comprehension, the mental processes involved in discourse comprehension depends on the demands that are imparted on the system, the encoding of inferences place more demands on memory capacity, when compared to the encoding of explicit information in the discourse.

5.2 Comparison between TDC and children with LD on LPT, VWM and DLC.

The results of the current study revealed that for children with LD, there was no significant difference between the 3rd and the 4th graders on LPT, but the performance of 4th graders are better than that of 3rd graders which indicated a developmental trend. This can be attributed to the development of language with age. It has been reported that as children develops, their vocabulary size and other linguistic knowledge improves as a function of age. This occurs in particular when children become active readers, where they have a new source of vocabulary learning along with listening (Nippold, 2006). As children with LD lag in acquiring this new source of language learning, their language development could also slow down when compared to the normal peers. This may account for the lack of significant difference between 3rd and 4th graders with LD on LPT, but the development of language may still occur through the listening mode, which can be observed as the improvement of scores in the current study.

The results of the VWM revealed that there was no significant difference between the performance of 3rd and 4th graders with LD, and the performance of both the grade children were similar. Working memory is reported to be a central part of reading comprehension, where the child have to recall the sentences that is read and to make inferences from the text and to create a complete mental model of the text being read (Daneman& Carpenter, 1980). Working memory skills in children are reported to improve as age increases, which contradicts the current results. As reported by Seigel and Ryan (1989), in children with dyslexia and dyscalculia an age related improvement is observed, even though there was a generalized deficit present in

working memory. The current results may be viewed as a slower pace of development of working memory in children with learning disability. This may be attributed to the delay and inadequate acquisition of academic skills by these children. Alloway (2009) reported that in children with learning difficulties, along with the developmental lag, the working memory deficit cannot make up as the age increases and will continue to follow the same pattern and capacity throughout years of school life. A similar report was also proposed by Swanson and Sachse- Lee (2001) that is the working memory deficits in children with LD is a sustained one, which doesn't improve over time.

Further qualitative analysis of VWM in children with LD revealed that there was primacy error, recency error and non-word errors present on sentence repetition task. In case of non-word errors, majorly omission of non-words in a sentence, substitution and omission of syllables or phonemes in the non-word were observed. None of the children with LD were able respond at higher level VWM task, where the children had to repeat six and seven word sentences with an embedded non-word. The serial recall errors in children with LD may be attributed to the capacity limitations of their memory system (Swanson & Sachse- Lee , 2001) and the non-word errors could be because of the limited capacity of phonological working memory (Dollaghan& Campbell, 1998, Baddeley, 1986, Baddeley& Hitch, 1974). It has been reported that as the number of items to be remembered increases, the demands on working memory increases. Hence for a sentence based working memory task, it becomes increasingly difficult for the children to repeat them back correctly when the number of words increases. Daneman and Carpenter (1980) reported that this working memory spans are correlated with reading comprehension in adults.

The current study also revealed that, there was a significant difference between the 3rd and 4th graders on DLC, where the performance of 4th grade children

with LD were better than that of the 3rd grade children with LD. Listening comprehension is influenced by many linguistic and cognitive factors such as vocabulary, background knowledge, working memory and inferencing (Hogan, Adolf & Alonzo, 2014). The increase in these skills is reported to be a function of age. In case of children with LD there are evidences of improvement in working memory (Seigel & Ryan., 1989) and Inferencing (Divyashree, 2017) with age. This result may be attributed to a higher order skill, such as being dependent on more basic vocabulary knowledge for comprehending a passage. Therefore it could be said that poor discourse level listening comprehension skills is due to poor vocabulary knowledge. The better performance of older children with LD can be attributed to the better vocabulary knowledge, background knowledge, inferencing and working memory in comparison with younger children with LD.

The results of the current study revealed that, there was no significant difference between children with LD in 3rd and 4th grade on LCF and LCI, but there was a developmental trend observed where the 4th graders performed better than that of 4th graders on both LCF and LCI. The results are supported by Divyashree (2007), where she reported that younger Kannada speaking children with LD performed poorer than that of older children in both factual and inferential questions. They attributed the finding to working memory, where the working memory is utilized by children to construct coherent mental representations, which helps them to recall and retrieve information accordingly. The results of improvement of factual questions as a function of age in the current study may be attributed to the increase in vocabulary and language knowledge with age (Duff, Reen, Plunkrt& Nation, 2015) which may help children to form a better coherent mental representation about the passage. These formations of mental representation in younger children with LD may not be as

efficient as in older children with LD. In case of inferencing also the ability to form better mental representation by older children may lead to their improvement in performance.

The qualitative analysis on DLC on children with LD revealed that children in both the grades had some correct, incomplete correct and incorrect responses for factual questions. For inferential questions most of the answers were 'incomplete correct' and 'incorrect'. Both these are found to be poorer than that of TDC. This can be attributed to the limited capacity of memory system in children with LD which is needed to derive implicit and explicit information from the available passage (Zwaan & Radwansky, 1998).

Further, present study compared the performance of LD and TDC on LPT, VWM and DLC. The results revealed that the performance of children with LD were poorer than that of TDC in all the parameters, both 3rd and 4th graders. On LPT, the current study revealed that there was a significant difference between the performances of children with LD and TDC. The performance of children with LD was poorer than that of TDC. It is reported that the developmental trend of TDC is different from that of children with LD (Andolina, 1980), where children with LD develop vocabulary and syntax gradually when compared to the rapid development in TDC after seven years. It may be because of the differences in reading skills of both the groups, it has been reported that in later language development reading also supplement listening (Nippold, 2006). As children with LD develop their vocabulary gradually and they lack fluent reading and reading comprehension skills, it could lead the language skills to fall behind that of TDC in the primary grades.

On VWM task, there was a significant difference between TDC and children with LD. Children with LD performed poorer than that of TDC. The current results could be supported by Fletcher (1985), he found that the children with dyslexia and dyscalculia had poor performance in both verbal and nonverbal working memory tasks when compared to age matched peers. These limitations working memory capacity can be due to storage constraints in the executive system, which limits the children's ability to store and process incoming information simultaneously.

On DLC tasks, there was a significant difference between the performance of children with LD and TDC on LCF, LCI and DLC. In all the three measures children with LD performed poorer than that of TDC. The results revealed that TDC could better understand literal and explicit information presented. Working memory plays an important role in deriving both factual and inferential information from the discourse. As observed in the present study children with LD have limited working memory capacity when compared to TDC, similar findings were reported by Seigel and Ryan (1989). Cain and Oakhill (1999) reported that constructive and integrative processes should happen on the text that is heard, in order to derive factual and inferential information from the discourse, this skill of deep analysis might be lacking in children with LD which make them poor comprehenders. Justice, Mashburn, and Petscher (2013) analyzed the language skills of children at 15, 24, 36 and 54 months, till their school entry and they reported that dyslexic children with poor comprehension skills also had deficient language skills. Hence it could be the deficient language skills and reduced working memory span and lack of deep analysis skills, which makes the children with LD perform poorer on DLC tasks.

5.3 Relationship between VWM and DLC in children with Learning disability in the 3rd and 4th grades.

The results of the current study revealed that there was a positive correlation between VWM and DLC, however it was not significant, for both the TDC and LD in both 3rd and 4thgraders. The results of the current study also indicated that in children with LD, the performance of VWM was poor, and their performance on DLC was also poor, wherein for the TDC, performance on VWM was better and DLC also was better.

There are various studies which have attempted to find out the relationship between VWM, listening and reading comprehension. It has been reported that working memory deficits contribute to comprehension deficits of both reading and listening in college students (Baddeley, 1986; Daneman & Carpenter., 1980). Studies have shown several working memory tasks correlate well with comprehension (Ackerman, Beier, & Boyle, 2002; Daneman & Merikle, 1996). Nation et al (1999) also showed that a direct relation exists between memory and listening comprehension, and he excluded the role of visuo spatial memory in listening comprehension. Language comprehension is not just hearing a message or decoding a stream of word. In order to have a better comprehension, it has been reported that listener should be able to process the incoming syntactic and semantic information, store the information on-line and retrieve and relate the relevant information together to form a coherent mental representation (Daneman & Merikle, 1996). But it was reported that when the tasks such as digit span, word span, letter span etc are used as the memory task, investigators couldn't find a significant correlation with language skills always (Perfetti & Lesgold, 1977). The positive correlation between VWM and DLC in the current study can be justified, as verbal working memory is a key factor in

comprehending complex and lengthy spoken information, as the important information will be stored while the processes for comprehension take place. It is proposed that a coherent mental representation of both explicit and implicit information is formed during listening, when the working memory is competent (Kintsch, 1998; Zwaan & Radvansky, 1998).

Further, the results of the current study revealed that there is no significant correlation between LPT and VWM in TDC of 3rd and 4th grade. Whereas, in children with LD, only 4th graders showed significant correlation between LPT and VWM. Even though not significant all the groups showed a positive correlation between LPT and VWM. The results of the current study also revealed that children with LD have poor language skills and VWM, whereas for TDC the LPT scores were found to be better, similarly VWM was also better. The results are in line with the report of Kim (2016), who reported that working memory can be directly related to language skills such as vocabulary and syntax. It has been reported that there is a link between vocabulary and verbal memory, which arises from the requirement to articulate memory items at recall or from earlier processes involved in the encoding and storage of the verbal material (Gathercole, Service, Hitch, Adams & Martin., 1999).

Further, the results of the current study revealed that there was no significant correlation between LPT and DLC tasks in both LD and TDC, in both 3rd and 4th grade children. There was a positive correlation between LPT and DLC, however it was not significant. Kim (2016) reported that the foundational oral language skills such as vocabulary and grammatical knowledge are related to inferencing and listening comprehension. In the current study, it was revealed that the LPT and DLC scores improve with age, and also when children with LD showed poorer LPT scores

their DLC was also observed to be poor. It has been reported that listening skills are important for language learning in children (Nippold, 2006). Hence the positive correlation can be attributed to the role of listening in language development, and vice versa.

CHAPTER 6: Summary and Conclusion

The current study was done in order to understand the Verbal working memory (VWM) and Discourse level listening comprehension (DLC) in children with Learning Disability (LD). The DLC was assessed at inferential level and at factual level. The primary aim of the present study was to investigate verbal working memory and discourse level listening comprehension in children with LD in the 3rd grade and 4th grade. Listening comprehension is reported to be a very important skill in both language and academic development (Stoganovik& Riddell, 2008). The VWM also reported to play a major role in the development of children's listening comprehension skills. Literature suggests that verbal working memory is a key factor in comprehending complex and lengthy spoken information, where the children have to store the incoming information and simultaneously process it in order to build a coherent mental structure of the passage. Many authors have proposed that working memory plays an important role in processing both factual and inferential information. Deficits in working memory are found to be a common feature of a wide range of developmental disorders and specific learning difficulties (Swanson&Sachse-Lee, 2007). It has been reported in literature that impairment of working memory are closely associated with learning deficits, as well as daily classroom activities (Alloway, 2006).Children with Learning disability often suffer verbal and visuo - spatial working memory deficits. These limitations in verbal working memory can also be demonstrated as listening comprehension deficits in children with learning disability as they are not able to store and process large amount of information needed for discourse level listening comprehension, which may further affect their academic achievement.Hence there is a need to study the verbal working memory and listening comprehension in children with learning disability.

Thus, the current study was aimed to investigate VWM and DLC in children with LD in the 3rd and 4th grades. The objectives of the study were, to study the performance of typically developing children in the 3rd and 4th grades on VWM and DLC, to compare the performance of typically developing children and children with Learning disability in the 3rd and 4th grades on VWM and DLC, and to study the relationship between VWM and DLC in children with Learning disability in the 3rd and 4th grades. The components of DLC assessed in the present study are listening comprehension of factual question (LCF), listening comprehension of inferential questions (LCI) and the total score of listening comprehension task (DLC).

The participants were divided into two groups, the clinical group and the control group. The clinical group included a total of 10 children with LD. The control group included a total of 20 TDC. All the participants were further subdivided into groups of 3rd grade(8yrs $\leq$ A $\leq$ 9.0 years) and 4th grade (9.0 $\leq$ A $\leq$ 10.0 years),children, where 'A' is the age of the child).The task for assessing verbal working memory was repetition of sentences in Malayalam, which are embedded with one trisyllabic non word and for assessing listening comprehension fivestories in Malayalam, each followed by six questions were used. The linguistic ability of the participants was also assessed using LPT in Malayalam (Asha, 1997). The obtained data was analyzed both qualitatively and quantitatively. Non parametric tests were done to analyze the data. Mann Whitney-U test was administered in order to compare the data between grades and between groups and Spearman correlation test was used to find the relationship between VWM and DLC. The study also revealed the correlation between LPT and VWM and between LPT and DLC.

