ACQUISITION OF NOVEL ENGLISH WORDS ON READING IN CHILDREN WITH LANGUAGE LEARNING DISABILITY

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May, 2014

CERTIFICATE

This is to certify that this dissertation entitled "**Acquisition of Novel English Words on Reading in Children with Language based Learning Disability**" is a bonafide work submitted in part fulfilment for the Degree of Master of Science (Speech Language Pathology) of the student (Registration No.: 12SLP009). This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any of the University for the award of any other Diploma or Degree.

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DECLARATION

This is to certify that this dissertation entitled "**Acquisition of Novel English Words on Reading in Children with Language based Learning Disability**" is the result of my own study under the guidance of Dr. Jayashree. C. Shanbal, Reader in Language Pathology, Department of Speech -Language Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier in other University for the award of any Diploma or Degree.

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: Introduction

Incidental learning from context during free reading is the major mode of vocabulary acquisition during the school years, and the volume of experience with written language, interacting with reading comprehension ability, is considered as the major determinant of vocabulary growth (Nagy, Herman, & Anderson, 1985). Without any kind of instruction or guidance, children are able to learn words as they read silently for enjoyment or for school-related assignments (Nagy & Herman, 1987). Reading is an important area for children to independently build complete and partial word knowledge. Studies of typically-developing children have shown that little detailed information is gained from a child's first encounter with a word in text (Nagy et al., 1985). Subsequent encounters with the words help to refine the mental representations of words by adding correct details and eliminating incorrect details. Dale (1965) proposed a continuum involving the following stages: (a) "I never saw the word before"; (b) "I know there is such a word, but I don't know what it means"; (c) I have "a vague contextual placement of the word"; and (d) I have the meaning of the word "pinned down." Although these stages may not completely capture the word learning process in a detailed way, they do allow consideration of what has been termed *partial word knowledge* (Schwanenflugel, Stahl, & McFalls, 1997; Wagovich & Newhoff, 2004).

The concept of partial word knowledge is associated with the type of information that is involved with knowing a word, specifically, phonological, semantic, syntactic, morphologic, and (in literate individuals) orthographic information. Current models of lexical processing and access assume that these components are separate, yet

neurologically interconnected (Caramazza, 1997). This growth of partial word knowledge cannot be assessed through static measures of vocabulary, such as the common "Show me 'X'" picture-pointing format. A more thorough analysis of children's errors in these tasks may also be helpful for understanding the development of word knowledge in children who find reading a complex task such as children with language learning disability (LLD).

Impaired ability to store semantic information in children with LLD due to weak or diffuse semantic representations are suggested to be one of the reasons why children with LLD have difficulty in word knowledge(Alt, Plante, & Creusere, 2004; McGregor, Newman, Reilly, & Capone, 2002). McGregor et al. (2002) studied the semantic representation of age-appropriate words by 16 school-age children with LLD and 16 typically developing control children who were between 5 and 8 years old. Children named, provided definitions, and drew stimulus words. Naming errors were coded as semantically related, indeterminate, or phonologically similar. The findings of their study indicated that the complexity of the children's drawings revealed a continuum, from no knowledge to minimal knowledge to complete knowledge. The LLD group made more naming errors than the control group, and both groups made more semantically related errors than other error types. In addition, for both groups, words that were incorrectly named received lower drawing scores and lower definition scores. The authors concluded that retrieval of known information could not account for their findings. Rather, the errors in naming were interpreted to be the result of sparse or missing semantic representations for these age-appropriate words.

Alt et al. (2004) concluded that children with LLD had weak phonological representation of the word labels. However, the problems went beyond merely learning the labels for words; they also showed an impaired ability to acquire the details of word meanings. These studies suggest that children with LLD have primary difficulties learning semantic information, in addition to phonological information. Furthermore, the locus of difficulty may be in learning or storing phonological and semantic information, rather than retrieval of information, for words learned through the oral-auditory channel. These results have important implications for how best to address the word learning challenges of children with LLD.

Children develop wide-ranging vocabulary during early years. One of the major sources of novel word learning is reading in the developmental period (Nagy et al., 1985). Studies have suggested that reading alone makes 5th graders to acquire 800-1200 words per year (Nagy et al., 1985). Through recurrent exposures, children develop partial word knowledge based on the frequency of occurrence of the word and contextual cues. Word learning is a gradual process where children