The findings of the present study revealed that in TDC, the performance on LPT, VWM and DLC was better in 4th graders than in 3rd graders, which was indicative of the developmental trend of these parameters. On LPT, the 4th graders performed significantly better than that of children in 3rd grade. It has been reported that a great deal of language development occurs even after the age of 5 years, particularly this process is very active during years of formal schooling , where children learn more formal use of language through academic instructions. This could be attributed to the additional source of language which children acquire during school years, that is reading. Reading also contributes along with listening in later language development school age (Nippold, 2006).

In VWM task, even though not significant a developmental trend could be observed, where the TDC in 4th grade performed better than TDC in 3rd grade. This can be attributed to the difficulty for younger children in keeping memory traces for words and the lack of effective and spontaneous memory strategies which are used by the older children as the age increases, an improvement is seen in the storage and retrieval of verbal information presented to the child which is mediated by the phonological loop of working memory (Baddeley, 1998; Alloway et al., 2004).The results of the current study also showed that the performance of TDC in 3rd and 4th grades on VWM task was better on sentence repetition task when the length of the sentences to be repeated was shorter. This could be because of the limitations in the memory capacity of younger children in comparison to older children. Longer sentences require more storage capacity (Marinis & Armon-Lotem, 2015) and hence the performance becomes poorer when the sentence length increases. Episodic buffer is a system with a limited capacity, which can be related to the constraints in language processing capabilities of a person (Baddeley, 2000). The qualitative analysis of

VWM also showed less accuracy of performance when sentence length increases. It could be because the task used to assess verbal working memory in the current study, taxes the children's working memory capacity in different ways, that is in order to repeat a stimulus sentence the children have to simultaneously process the semantic and syntactic structure of the sentence and also to remember the phonologic representation of the non-word, which makes it more difficult for children to perform correctly at higher levels. The error analysis on the task revealed that primacy errors, recency errors and non word errors were present. The primacy and recency errors observed in the task may be attributed to the short term retention and subvocal rehearsal of items in memory respectively. The errors present on non-words were as follows: omission and substitution of syllables in the non-word, and the conversion of non-word into a word in TDC. It was reported that non word repetition requires the person to convert the acoustic strings to phonemes and to store it in the phonological working memory (Dollaghan& Campbell, 1998, Baddeley, 1986, Baddeley& Hitch, 1974). Hence the conversion of non-word to a word, could be a strategy used by TDC to eliminate the load on working memory system in terms of storing the phonological representation of non-word.

Further, findings of the current study revealed that, for total scores of DLC, the older TDC performed significantly better than the younger TDC. Van den Broek et al. (2005) reported that, as the vocabulary knowledge and the cognitive proficiency improves, the mental representations expand and an improvement in comprehension skill is observed with development of age in children. Younger children are in an active process creating mental representations of events in their environment. Since in younger children, these mental representations contain fewer relations, their performance on comprehension tasks seems to be poorer than older children.

Further, findings of the current study revealed that on LCF, the performances of TDC in 3rd and 4th grade children were similar. Florit, Roch and Levorato (2011) reported that linguistic and cognitive processes works together to understand the explicit information. They also reported that the mental processes required for comprehending the explicit information (both constructive and integrative) are lesser than that needed for implicit information. Further, findings of the present study revealed that on inferential questions the TDC in 4th grade performed better than TDC in 3rd grade. As development of working memory is a function of age (Seigel, & Ryan., 1989) it could be explained that it could be due to better verbal working memory and the ability to recall and manipulate the information from passage is better in older children when compared to younger children.

Further, the findings of the current study revealed that, TDC performed better on factual questions than on inferential questions. The better performance on factual questions than that of inferential questions can be attributed to the cognitive load that the inferencing creates, as it needs the maintenance and manipulation of incoming information simultaneously to a greater extent than needed for understanding explicit information (Florit, Roch & Levorato, 2011).

Further, comparison between 3rd and 4th grade children with LD revealed that on LPT, the children with LD in 4th grade performed better than that of children with LD in 3rd grade. It has been reported that as children develop, their vocabulary size and other linguistic knowledge improves as a function of age. The current study also revealed that both 3rd and 4th grade children with LD performed similarly on VWM task. Sachse- Lee (2001) reported that the working memory deficits in children with LD are a sustained one, which doesn't improve over time. Hence, the current results may be viewed as a slower pace of development of working memory in children with

learning disability. This may be attributed to the delay and inadequate acquisition of academic skills by these children. Further qualitative analysis of VWM in children with LD revealed that there was primacy error, recency error and non-word errors present on sentence repetition task. In case of non-word errors, majorly omission of non-words in a sentence, substitution and omission of syllables or phonemes in the non-word were observed. The serial recall errors in children with LD may be attributed to the capacity limitations of their memory system (Sachse- Lee , 2001) and the non-word errors could be because of the limited capacity of phonological working memory (Dollaghan& Campbell, 1998, Baddeley, 1986, Baddeley& Hitch, 1974).

Further, the findings of the current study revealed that, on LCF, LCI and DLC, older children with LD performed better than younger children with LD. The better performance of older children with LD can be attributed to the better vocabulary knowledge, background knowledge, inferencing and working memory in comparison with younger children with LD.

Further, the present study compared TDC and children with LD on LPT, VWM and DLC. The findings revealed that in all the components children with LD performed significantly poorer than TDC. The findings of the current study revealed that the performance of children with LD was poorer than that of TDC on LPT. It is reported that the developmental trend of TDC is different from that of children with LD (Andolina, 1980), where children with LD develop vocabulary and syntax gradually when compared to the rapid development in TDC after seven years. As children with LD develop their vocabulary gradually and they lack fluent reading and reading comprehension skills, it could lead the language skills to fall behind that of TDC in the primary grades.

The findings of the current study revealed that the performance of children with LD was poorer than that of TDC on VWM. On qualitative analysis also the children with LD were observed to be poorer than that of TDC. There are reports showing reduced working memory capacity in children with LD (Fletcher, 1985). The limitations in working memory capacity can be due to storage constraints in the executive system (Lee, 1993), which limits the children's ability to store and process incoming information simultaneously (De Jong, 1998) and hence leading to the poor performance on VWM tasks.

The findings of the current study revealed that on all three Discourse listening comprehension measures, that included LCF, LCI and DLC, children with LD performed poorer than that of TDC. The results revealed that TDC could better understand literal and explicit information presented. Cain and Oakhill (1999) reported that constructive and integrative processes should happen on the text that is heard, in order to derive factual and inferential information from the discourse, this skill of deep analysis might be lacking in children with LD which make them poor comprehenders. Hence, it could be the deficient language skills and reduced working memory span and lack of deep analysis skills, which makes the children with LD perform poorer on DLC tasks.

The current study was also aimed to study the relationship between VWM and DLC. The findings revealed that there was a positive correlation between the two measures in both TDC and LD groups, however it was not significant. The positive correlation between VWM and DLC in the current study can be justified, as verbal working memory to be a key factor in comprehending complex and lengthy spoken information, as the important information will be stored while the processes for comprehension take place. It is proposed that a coherent mental representation of both

explicit and implicit information is formed during listening, when the working memory is competent (Kintsch, 1998; Zwaan & Radvansky, 1998).

The findings of the current study also reported that there was a positive correlation between LPT and VWM in TDC and LD of both 3rd and 4th graders. However, it was significant only for children with LD in 4th grade. It has been reported that there is a link between vocabulary and verbal memory, which arises from the requirement to articulate memory items at recall or from earlier processes involved in the encoding and storage of the verbal material (Gathercole, Service, Hitch, Adams & Martin., 1999).

The findings of the current study also reported that there was a positive correlation between LPT and DLC in TDC and LD of both 3rd and 4th graders, however it was not significant. It has been reported that listening skills are important for language learning in children (Nippold, 2006). Hence the positive correlation can be attributed to the role of listening in language development, and vice versa.

Hence the first hypothesis of the study, which is there is no significant difference in the performance of typically developing children in the 3rd and 4th grades on VWM and DLC was partially accepted. The second hypothesis proposed was, there is no significant difference in the performance of typically developing children and children with Learning disability in the 3rd and 4th grades on VWM and DLC was rejected. The third hypothesis proposed was, there is no significant correlation between VWM and DLC of children with Learning disability in the 3rd and 4th grades was accepted.

Implications of the present study

The current study provides an insight into the language, VWM and DLC skills and its impairments in Malayalam speaking children with LD in 3rd and 4th grades and their typically developing counterparts. It provides an understanding about how these skills varies with age. The current study also provides an understanding of relationship between verbal working memory and listening comprehension in Malayalam speaking children with LD in comparison to TDC.

The present study contributes to the fact that children with learning disability demonstrate some deficiencies in verbal working memory and in listening comprehension at a discourse level. As it is a known fact that working memory and listening comprehension contributes to literacy skills and later language development, it is important to look into these factors at early ages. Thus the listening comprehension and working memory can be used as an essential part of assessment in order to predict oral language deficits and poor academic skills in children.

The present study may also contribute to the fact that the deficiencies in discourse listening comprehension could be contributed by the deficiencies in verbal working memory also. These findings have implications for better management of children with Learning disability and can effectively ameliorate the problems of learning that are associated with impairments of working memory and listening comprehension.

Limitations of the study

The current study was conducted to study the VWM and DLC in children with LD in 3rd and 4th grade only, in order to find a clear developmental trend a wider age range should have been considered. The number of participants considered for the

present study was not adequate enough to assert a significant result; hence it should have been considered to examine on a larger population for the study. Future research would be required to include a wider age range and a larger sample size in order to generalize results of the current study.

References

Adams, A. M., Bourke, L., & Willis, C. (1999). Working memory and spoken language comprehension in young children. *International Journal of Psychology*, *34*: 364–373. doi:10.1080/002075999399701

Ackerman, P. L., Beier, M. E., & Boyle, M. O. (2005). Working memory and intelligence: The same or different constructs? *Psychological Bulletin, 131,* 30 – 60.

Asha, M.M. (1997*).Linguistic Profile Test (LPT) (Malayalam) Normative Data For Children In Grades I to IX*. An unpublished Master's Dissertation.University of Mysore, Mysore.

Augur, J. (1985). Guidelines for teachers, parents and learners.In M. Snowling (Ed.), Children's Written Language Difficulties (147-170). Windsor, Berkshire: NFER-Nelson.

Alloway, T.P. (2007). Working Memory, Reading and Mathematical Skills in Children with Developmental Coordination Disorder.*Journal of Experimental Child Psychology, 96,* 20-36

Alloway, T.P. (2009). Working memory, but not IQ, predicts subsequent learning in children with learning difficulties. *European Journal of Psychological Assessment*, 25, 92-98.

Alloway, T.P. (2010). Working memory and executive function profiles of students with borderline intellectual functioning.*Journal of Intellectual Disability Research, 54,* 448-456

Alloway, T.P., & Archibald, L.M. (2008).A comparison of working memory and learning in children with developmental coordination disorder and specific language impairment.*Journal of Learning Disabilities , 41,* 251-262.

Alloway, T. P., Gathercole, S. E., Willis, C., Adams, A. M. (2004). A structural analysis of working memory and related cognitive skills in young children.*Journal of Experimental Psychology.87(2):*85-106.

Andolina, C. (1980). Syntactic maturity and vocabulary richness of learning disabled children at four age levels. Journal of Learning Disabilities, 13(7), 372-377.

Baddeley, A.D (1986). Working memory and comprehension. In D. Broadbent, J. McGaugh, M. Kosslyn, N. Mackintosh, E. Tulving, & L. Weiskrantz (Eds.), Working memory (pp. 75–107). New York: Oxford University Press.

Baddeley, A. D. (2000). The episodic buffer: A new component of working memory?.*Trends in Cognitive Sciences, 4,* 417–423.

Baddeley, A., Gathercole, S., & Papagno, C. (1998). The phonological loop as a language learning device. *Psychological Review, 105,* 158–173.

Baddeley, A. D., Hitch, G. J. (1974). Working memory. In The Psychology of Learning and Motivation: Advances in Research and Theory, ed. GA Bower, pp. 47–89. New York: Academic

Baker, L. (1985). Working memory and comprehension: A replication.*Bulletin of the Psychonomic Society*,23, 28–30.

Berninger, V. W. (2000) Development of language by hand and its connections with language by ear, mouth, and eye. *Topics in Language Disorders* ;20:65–84

.

Bilvashree, C. (2013). *Development of word and sentence level working memory test for typically developing children*.Unpublished masters dissertation, University of Mysore.

Bishop, D. V. M. (1997).*Uncommon Understanding: Development and Disorders of Language Comprehension in Children.* Psychology Press, 1997

Bishop, D. V. M., & Snowling, M. J. (2004). Developmental dyslexia and specific language impairment: same or different?.*Psychological Bulletin, 130* (6), 858

Bowyer-Crane, C., & Snowling, M. J. (2005). Assessing children's inference generation: what do tests of reading comprehension measure? *The British Journal of Educational Psychology*, (*75),* 189 – 201.

Braze, D., Tabor, W., Shankweiler, D. P., & Mencl, W. E. (2007). Speaking up for vocabulary reading skill differences in young adults.*Journal of Learning Disabilities*, *40,* 226 – 243.

Bull, R., Scerif, G. (2001). Executive functioning as a predictor of children's mathematics ability: Inhibition, switching, and working memory. *Developmental Neuropsychology, 19,* 273–293

Cain, K., & Oakhill, J. V. (1999).Inference making ability and its relation to comprehension failure in young children.*Reading & Writing: An Interdisciplinary Journal,* 11, 489-503.

Cain, K., Oakhill, J. V., Barnes, M. A., & Bryant, P. E. (2001).Comprehension skill, inference-making ability, and the relation to knowledge.*Memory & Cognition, 29(6*), 850-859.

Cain, K., Oakhill, J., & Bryant, P. (2004). Children's Reading Comprehension Ability: Concurrent Prediction by Working Memory, Verbal Ability, and Component Skills. *Journal of Educational Psychology, 96(1),* 31-42.

Communication Development: Kindergarten–5th grade , Retrieved from https://www.asha.org/public/speech/development/

Cromley, J. G., & Azevedo, R. (2007). Testing and refining the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology ,99* , 311 .

Daneman, M., &Merikle, P. M. (1996).Working memory and language comprehension: A meta-analysis. *Psychonomic Bulletin & Review,3(4):*422-33.

Daneman, M., &Blennerhassett, A. (1984).How to assess the listening comprehension skills of prereaders.*Journal of Educational Psychology, 76(6),* 1372-1381.

Daneman, M., &Carpenter, P. A. (1980).Individual differences in working memory and reading.*Journal of verbal behaviour and verbal learning*, 19(4), 450-466

Divyashree, G. (2017). *Discourse level listening comprehension in 3rd grade and 4th grade Kannada speaking children with Learning disability*. Unpublished masters dissertation, University of Mysore.

Dollaghan, C., & Campbell, T. F. (1998).Nonword repetition and child language impairment.*Journal of Speech, Language, and Hearing Research, 41*, 1136-1146.

Duff, F. J., Reen, G., Plunkett, K., & Nation, K. (2015). Do infant vocabulary skills predict school-age language and literacy outcomes?. *Journal of Child Psychology and Psychiatry*, *56*, 848–856. doi:10.1111/jcpp.12378

Elliot, L. (1999). *What's going on in there?How the brain and mind develop in the first five years of life*. New York: Bantam Books.

Ethical Guidelines for Bio-Behavioral Research.(n.d.). Retrieved from http://www.aiishmysore.in/en/ethiccommittee.html

Fletcher, J. M. (1985). Memory for verbal and nonverbal stimuli in learning disability subgroups: Analyses by selective reminding. *Journal of Experimental Child Psychology, 40,* 244-259.

Florit, E., Roch, M., Altoè, G. and Levorato, M. C. (2009), Listening comprehension in preschoolers: The role of memory. *British Journal of Developmental Psychology*, 27: 935–951. doi:10.1348/026151008X397189

Garrod, S. C. (1995). Distinguishing between explicit and implicit focus during text comprehension. *Focus and coherence in discourse processing*, Edited by: Rickheit, G. and Habel, C. 3–17. Berlin, , Germany: de Gruyter.

Garrod S. C.,& Sanford A. J. (1981). Bridging inferences in the extended domain of reference. In J. Long & A. Baddeley (Eds.), *Attention & Performance*, 9, pp. 331–346).

Gathercole, S.E., Alloway, T.P., Kirkwood, H.J., Elliott, J.E., Holmes, J., & Hilton, K. (2008).Attentional and executive function behaviours in children with poor working memory.*Learning and Individual Differences, 18*, 214–223.

Gathercole, .E., & Pickering, S. J. (2000).Working memory deficits in children with low achievements in the national curriculum at 7 years of age. *British journal of educational psychology*, 70 (2), 177-194

Gathercole, S. E., Lamont, E., & Alloway, T. P. (2006).*Working memory in the classroom.*In S. Pickering(Ed.), Working memory and education (pp. 219–240). Amsterdam: Elsevier Press.

Gathercole, S. E., Service, E., Hitch, G. J., Adams, A.. M., & Martin, A. J. (1999). Phonological short-term memory and vocabulary development: Further evidence on the nature of the relationship. *Applied Cognitive Psychology, 13(1),* 65-77. http://dx.doi.org/10.1002/(SICI)1099-0720(199902)13

Geary, D.C., Hamson, C.O., & Hoard, M.K., (2000). Numerical and arithmetical cognition: A longitudinal study of process and concept deficits in children with learning disability .*Journal of Experimental Child Psychology, 77*, 236—263.

Gough, P. B., & Tunmer, W. E. (1986).Decoding, reading, and reading disability.*Remedial and special education*, *7*(1), 6-10.

Hogan, T. P., Adolf, S., Alonzo (2014). On the importance of listening comprehension. *International Journal Of Speech Language Pathology* , 16(3) ,199-207.

Hoover, W. A., & Gough, P. B. (1990). The simple view of reading.*Reading and Writing, 2(2),* 127–160.

ICF Checklist (2003) Version 2.1a, *Clinical Form for International Classification of Functioning, Disability and Health*.World Health Organization.

Johnson-Laird, P. N., Bethell-Fox, C. E. (1978). Memory for questions and amount of processing.*Memory & Cognition,* 6(5), 496- 501

Jones, R. G. (2016).*A primer on communicative studies (Classic Edition).*Guilford Press

Just, M. A., & Carpenter, P. A. (1992).A capacity theory of comprehension. *Psychological Review, 99*, 122-149.

Justice, L. M., Mashburn, A., & Petscher, Y. (2013).Very early language skills of fifthgrade poor comprehenders.*Journal of Research in Reading, 2*, 172–185.

Kim, Y. G. (2016). Direct and mediated effects of language and cognitive skills on comprehension of oral narrative texts (listening comprehension) for children.*Journal of Experimental Child Psychology, 141*, 101–120

Kintsch, W. (1998).Comprehension.A paradigm for cognition. Cambridge, UK: Cambridge University Press

Kintsch, W. & Kintsch, E. (2005).Comprehension. In Paris, S. G. and Stahl, S. A. (eds.) *Children's Reading Comprehension and Assessment*, pp 71–92.

Lehman-Blake, M. T., &Tompkins, C. A. (2001).Predictive inferencing in adults with right hemisphere brain damage. *Journal of Speech, Language, and Hearing Research*, 44, 639–654

Marinis, T. & Armon-Lotem, S. (2015) Sentence repetition. In: Armon-Lotem, S., de Jong, J. and Meir, N. (eds.) *Methods for assessing multilingual children: disentangling bilingualism from Language Impairment. Multilingual Matters*, pp. 95-124

McLean, J. F., & Hitch, G. J. (1999).Working memory impairments in children with specific arithmetic learning difficulties. *Journal of Experimental Child Psychology*, *74,* 240−260.

McInnes A, Humphries T, Hogg-Johnson S, Tannock R (2003): Listening comprehension and working memory are impaired in attention-deficit/ hyperactivity disorder irrespective of language impairment. *Journal of Abnormal Child Psychology 31*:427– 443.

McLoughlin, D., Fitzgibbon, G., & Young, V. (1994). Adult Dyslexia: Assessment, Counselling and Training. London: Whurr.

Miles, T. R. (1982). The Bangor Dyslexia Test. Cambridge: Learning Development Aids.

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review.63*, 81–97.

Molloy, P. J. (1997). *The role of individual differences in working memory in reading and listening comprehension in intermediate grade students.*(Doctoral Dissertation).Retrieved from ProQuest Dissertation and Theses database.

Muter, V., Hulme, C., Snowling, M. J., & Stevenson, J. (2004). Phonemes, rimes, vocabulary, and grammatical skills as foundations of early reading development: evidence from a longitudinal study. *Developmental Psychology, 40*, 665.

Nation, K., Adams, J. W., Bowyer-Crane, C A., & Snowling, M. J. (1999). Working Memory Deficits in Poor Comprehenders Reflect Underlying Language Impairments.*Journal of Experimental Child Psychology,73(2),* 139-158.

Nippold, M. A. (1998). The definition of words. Later language development: the school-age and adolescent years, pp 43-58. *Austin, TX: Pro-Ed.*

Nippold, M. A. (2006). Language development in school-age children, adolescents, and adults. *In K. Brown (Ed.), Encyclopedia of language and linguistics (2nd ed.) (Volu*

Norbury, C. F., & Bishop, D. V. (2002). Inferential processing and story recall in children with communication problems: a comparison of specific language-impairment, pragmatic language impairment and high functioning autism. *International Journal of Language &Communication Disorders, 37*(3), 227-251.

Paris, S. G., & Upton, L. R. (1976).Children's memory for inferential relations in prose.*Child Development, 47,* 660-668.

Pickering, S. J., & Gathercole, S. E. (2004). Distinctive working memory profiles in children with special educational needs. *Educational Psychology, 24*, 393 – 408.

Polišenská, K., Chiat, S. & Roy, P. (2015). Sentence repetition: what does the task measure?.*International Journal of Language & Communication Disorders, 50(1),* pp. 106-118. doi: 10.1111/1460-6984.12126.

Prema, K. S. (1997). *Reading acquisition profile in Kannada* (Doctoral thesis).Retrieved from AIISH digital repository, (Th-21).University of Mysore, Mysore.

Roch, M., Florit, E., & Levorato, M. C. (2012). The advantage of reading over listening text comprehension in Down syndrome: what is the role of verbal memory? Journal of Research in. Developmental Disabilities, 33, 890-899. doi:10.1016/j.ridd.2011.11.002

Rosenblatt, L. M. (1985). Viewpoints: Transaction versus interaction - A terminological rescue operation. *Research in the Teachingof English*, (*19),* 96 – 107.

Santos, F. H., & Beuno, O. F. A. (2003). Validation of the Brazilian children's test of pseudoword repetition in Portuguese speakers aged 4 to 10 years. *Brazilian Journal of Medical and Biological Research,*36, 1533–1547.

Seeff-Gabriel, B., Chiat, S., &Roy, P. (2008).*The Early Repetition Battery*. London: Pearson Assessment.

Siegel, L. S. & Ryan, E. B. (1989). The development of working memory in normally achieving and subtypes of learning disabled children. *Child Development, 60,* 973-980.

St. George, M., Mannes, S., & Hoffman, J. E. (1997). Individual differences in inference generation: An ERP analysis. *Journal of Cognitive Neuroscience, 9, 776–787*.

Stojanovik, V., &Riddell, P.(2008). Expressive versus receptive language skills in specific reading disorder.*Clinical Linguistics and Phonetics, 22(45),*305-310.

Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*, *38*, 934.

Swanson, H. L. (1993). Working memory in learning disability subgroups.*Journal of Experimental Child Psychology, 56(1),*87-114.

Swanson, H.L., & Alexander, J.E. (1997). Cognitive processes as predictors of word recognition and reading comprehension in learning-disabled and skilled readers: Revisiting the specificity hypothesis. *Journal of Educational Psychology, 89(1),* 128-158.

Swanson, H. L., & Beebe-Frankenberger, M. (2004). The Relationship Between Working Memory and Mathematical Problem Solving in Children at Risk and Not at Risk for Serious Math Difficulties. *Journal of Educational Psychology, 96(3),* 471-491.

Swanson, H. L., Berninger, V. (1996). Individual differences in children's working memory and writing skill. *Journal of Experimental Child Psychology* , 358-385.

Swanson, H. L., & Sachse- Lee.(2001). Mathematical problem solving and working memory in children with learning disabilities. Both executive and phonological processes are important. *Journal ofExperimental Child Psychology,79*, 294-321

Swapna, N., (2011).*Word and Non-word repetition test for children in Kannada.* AIISH Departmental project. Mysore.

Tunmer, W. E., & Greaney, K. T. (2010).Defining dyslexia.*Journal of Learning Disabilities,43*, 229–243.

Van den Broek, P., Kendeou, P., Kremer, K., Lynch, J., Butler, J., White, M.J. & Lorch, E.P. 2005.Assessment of comprehension abilities in young children. In Paris, S. G. & Stahl, S.A. (eds). *Children's reading comprehension and assessment*: 107- 130.

Varghese, A. (2000). *Reading comprehension and listening comprehensionamong third and fourth graders*. An unpublished Master's Dissertation.University of Mysore, Mysore.

Vellutino, F. R., Tunmer, W. E., Jaccard, J. J., & Chen, R. (2007). Components of reading ability: Multivariate evidence for a convergent skills model of reading development. *Scientific Studies of Reading*, *11*, 3–32

Westby, C. (1991). Learning to talk, talking to learn: Oral– literate language differences. In C. S. Simon (Ed.), *Communication skills and classroom success: Assessment and therapy methodologies for language learning disabled students* (pp. 334–357). Eau Claire, WI: Thinking Publications.

Zwaan, R. A., & Radvansky, G. A., (1998) Situation Models in Language Comprehension and Memory .*Psychological Bulletin*. *123(2),* 162-185

Appendix I

TO ASSESS WORKING MEMORY

Task: Sentence repetition

Instruction:

"I will say few sentences, listen carefully and repeat the same."

/ɲɑːn kʊɾɑtʃʊ vaːkjaŋaļ parajʊm, aṭ̪ʊ sraḍ̪ḍ̪^{h}itʃʊ kːṭ̪ṭ̪a sɘːʃam aṭ̪ʊ poːlə ṭ̪annə ṭiritʃu paṛ̥ajuka./

nhAn kuRe vAkiangaL paRayum , atu sraddhichchu kETTa sesham atu pOle tanne tirichchu paRayuka

"ഞാന് കുറച്ച് വാക്യങ്ങള് പറയും, അത് ശ്റദ്ധിച്ചു കേട്ട ശേഷം അതുപോലെ തന്നെ തിരിച്ചു പറയുക."

Stimuli:

- **Practice items:**

- njAn kuRe *Lakichu.*

  /ɲɑːn kʊvə ļakɪtʃʊ /

  ഞാന് കുറെ *ളകിച്ചു*.

  I played a lot.

- maina *nnaRupa* pOyi.

  /nəɪma nnaɾʊpa pɔːjɪ/

  മൈന *ന്നറുപ* പോയി.

The bird flew away.

- **Stage 1**: (3 words)

1. njAn *dharumam* kazhichchu

   /ɲɑːn ɖarumam kaʃɪtʃʊ/

   ഞാന് *ധരുമം* കഴിച്ചു

   I had sweets.

2. avan pAdaBAgam *yAchchivu*.

   /avan ʈ^{h}ab^{h}aga:pam ja: tʃɪvʊ/

   അവന് *പാഠഭാഗം യാച്ചിവു.*

   He read the lesson.

3. enik d^{h}iyAmi vENam

   enɪk ʈ^{h}ɪja:mɪ və:ɳam

   എനിക്ക് *ഠിയാമി*വേണം

   I want chocolate.

- **Stage 2: (4 words)**

4. ayAL putiya *Lakima* paNitu.

   /aja:ɭ pʊʈɪja ɭa:kɪma paɳɪʈʊ/

   അയാള് പുതിയ *ളാകിമ* പണിതു.

   He built new bangalow.

5. samaram *rANakam* bas vanilla

   /samaram ra:ɳakam bas vanɪlla/

   സമരം *രാണകം* ബസ് വന്നില്ല.

   The bus didn’t come because of strike

6. vITTil putiya *sarEka* vAngi

   vɪːʈʈɪl pʊʈɪja *sarəːka* vaːɲɲɪ

   വീട്ടിൽ പുതിയ *സരേക* വാങ്ങി

   Have brought a new chair at home.

- **Stage 3: (5 words)**

7. *jAgindhi* ePOLum satyam paRayAn upadEshichchu.

   /*d͡ʒaː gɪndʰɪ* epɔːl̪um ʈ̪jasam paṛ̪ajaːn upaɖ̪əːsɪtʃu/

   ജാഗിന്ധി എപ്പോളും സത്യം പറയാന് ഉപദേശിച്ചു.

   Gandiji advised to always tell truth.

8. avaruDe *vItijam* dhuritam niRanjat Ayirunnu.

   /ɑvarʊtə *vɪːʈɪdʒam* ðʊrɪʈam nɪr̪ɑɲɲɑʈə ɑːjɪrʊnnʊ. /

   അവരുടെ *വീതിജം* ദുരിതം നിറഞ്ഞത് ആയിരുന്നു.

   Their life was miserable

9. strIk eattavum nalla Ab^{h}raNam ANu *njuripi*.

   |sʈrɪːkk ɘːttavum nalla aːbʰaraṇ̪am aːn̪ʊ *ntʃʊrɪpɪ*|

   സ്ത്രീക്ക് ഏറ്റവും നല്ല ആഭരണമാണു *ഞ്ചുരിപി*

   Smile is the best ornament that a woman can wear

- **Stage 4: (6 words)**

10. ayALuDe pATTu kETT ALukaL *yanAnni* kUvi

    /ajaːl̪ʊʈə paːʈʈʊ kəːʈʈ aːl̪ʊkal̪ *janaːnnɪ* kʊːvɪ/

    അയാളുടെ പാട്ടു കേട്ട് ആളുകള് *യനാന്നി* കൂവി

    People started whistling by listening to his song

11. avadhikkAlam aTukkumpOL mAvukaL niRaye *kkUlupa* uNTAkAruNT.

/avad^{h}ikka:lam aʈʊkkumbɔ:ḷ ma:vʊkaḷ niṛajə *kkʊ:lʊpa* ʊnʈa:ka:ṛunʈə /

അവധിക്കാലം അടുക്കുമ്പോള് മാവുകള് നിറയെ *ക്കൂലുപ* ഉണ്ടാകാറുണ്ട്.

Mango trees used to be full of flowers when vacation is near.

12. ucchaK b^{h}akShaNattinte *katupi* njAn mALuvinu koTuttu.

|ʊtʃtʃakk b^{h}akʃaṇaʈʈɪntə *kaʈʊpɪ* ɳa:n ma:ḷʊvɪnʊ kɔʈʊʈʈʊ|

ഉച്ചക്ക് ഭക്ഷണത്തിൻറെ *കതുപി* ഞാൻ മാളുവിനു കൊടുത്തു

I gave half of the lunch to Malu.

- **Stage 5: (7 words)**

13. kaLi kazhinju vannappOL mukham *Riyane* azhukk a:yirunnu.

/kaḷı kɑʒɪɲɲʊ vɑnnɑpɔ:ḷ mʊkham *ɾɪjanə* aḻukk a:jɪrʊnnʊ./

കളി കഴിഞ്ഞു വന്നപ്പോള് മുഖം *റിയനെ* അഴുക്ക് ആയിരുന്നു

Face was dirty when I came back after playing

14. vEnalil uNangngiya maram *tayipe* pookkaL koNT niRanjnju

/vɜ:nalil ʊṇaŋɪja maram *ʈajipə* pʊ:kaḷ kɔnʈə nɪṛaɲʊ/

വേനലില് ഉണങ്ങിയ മരം *തയിപെ* പൂക്കള് കൊണ്ട് നിറഞ്ഞു

The tree that was drying during summer started to fill with flowers slowly

15. nannAyi paD^{h}Icchatu koNT avan *rakShIpa* onnAmatAyi vijayicchu.

nanna:jı pat^{h}tʃtʃaʈʊ kɔṇʈ avan *rakʃi:pa* onna:maṭa:jı vidʒajɪtʃtʃʊ

നന്നായി പഠിച്ചതു കൊണ്ട് അവന് *രക്ഷീപ* ഒന്നാമതായി വിജയിച്ചു.

He passed the exam with first rank as he studied well.

**Non- words embedded in sentences are italicised & underlined.

Appendix II

Listening Comprehension

Story 1

Ravi has a dog. The dog saw a chicken one day. The dog caught the chicken and ate it. Ravi hit the dog. The dog went inside the kennel.

രവിക്ക് ഒരു നായ ഉണ്ട്. ഒരു ദിവസം നായ ഒരു കോഴിക്കുഞ്ഞിനെ കണ്ടു. നായ കോഴിക്കുഞ്ഞിനെ പിടിച്ചു തിന്നു. രവി നായയെ അടിച്ചു. നായ കൂട്ടിനുള്ളില് പോയി.

/ravikk oru na:ja uṇṭ. ɔrʊ dıvasam na:ja orʊ kɔ:zhikkʊɲɲınə kantʊ. aṭə kɔ:zhikkʊɲɲınə pıtıtʃtʃʊ ţınnʊ. ravi na:jajə atıtʃtʃʊ. na:ja kʊ:ţţınʊl̪l̪ıl pɔ:jı./

Questions

1. Who has the dog?

   ആർക്കാണ് നായ ഉള്ളത്?

   /ɑ:rkka:ṇʊ na:ja ullaṭə?/

2. What did the dog eat?

   നായ എന്തിനെ ആണ് തിന്നത്? (Cue card 1)

   /na:ja enţınə a:ṇʊ ţınnaṭə?/

3. Where did the dog go?

   നായ എവിടെ ആണു പോയത്? (Cue card 2)

   /na:ja ɘvıtə a:ṇʊ pɔ:jaṭ?/

4. Why did dog eat chicken?

   നായ എന്തിനാണ് കോഴിക്കുഞ്ഞിനെ തിന്നത്?

/na:ja enṭına:n̪ʊ kɔ:l̪ɪkuɲɲınə ṭınnaṭə?/

5. Why the dog went inside the kennel?

നായ എന്തിനാണ് കൂട്ടിനുള്ളില് കുരച്ചു കൊണ്ടിരുന്നത്?(Cue card 3)

/na:ja enṭına:n̪ʊ kʊ:ʈʈınul̪l̪il pɔ:jaṭ?/

6. If dog didn't eat chicken, what would have happened?

നായ കോഴിക്കുഞ്ഞിനെ തിന്നില്ലായിരുന്നെന്കില് എന്ത് സംഭവിച്ചേനെ?

/na:ja kɔ:l̪ɪkuɲɲınə ṭınnılla:jırʊnnənkl enṭʊ sambavıtʃtʃə:nə?/

Answer keys

1. Ravi has a dog.

രവിക്ക് ഒരു നായ ഉണ്ട്

/ravikk oru na:ja un̪ṯ./

2. The dog ate chicken

നായ ഒരു കോഴിക്കുഞ്ഞിനെ തിന്നു

/na:ja orʊ kɔ:zhikkʊɲɲınə ṭınnʊ./

3. The dog went inside the kennel

നായ കൂട്ടിനുള്ളില് പോയി.

/na:ja kʊ:ʈʈınʊl̪l̪ıl pɔ:jı./

4. Dog was hungry, hence it ate the chicken

നായക്ക് വിശന്നത് കൊണ്ട് കോഴിക്കുഞ്ഞിനെ തിന്നു

/na:jakə vısannaṭə kɔnt kɔ:zhikkʊɲɲınə ṭınnʊ./

5. Ravi hit the dog, the dog was sad hence it went inside the kennel.

രവി നായയെ അടിച്ചത് കൊണ്ട് അതിനു വിഷമം ആയി, അതിനാല് നായ കൂട്ടിനുള്ളില് പോയി

/ravı na:jaye atıtʃ͡tʃaṭʊ kont aṭınʊ viʃamam a:jı, aṭına:l na:ja kʊ:ʈʈınʊl̪l̪ıl pɔ:jı./

6. Chicken wouldn’t die, it would have grown bigger.

കോഴിക്കുഞ്ഞ് മരിക്കുമായിരുന്നില്ല, അത് വളരെയധികം വളരുമായിരുന്നു.

/kɔ:zhikkʊɲɲə marikkumāyirunnilla, at vaḷareyadhikaṁ vaḷarumāyirunnu/

Story 2

Appu and the dog

A dog was shouting in front of Appu's house. Appu gave stomache full of milk to the dog. Dog waved its tail because of happiness. Now the dog is taking care of Appu's house.

ഒരു ദിവസം അപ്പുവിൻറെ വീടിനു മുന്നില് ഒരു നായ കുരച്ചു കൊണ്ടിരുന്നു. അപ്പു നായക്ക് വയറു നിറയെ പാല് കൊടുത്തു. നായ സന്തോഷം കൊണ്ട് വാലാട്ടി. ഇപ്പോൾ നായ അപ്പുവിൻറെ വീടിനു കാവൽ നിൽക്കുന്നു.

/oru dɪvasam appʊvɪnt̪ə vɪ:tɪnʊ mʊnnɪl oru na:ja kʊrat͡ʃt͡ʃʊ kɔn̪ṯɪrʊnnʊ. appʊ na:jakk vayar̪ʊ nɪr̪aje pa:lʊ kɔtʊṯṯʊ. na:ja santɔ:ʃam kon̪t̪ va:la:ṯṯɪ. ɪppɔ:l̪ na:ja appʊvɪnt̪ə vɪ:tɪnʊ ka:val nilkkʊnnʊ./

Questions

1. What was shouting in front of Appu's house?

   അപ്പുവിൻറെ വീടിനു മുന്നിൽ എന്താണ് കുരച്ചു കൊണ്ടിരുന്നത്?. (Cue card 4)

   /appʊvɪnt̪ə vɪ:tɪnʊ mʊnnɪl enṭa:n̪ʊ kʊrat͡ʃt͡ʃʊ kɔn̪ṯɪrʊnnaṭ?/

2. What did Appu give to the dog?

   അപ്പു നായക്ക് എന്താണ് കൊടുത്തത്?. (Cue card 5)

   /appʊ na:jakk enṭa:n̪ʊ kɔtʊṭṭaṭ?/

3. What did the dog do because of happiness?

   സന്തോഷം കൊണ്ട് നായ എന്താണ് ചെയ്തത്? (Cue card 6)

   /santɔ:ʃam kon̪t̪ na:ja enṭa:n̪ʊ t͡ʃɔjṭaṭə?/

4. Why was the dog shouting?

   നായ എന്തിനാണ് കുരച്ചു കൊണ്ടിരുന്നത്?.

/na:ja enṭına:n̪ʊ kʊraʧʧʊ kɔn̪tırʊnnaṭ?/

5. If Appu didn't give milk, what the dog would have been done?

അപ്പു പാൽ കൊടുത്തില്ലയിരുന്നെന്കിൽ നായ എന്തു ചെയ്തേനെ?

/appʊ pa:l kɔtʊṭṭılla:jırʊnnənkıl na:ja enṭʊ ʧəjṭə:nə?/

6. Why the dog is taking care of Appu's house?

നായ എന്തിനാണ് അപ്പുവിൻറെ വീടിനു കാവൽ നിന്നത്?.

/na:ja ənṭına:n̪ə appʊvınʈə vı:tınʊ ka:val nınnaṭə?/

Answer keys

1. The dog was barking in front of Appu's house.

അപ്പുവിൻറെ വീടിനു മുന്നില് ഒരു നായയാണ് കുരച്ചു കൊണ്ടിരുന്നത്.

/appʊvınʈə vı:tınʊ mʊnnıl orʊ na:jajan̪ʊ kʊraʧʧʊ kɔn̪tırʊnnaṭ./

2. Appu gave milk to the dog.

അപ്പു നായക്ക് പാൽ കൊടുത്തു.

/appʊ na:jakk pa:lʊ kɔtʊṭṭʊ./

3. Dog waved his tail because of happiness.

നായ സന്തോഷം കൊണ്ട് വാലാട്ടി

/na:ja sanṭɔ:ʃam kon̪ʈə va:la:ṭṭı./

4. The dog was shouting because of hunger.

വിശന്നതു കൊണ്ടാണ് നായ കുരച്ചു കൊണ്ടിരുന്നത്.

/vısannaṭʊ kon̪ta:nə na:ja kʊraʧʧʊ kɔn̪tırʊnnaṭə/

5. If Appu didn't give milk, the dog would have died.

അപ്പു പാല് കൊടുത്തില്ലയിരുന്നെന്കില് നായ മരിച്ചു പോകുമായിരുന്നു.

/appʊ pa:l kɔtʊṭṭılla:jirʊnnənkıl na:ja marıtʧʊ pɔ:kʊma:jirʊnnʊ/

6. The dog is taking care of Appu’s house because of the love as he gave milk to it.

   അപ്പു പാല് കൊടുത്തതു കൊണ്ടുള്ള സ്നേഹം കാരണമാണ് നായ അപ്പുവിൻറെ വീടിനു കാവൽ നിൽക്കുന്നത്.

   /appʊ paːl kɔtʊṭṭaṭə kɔntuḷḷa sneːham kaːraṇamaːnə naːja appʊvɪntə vɪːtɪnʊ kaːval nɪlkkunnaṭə./

Story 3

There was a shepherd boy lived in a village. One day while herding the flock he thought he will have some fun, and started screaming “ fox .. fox”. Hearing this all the farmers nearby ran and came with sticks. The shepherd boy started laughing at the farmers. Then the farmers went back without the boy who lied to them. After one week the boy again screamed that a fox is there. This time also the farmers ran and came. They went back angrily by seeing fox is not there. After a few days the same boy screamed “fox.. fox”. This time nobody came to help him. The fox ate all his sheep without any fear. The boy realized the mistake he did.

ഒരു ഗ്രാമത്തിൽ ഒരു ആട്ടിടയൻ ഉണ്ടായിരുന്നു. ഒരു ദിവസം ആടു മേയ്ക്കാന് പോയപ്പോൾ അവനൊരു തമാശ തോന്നി, അവൻ "കുറുക്കൻ വന്നേ കുറുക്കൻ" എന്നു ഉറക്കെ കരയാൻ തുടങ്ങി. ഇതു കേട്ട് അടുത്തുള്ള കർഷകർ മുഴുവൻ വടിയും എടുത്ത് ഓടി വന്നു. ആട്ടിടയൻ കർഷകരെ നോക്കി ചിരിക്കാൻ തുടങ്ങി. ആട്ടിടയൻ നുണ പറയുകയാണെന്നു മനസ്സിലായ കർഷകർ തിരിച്ച് പോയി. ഒരാഴ്ചക്ക് ശേഷം വീണ്ടും ആട്ടിടയൻ കുറുക്കൻ വന്നേ എന്നു പറഞ്ഞ് കരഞ്ഞു. ഇത്തവണയും കർഷകർ ഓടി വന്നു. കുറുക്കൻ ഇല്ലെന്നറിഞ്ഞ് അവർ ദേഷ്യത്തോടെ മടങ്ങിപ്പോയി. കുറച്ചു ദിവസങ്ങൾക്ക് ശേഷം ആട്ടിടയൻ "കുറുക്കൻ വന്നേ കുറുക്കൻ" എന്നു ഉറക്കെ കരഞ്ഞു. പക്ഷെ ഇത്തവണ ആരും അവനെ സഹായിക്കാൻ വന്നില്ല. കുറുക്കൻ എല്ലാ ആടുകളെയും തിന്നു. ആട്ടിടയനു തൻറെ തെറ്റ് മനസ്സിലായി.

/orʊ gɾa:maṭṭɪl orʊ a:ṭ̥ṭ̥ɪtayan ʊn̥ṭ̥a:yirʊnnʊ. orʊ ḍɪvasam a:ṭ̥u me:jka:n po:jappɔ:l̥ avanɔrʊ ṭama:ʃa ṭɔ:nnɪ, avan "kʊr̥ʊkkan vannɘ: kʊr̥ʊkkan" ennʊ ʊr̥akkə karaja:n ṭʊṭ̥aɳɳɪ. ɪṭʊ kɘ:ṭ̥ṭ̥ atʊṭ̥ṭ̥ʊl̥l̥a kar̥ʃakar̥ mʊʒʊvan vaṭ̥ɪjʊm ətʊṭ̥ṭ̥ ɔ:ṭ̥ɪ vannʊ. a:ṭ̥ṭ̥ɪṭ̥ajan kar̥ʃakar̥ɘ nɔ:kkɪ t͡ʃɪrɪkka:n ṭʊtaɳɳɪ. a:ṭ̥ṭ̥ɪṭ̥ajan nʊn̥a par̥ajukaya:nɘnn

manasila:ja kar̥ʃakar̥ ṭɪrɪt͡ʃʊ pɔ:jɪ. ora:ʒt͡ʃakkə sɘ:ʃam vɪ:n̥t̥ʊm a:t̥t̥ɪt̥ajan kʊr̥ʊkkan vannɘ: ɘnnʊ par̥aɳɳə karaɳɳʊ. ɪṭṭavan̥ajʊm kar̥ʃakar̥ ɔ:t̥ɪ vannʊ. kʊr̥ʊkkan ɪllənnar̥ɪɳɳɘ avar ðə:ʃaṭṭɔ:t̥ə mat̥aɲɲɪppɔ:jɪ. kʊr̥t͡ʃ ðɪvasaɳɳal̥kk sə:ʃam a:t̥t̥ɪt̥ajan "kʊr̥ʊkkan vannɘ: kʊr̥ʊkkan" ennʊ ʊr̥akk karaɳɳʊ. pakʃə ɪṭṭavan̥a a:rʊm avanɘ saha:jɪkka:n vannɪlla. kʊr̥ʊkkan ella: a:t̥ʊkal̥ɘjʊm ṭɪnnʊ. a:t̥t̥ɪt̥ajanʊ ṭantə ṭɘttʊ manasɪla:jɪ./

Questions

1. What did all the farmers do when the boy screamed “fox.. fox”?

   ആട്ടിടയൻ "കുറുക്കൻ വന്നേ കുറുക്കൻ" എന്നു കരഞ്ഞപ്പോൾ കർഷകർ എന്താണു ചെയ്തത്?

   /a:t̥t̥ɪt̥ajan "kʊr̥ʊkkan vannɘ: kʊr̥ʊkkan" ennʊ karaɳɳappɔ:l̥ ənṭa:n̥ʊ t͡ʃəjṭaṭɘ?/

2. What did the farmers get along with them?

   കർഷകർ ഓടി വന്നപ്പോൾ എന്താണു കൊണ്ടു വന്നത്? (Cue card 7)

   /kar̥ʃakar̥ ɔ:t̥ɪ vannappɔ:l̥ ənṭa:n̥ʊ kɔnt̥ʊ vannaṭɘ?/

3. What did the shepherd thought of doing when herding the sheep?

   ആടു മേയ്ക്കാന് പോയപ്പോൾ ആട്ടിടയന് എന്താണു തോന്നിയത്?

   /a:t̥ʊ mɘ:jka:n pɔ:jappɔ:l̥ a:t̥t̥ɪt̥ajanə ənṭa:n̥ʊ ṭɔ:nnijaṭə?/

4. Why did farmers get sticks along with them?

   കർഷകർ ഓടി വന്നപ്പോൾ എന്തിനാണ് വടി കൊണ്ടു വന്നത്?

   /kar̥ʃakar̥ ɔ:t̥ɪ vannappɔ:l̥ ənṭɪna:n̥ʊ vat̥ɪ kɔnt̥ʊ vannaṭɘ?/

5. What was the shepherd’s mistake?

   ആട്ടിടയൻറെ തെറ്റ് എന്തായിരുന്നു?

   /a:t̥t̥ɪt̥ajantə ṭəttɘ ənṭa:jɪrʊnnʊ?/

6. Why did the boy laughed at the farmers?

എന്തിനാണ് ആട്ടിടയൻ കർഷകരെ നോക്കി ചിരിച്ചത്?

/ənt̪ɪna:n̪ʊ a:ʈʈɪt̪ajan kaɾ̪ʃakaɾ̪ə nɔ:kkɪ tʃɪrɪtʃat̪?/

Answer keys

1. The farmers came running to him while he screamed fox is here.

   ആട്ടിടയൻ "കുറുക്കൻ വന്നേ കുറുക്കൻ" എന്നു കരഞ്ഞപ്പോൾ കർഷകർ മുഴുവൻ ഓടി വന്നു.

   /a:ʈʈɪt̪ajan "kʊɾ̪ʊkkan vannɜ: kʊɾ̪ʊkkan" ennʊ karaɳɳappɔ:l̪ kaɾ̪ʃakaɾ̪ mʊʒʊvan ɔ:ʈɪ vannʊ./

2. The farmers got sticks along with them.

   കർഷകർ വന്നപ്പോൾ വടി കൊണ്ട് വന്നു.

   /kaɾ̪ʃakaɾ̪ ɔ:ʈɪ vannappɔ:l̪ vaʈɪ kɔnʈʊ vannʊ/

3. The shepherd thought of having fun by fooling the farmers.

   ആട്ടിടയൻ കർഷകരെ പറ്റിച്ച് രസിക്കാം എന്ന് വിചാരിച്ചു.

   /a:ʈʈɪt̪ajan kaɾ̪ʃakaɾ̪ə pattɪtʃtʃə rasɪkka:m ɜnnʊ vɪtʃa:rɪtʃtʃʊ./

4. The farmers got the sticks to beat the fox.

   കുറുക്കനെ തല്ലുവാൻ വേണ്ടിയാണ് കർഷകർ വടി കൊണ്ട് വന്നത്.

   /kʊɾ̪ʊkkanə ʈ̪allʊva:n və;n̪ʈɪja:n̪ə kaɾ̪ʃakaɾ̪ vaʈɪ vaʈɪ kɔnʈʊ vannaʈ̪ə/

5. The shepherd lied to the farmers saying a fox is there.

   ആട്ടിടയൻ കുറുക്കൻ വന്നേ എന്ന് കർഷകരോട് നുണ പറഞ്ഞു.

   /a:ʈʈɪt̪ajantə kʊɾ̪ʊkkan vannɜ ennʊ kaɾ̪ʃakaɾ̪ɔ:t nʊn̪a paɾ̪aɳɳʊ/

6. He laughed at the farmers because he thought that they believed the lie that he told and came running.

താൻ പറഞ്ഞ നുണ വിശ്വസിച്ച് കർഷകർ ഓടി വന്നതു കൊണ്ട് ആട്ടിടയൻ അവരെ കളിയാക്കി ചിരിച്ചു

/t̪a:n paranɳa nʊn̪a vɪʃvasɪtʃtʃə kaɽ̪ʃakar ɔ:t̪ɪ vannat̪ kɔn̪t a:t̪̪ɪtajan avarə kal̪ɪja:kkɪ tʃɪrɪtʃtʃʊ/

Story 4

A man had one elephant. He never gave it enough food to eat. But he used to make the elephant work too much. The elephant got very angry at its owner and put him under his feet and stamped him. He died. His wife started crying. She brought her son and put him under elephant's feet and said, "Hey elephant! You killed the father, now kill his son." The elephant saw the son and took him up and made him sit on its neck. From that day onwards, it started to listen and act as said by the boy. It started to work for the boy.

ഒരാൾക്ക് ഒരു ആന ഉണ്ടായിരുന്നു.അയാൾ ഒരിക്കലും ആനയ്ക്ക് ആവശ്യത്തിന് ഭക്ഷണം നല്കിയിരുന്നില്ല. പക്ഷെ അയാൾ ആനയെ കൊണ്ട് വളരെയധികം ജോലി ചെയ്യിപ്പിച്ചു. ആനയ്ക്ക് ദേഷ്യം വരുകയും ഉടമസ്ഥനെ കാലിനടിയിലിട്ട് ചവിട്ടുകയും ചെയ്തു. അയാൾ മരിച്ചു പോയി. അയാളുടെ ഭാര്യ കരയാൻ തുടങ്ങി. അവൾ അവരുടെ മകനെ എടുത്ത് ആനയുടെ കാലിനടിയിൽ ഇട്ടു കൊണ്ട് പറഞ്ഞു, "നീ ഇവൻറെ അച്ഛനെ കൊന്നില്ലേ , മകനെയും കൊന്നേക്ക്". ആന മകനെ എടുത്ത് അതിൻറെ പുറത്ത് ഇരുത്തി. അന്നു മുതൽ, ആന ആ കുട്ടി പറയുന്നത് കേൾക്കാൻ തുടങ്ങി. ആന ആ കുട്ടിക്ക് വേണ്ടി ജോലി ചെയ്യാൻ ആരംഭിച്ചു.

/oraːl̪k oru aːna ʊn̪t̪aːjɪrʊnnʊ. ajaːl̪ orɪkkalʊm aːnakk aːvaʃyat̪t̪ɪnʊ bʰakʃan̪am nalkɪjirunnilla. pakʃə ajaːl̪ aːnajə kɔn̪t. val̪arəjad̪ɪkam jɔːlɪ t͡ʃəjjɪt͡ʃt͡ʃʊ. aːnajk ðəʃjam varɪkajʊm ʊtamastʰanə kaːlinat̪ɪlɪ;ɪt̪t̪ t͡ʃavɪt̪t̪ʊkajʊm t͡ʃəjt̪ʊ. ajaːl̪ marɪt͡ʃt͡ʃʊ pɔːjɪ. ajaːl̪t̪ə bʰaːrɪa karajaːn ʈʊt̪aɲɲɪ. aval̪ avarʊt̪ə makanə aːnajʊt̪ə kaːlinat̪ɪjɪl ɪt̪t̪ʊ kɔn̪t̪ paranɳɳʊ, "nɪ ɪvantə at͡ʃt͡ʃanə kɔnnɪllə, makanəjʊm kɔnnə;kk" aːna makanə ət̪ʊt̪t̪ə at̪ɪntə pʊrat̪t̪ə ɪr̪ʊt̪t̪ɪ. annʊ mʊt̪al a;na aː kʊt̪t̪ɪ parajʊnnat̪ə kːl̪kaːn ʈʊɳɲɪ. aːna kʊt̪t̪ɪkkə vəːn̪t̪ɪ d͡ʒɔːlɪ t͡ʃəjaːn aːrambʰɪt͡ʃt͡ʃʊ./

Questions

1. Which animal did the man have?

   അയാൾക്ക് എന്ത് മൃഗമാണ് ഉണ്ടായിരുന്നത്? (Cue card 8)

   /aja:l̪kk ənʈʊ mrʊgamaɳə uɳʈa:jɪrnnaʈə?/

2. What did the man not give in enough quantity to the elephant?

   ആനയ്ക്ക് അയാൾ ആവശ്യത്തിന് എന്താണ് നല്കാതിരുന്നത്?

   /a:nakk aja:l̪ a:vaʃyaʈʈɪnʊ ənʈa:ɳə nalka:ʈɪrʊnnaʈə?/

3. What did the elephant do in anger?

   ദേഷ്യം വന്ന ആന എന്താണ് ചെയ്തത്?

   /ðə:ʃiam vanna a:na enʈa:ɳʊt͡ʃəjʈaʈə?/

4. Why did the owners wife asked the elephant to kill the son also?

   ഉടമസ്ഥൻറെ ഭാര്യ എന്തിനാണ് മകനെയും കൂടെ കൊല്ലാൻ ആനയോട് പറഞ്ഞത്?

   /ʊtamastʰantə bʰa:r ɪa ənʈɪna:ɳə makanəjʊm kʊ:ʈə kɔlla:n a:vaʃɪappəʈʈaʈə?/

5. Why did the elephant not kill the son when the owner's wife asked to do so?

   എന്ത് കൊണ്ടാണ് ഭാര്യ പറഞ്ഞിട്ടും ആന ഉടമസ്ഥൻറെ മകനെ കൊല്ലാതിരുന്നത്?

   /ənʈʊ kɔɳʈa:ɳə bʰa:rɪa paranɲɪʈʈʊm a:na ʊtamastʰantə makanə kɔlla:ʈrʊnnaʈə?/

6. Why did the elephant make the child sit on its neck?

   എന്ത് കൊണ്ടാണ് ആന മകനെ എടുത്ത് അതിൻറെ പുറത്ത് ഇരുത്തിയത്?

   /ənʈʊ kɔɳʈa:ɳə a:na makanə əʊʈə aʈɪntə pʊraʈʈəɪrʊʈʈɪjaʈə?/

Answer keys

1. The man had an elephant.

   അയാൾക്ക് ഒരു ആന ഉണ്ടായിരുന്നു

   /aja:l̪kk oru a:na ʊn̪t̪a:jɪrʊnnʊ/

2. The man didn't give it enough food to eat.

   അയാൾ ആനയ്ക്ക് ആവശ്യത്തിന് ഭക്ഷണം നല്കിയിരുന്നില്ല

   /aja:l̪ a:nakk a:vaʃyat̪t̪ɪnʊ bʰakʃan̪am nalkɪjirunnilla./

3. The elephant got very angry at its owner and put him under his feet and stamped him

   ആനയ്ക്ക് ദേഷ്യം വരുകയും ഉടമസ്ഥനെ കാലിനടിയിലിട്ട് ചവിട്ടുകയും ചെയ്തു

   /a:najk ðɔʃjam varɪkajʊm ʊtamastʰanɜ ka:linat̪ɪlɪ;ɪt̪t̪ t͡ʃavɪt̪t̪ʊkajʊm t͡ʃɔjt̪ʊ./

4. Because the elephant killed her husband the wife asked the elephant to kill her son also.

   ആന അവരുടെ ഭർത്താവിനെ കൊന്നതു കൊണ്ട് ഭാര്യ ആനയോട് അവരുടെ മകനെയും കൊന്നുകളയാൻ പറഞ്ഞു

   /a:na avarʊt̪ə bʰar̪t̪t̪a:vɪnə kɔnnat̪ʊ kɔn̪t̪ə bʰa:rɪa a:najɔ:t̪ə avarʊt̪ə makanəjʊm kɔnnʊ kal̪aja:n paranɳu./

5. The elephant started to assist the owner's family.

   ആന ഉടമസ്ഥൻറെ കുടുംബത്തെ സേവിക്കാൻ തുടങ്ങി.

   /a:na ʊtamastʰantɜ kʊtʊmbat̪t̪ɜ snɜ:hɪkka:n tɪʊt̪ɳɪ./

6. The elephant made the boy sit on its neck because it started to listen and act as said by the child.

   ആന മകനെ എടുത്ത് അതിൻറെ പുറത്ത് ഇരുത്തി കാരണം ആന ആ കുട്ടി പറയുന്നത് കേൾക്കാൻ തുടങ്ങി.

/aːna makanə əʈʊʈə aʈɪntə pʊraʈʈə ɪrʊʈʈɪ kaːraɳam aːna aː kʊʈʈɪ parajʊnnaʈə kə;ḷkkaːn ʈʊʈaɲɲɪ./

Story 5

Thief and his mother

Once upon a time there was a lady in a village. She had a son. One day he stole a book from his school and came home. His mother got to know about this, and she praised him saying that “you have done a good job, son”. So the boy thought that stealing is a good habit and he started stealing things. As and when he grown up he started stealing bigger things and one day he was caught by royal guards. After questioning him, king ordered death penalty for him. On the way to jail so many people came to see him. Everyone was laughing at him. Before hanging him, they asked him what is his last wish? Then he said I want to talk to my mother. He went near his mother’s ear and he started biting her ears with his teeth. The lady started screaming saying “ayyo”. Then the security started teasing him saying “you have stolen so many things and now you did this also, how cruel you are!” then he said “Yes I am cruel , because when I started stealing things she didn’t correct me, instead she encouraged me and now I became a thief and I have to die like this. Otherwise I would have also been a good human being like you all.”

ഒരിടത്ത് ഒരു ഗ്രാമത്തിൽ ഒരു സ്ത്രീ താമസിച്ചിരുന്നു. അവർക്ക് ഒരു മകന് ഉണ്ടായിരുന്നു. ഒരു ദിവസം അവന് സ്കൂളിൽ നിന്ന് ഒരു പുസ്തകം കട്ടു കൊണ്ട് വന്നു. അവന്റെ അമ്മ ഇത് മനസ്സിലാക്കി. ആ സ്ത്രീ അവനോട് പറഞ്ഞു "നീ ഒരു നല്ല കാര്യമാണു മോനെ ചെയ്തത്". ഇത് കേട്ട കുട്ടി മോഷണം ഒരു നല്ല കാര്യമാണെന്ന് കരുതി. ആതിനു ശേഷം അവൻ വീണ്ടും മോഷ്ടിക്കാൻ തുടങ്ങി.. അവന് വളർന്നപ്പോൾ വലിയ വലിയ സാധനങ്ങൾ മോഷ്ടിച്ചു. ഒരു ദിവസം അവനെ രാജഭടന്മാർ പിടികൂടി. വി ചാരണക്ക് ശേഷം രാജാവ് അവനെ തൂക്കിക്കൊല്ലാൻ വിധിച്ചു.. ജയിലിലെക്ക് കൊണ്ട് പൊകുന്ന വഴി അയാളെ

കാണാൻ നാട്ടുകാര് തടിച്ചു കൂടിയിരുന്നു. അവർ അയളെ കൂവുകയും കളിയാക്കി ചിരിക്കുകയും ചെയ്തു. തൂക്കിക്കൊല്ലുന്നതിനു മുന്പ് അവർ അയാളോട് അവസാനത്തെ ആഗ്രഹം എന്താണെന്ന് ചോദിച്ചു.. അപ്പൊൾ അയാൾ അമ്മയോട് സംസാരിക്കണമെന്ന് ആവശ്യപ്പെട്ടു. അയാള് അമ്മയെ കാണാനെത്തി, അമ്മയുടെ ചെവിക്കടുത്തു ചെന്ന് അവരുടെ ചെവി കടിച്ചു പറിക്കാൻ തുടങ്ങി. ആ സ്ത്രീ വേദന കൊണ്ട് "അയ്യൊ' എന്ന് അലറിക്കരഞ്ഞു.അപ്പോൾ രാജഭടന്മാർ അയാളെ കളിയാക്കാൻ തുടങ്ങി, നീ ഇതുവരെ ഒരുപാട് സാധനങ്ങൾ മോഷ്ടിച്ചു ഇപ്പോൾ ഇതും , എന്തൊരു ദുഷ്ടനാണ്നീ. അപ്പോൾ അയാൾ പറയാൻ തുടങ്ങി, അതെ ഞാൻ ദുഷ്ടനാണ്, കാരണം ഞാൻ മോഷ്ടിക്കാൻ തുടങ്ങിയപ്പോൾ അവർ എന്നെ തിരുത്തിയില്ല, പകരം എന്നെ പ്രോത്സാഹിപ്പിച്ചു. അതുകൊണ്ട് ഞാൻ ഇന്നൊരു കള്ളനായി ഇങ്ങനെ മരിക്കുന്നു അല്ലായിരുന്നെന്കിൽ ഞാനും നിങ്ങളെപ്പോലെ നല്ലൊരു മനുഷ്യൻ ആയെനെ.

/oriɻaṭə oru gra:maṭıl oru sṭrı: ṭa:masıʧirunnu. avarkk oru makan unɻa:jırunnu. oru ḍıvasam avan sku:ḷıl nınnə oru pusṭakam kaṯṯu konṯ vannu. avantə amma iṭu manasila:kkı. a: sṭhrı: avano:ṭə paraɲɲu "nı: oru nalla ka:rjama:ṉu monə: ʧəjṭaṭə". iṭu kə:ṯṯa kuṯṯı mo:ʃaṉam oru nalla ka:rjama:ṉənn karuṭı. aṭınu sə:ʃam avan vı:nɻum mo:ʃtıkka:n ṭuṭanɲı. avan vaḷarnnappo:ḷ valıja valı sa:ḍanaɲɲaḷ mo:ʃṯıtʃtʃu. oru dıvasm avanə ra:dʒabʰaṭanma:r pıṯıku:ṯı. vıtʃa:raṉakk sə:ʃam ra:dʒa:v avanə ṭu:kkıkkolla:n vıḍıtʃu. dʒajılıə:kk kondu po:kum vaʒı ay:lə ka:na:n na:ṯṯuka:ṛ ṭatıtʃtʃu ku:ṭıjırunnu. avar aya:ḷə ku:vukajum kaḷıya:kkı ʧırıkkukajum ʧəjṭu. ṭu:kkıkkollunnaṭınu munp avar aja:ḷoṭə avas:naṭə a:graham enta:nənn ʧo:ḍıtʃu. aja:ḷ ammajə ka:nanamenn a:vasjappəṯṯu.aja:ḷ ammajə ka:ṉa:nəṭṭı, ammajuṭə ʧəvıkkaɻuṭṯu ʧənn,avarutə ʧəvı kaɻıtʃʃu paṛıkka:n ṭutanɲı. a: sṭrı: və:ḍana konṯ "ayyo:" ənn

alaḷkkaraɲɲʊ. appoːḷ raːdʒabʰaṭanmaːr ajaːlə kaḷɪjaːkkaːn ʈʊṭɳɳɪ. nɪ opaːʈə saːɖanaɳɳaḷ moːʃtɪtʃtʃʊ, ɪppoːl ɪʈʊm. ənʈorʊ ɖʊʃtanaːnʃʊ niː. appoːḷ ajaḶ paraɲɲʊ. atə ɳaːn ɖʊʃtanaːnʃʊ, kaːraṇam, ɳaːn moːʃtɪkkaːn ʈʊṭanɳɳjappoːḷ avr ənne ʈruṭṭɪjɪlla. pakaram ənne proːlsaːhɪppɪtʃʊ. aṭʊkonṭ ɲaːn ɪnnoːrʊ kaḷḷanaːjɪ ɪɳɳanə marɪkkʊnnʊ, allaːjɪrʊnnənkɪl ɲaːnʊm nɪɳɳaḷəpoːlə nallorʊ manʊʃɪan ayəːnə/

Questions

1. What did the lady's son stole from the school?

   സ്ത്രീയുടെ മകൻ സ്കൂളിൽ നിന്ന് എന്താണ് മോഷ്ടിച്ചത്? (Cue card 9)

   /sʈrɪːutə makan skʊːḷɪl nɪnnə ənʈaːṉə moːʃṭɪtʃtʃat ə?/

2. Which part of his mother did he bite?

   അമ്മയുടെ ഏത് ഭാഗമാണ് അയാൾകടിച്ചത്? (Cue card 10)

   /ammajutə əːt bʰaːgamaːnə ajaːḷ kaṭṭɪtʃtʃaʈə?/

3. What punishment did the king give to the thief?

   രാജാവ് എന്ത് ശിക്ഷയാണ് കള്ളന് നല്കിയത്?

   /raːdʒaːv ənʈə ʃɪkʃajɑːṉə kaḷḷanə nalkɪjaʈə?/

4. What was the mistake made by the lady?

   സ്ത്രീ ചെയ്ത തെറ്റ് എന്തായിരുന്നു?

   /sʈrɪː tʃəjʈa ʈətt ənʈaːjɪṛʊnnʊ?/

5. What made the thief so angry with the mother?

   എന്താണ് കള്ളന് അമ്മയോട് വളരെ ദേഷ്യം തോന്നാൻ കാരണം?

   /ənʈaːṉə kaḷḷanə ammajoːṭ vaḷarə ɖəːʃɪam ʈoːnnaːn kaːraṇam?/

6. If the thief is released from the jail how will he live?

   കള്ളനെ ജയിലിൽ നിന്നും വെറുതെ വിട്ടാൽ അയാള് എങ്ങനെ ജീവിക്കും?

   /kaḷḷanə dʒajɪll ninnʊm vɪṭṭaːl ajaːḷ eɳɳanə dʒɪːvɪkkʊm?/

Answers keys

1. He stole a book from his school.

   അവന് സ്കൂളിൽ നിന്ന് ഒരു പുസ്തകം കട്ടു കൊണ്ട് വന്നു

   /avan skʊːl̪ɪl nɪnnə orʊ pʊsṭakam kaṯṯʊ konṯ̪ vannʊ/

2. He bit on his mother's ear.

   അയാൾ അമ്മയുടെ ചെവി കടിച്ചു പറിച്ചു.

   /ajaːl̪ ammajʊṭ̪ə ʧəvɪ kaṭ̪ɪtʃʧʃʊ paṛ̪ɪtʃʧʃʊ./

3. The king ordered death penalty for him.

   രാജാവ് അവനെ തൂക്കിക്കൊല്ലാൻ വിധിച്ചു

   /raːdʒaːv avanə ṭʊːkkɪkkollaːn vɪḍ̪ɪtʃʊ/

4. When her son started stealing things she didn't correct him, instead she encouraged.

   മകന് മോഷ്ടിക്കാൻ തുടങ്ങിയപ്പോൾ അവർ തിരുത്തിയില്ല, പകരം പ്രോത്സാഹിപ്പിച്ചു

   /makan moːʃtɪkkaːn ṭʊṭ̪anɳ̪ɪjappoːl̪ ṭ̪ruṯṯɪjɪlla. pakaram proːlsaːhɪppɪtʃʊ/

5. She encouraged him to become a thief.

   അവർ അവനെ ഒരു കള്ളൻ ആകാൻ പ്രോത്സാഹിപ്പിച്ചു

   /avar avanə oru kal̪l̪an aːkaːn proːlsaːhɪppɪtʃʧʃʊ/

6. He will live his rest of the life as a good person.

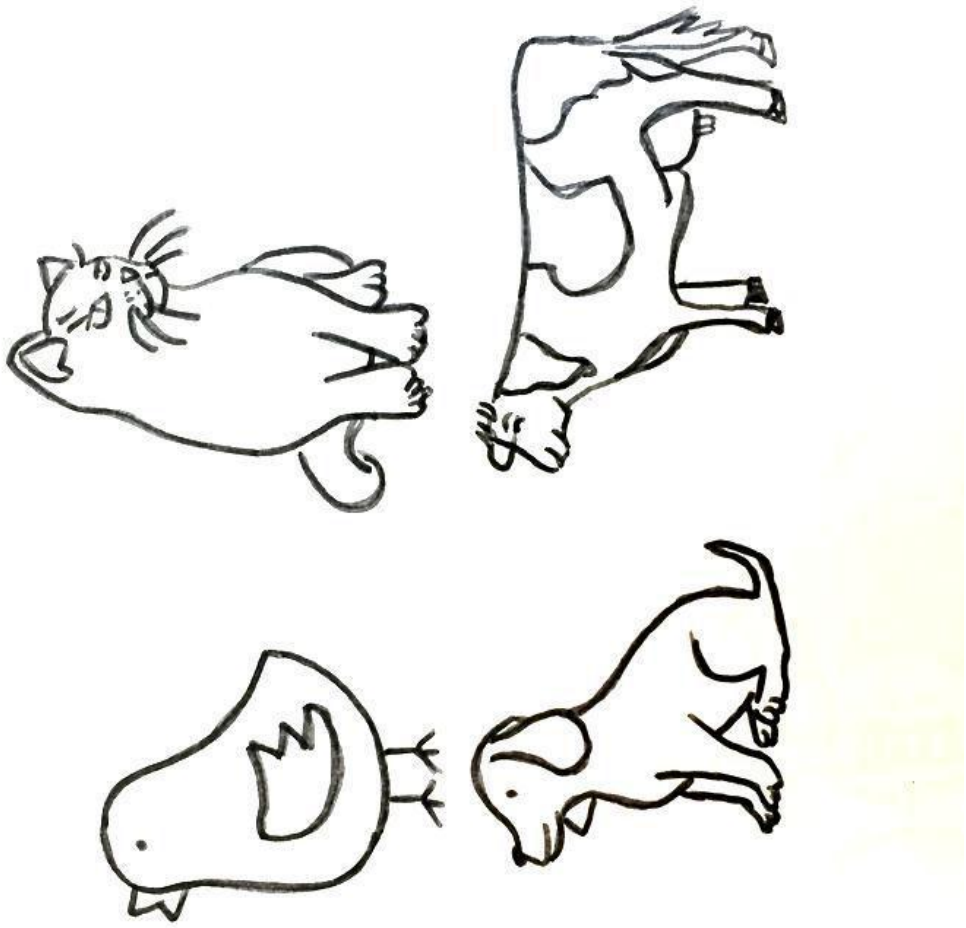
   ബാക്കിയുള്ള കാലം അയാൾ നല്ലവനായി ജീവിക്കും

   /baːkkɪjʊl̪l̪a kaːlam ajaːl̪ nallavanaːjɪ dʒɪːvɪkkʊm/

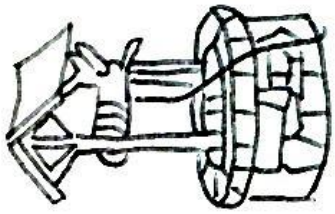
Appendix III

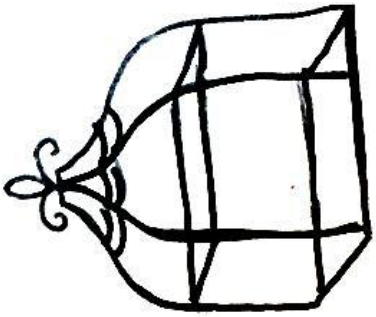
Cue cards

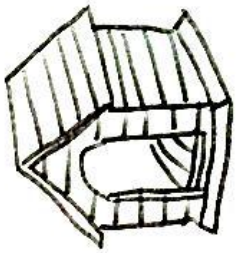
Cue card 1

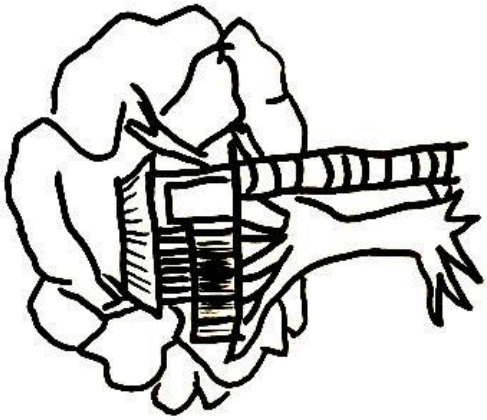


Cue card 2



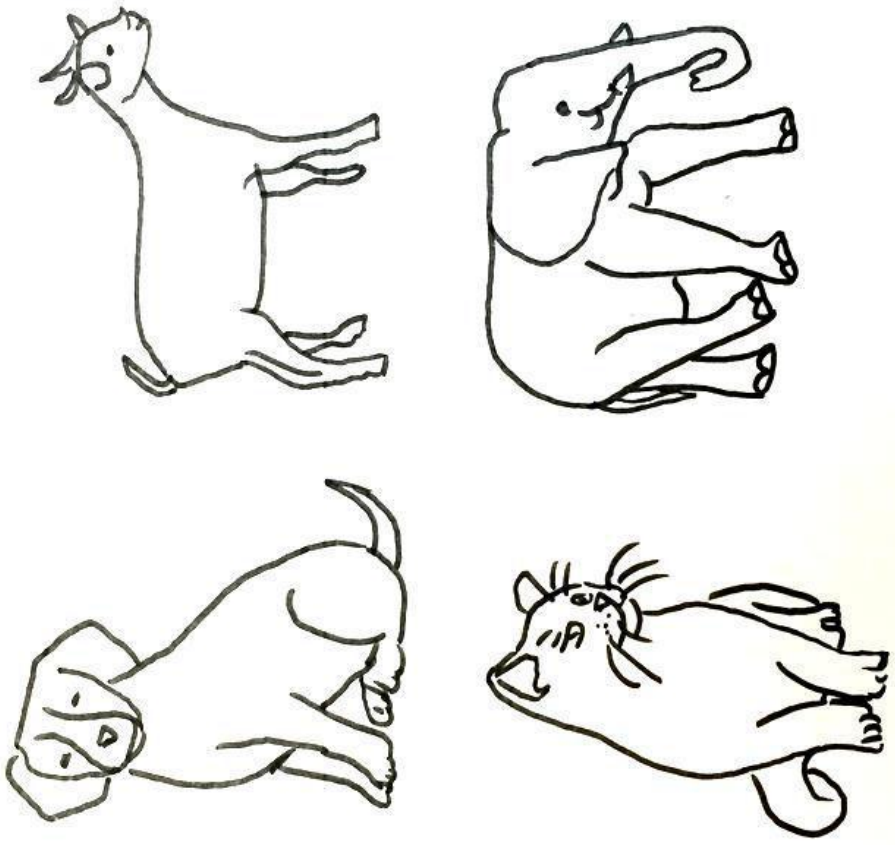




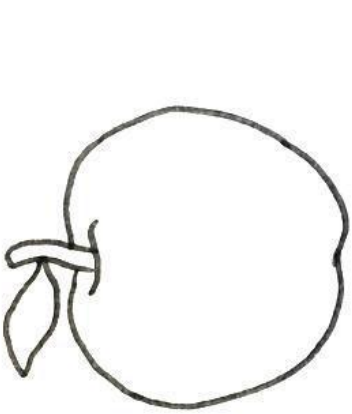


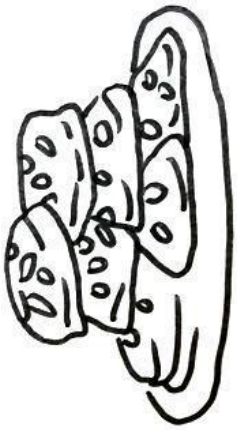
Cue card 3

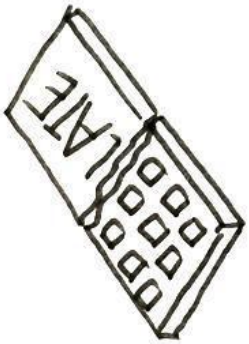
Cue card 4



Cue card 5

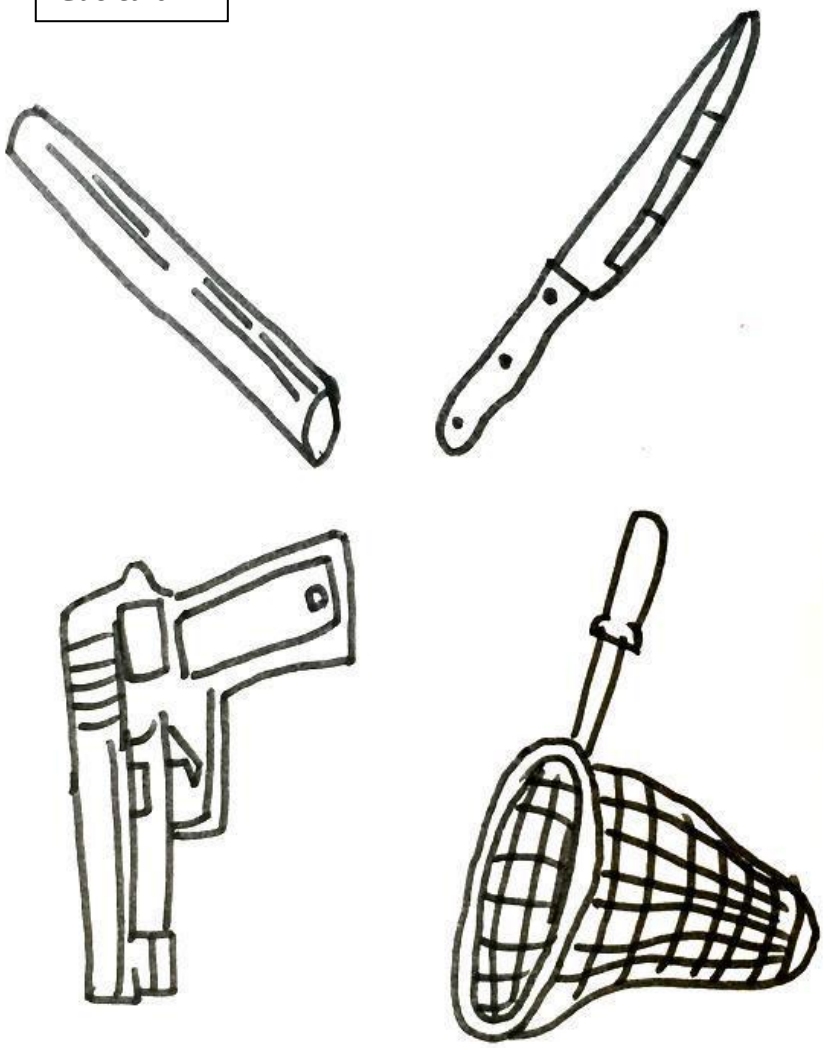




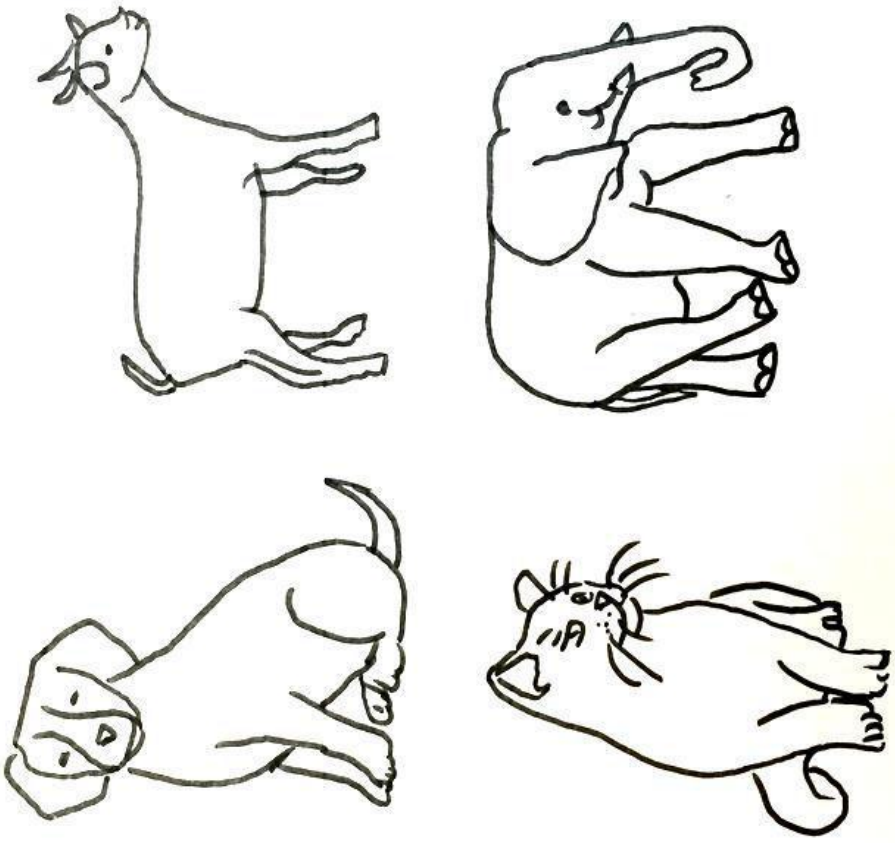


Cue card 6

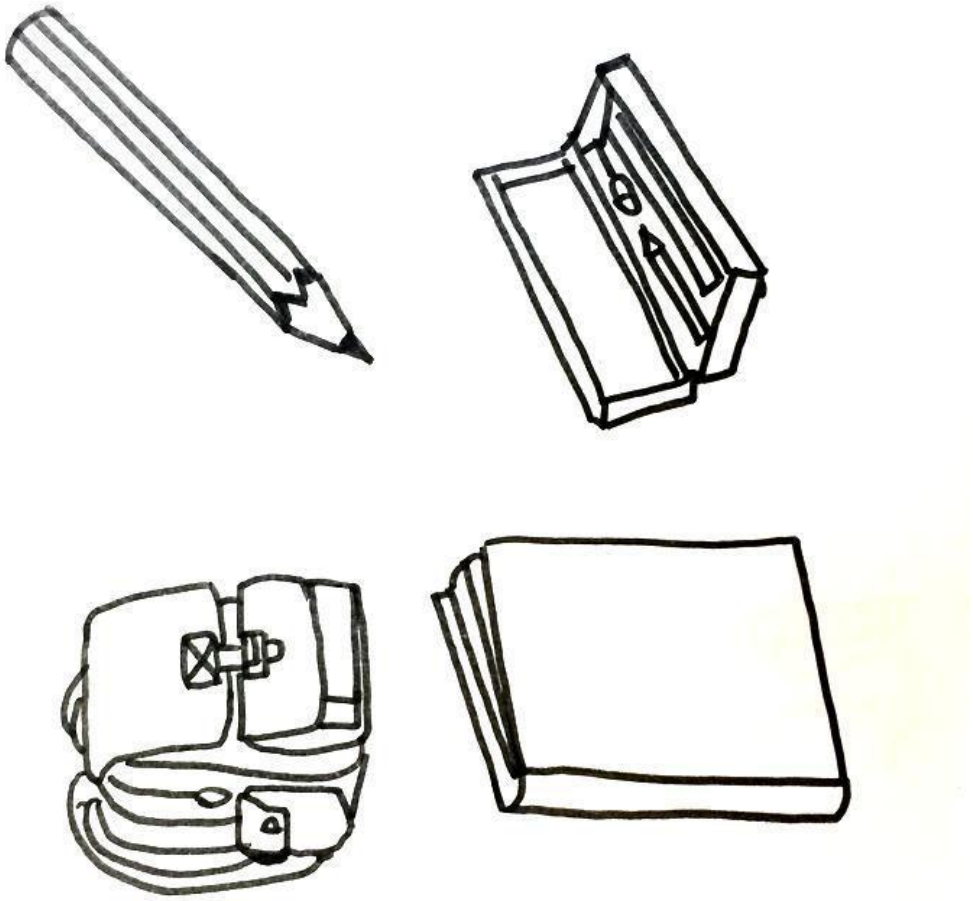
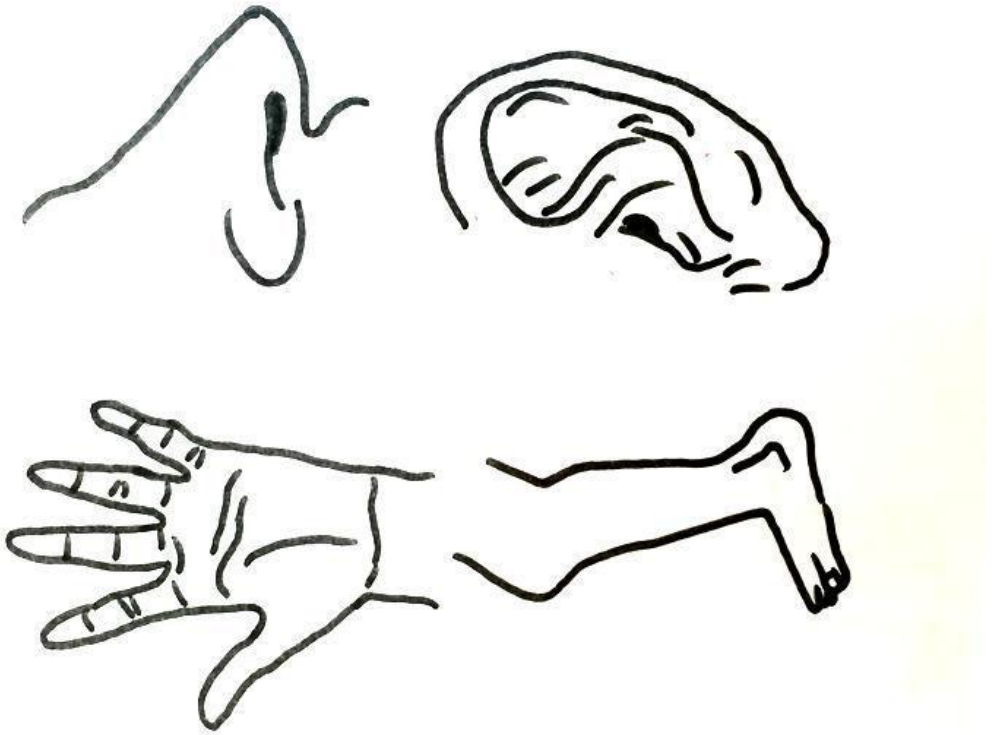
Cue card 7



Cue card 8



Cue card 9



Cue card 10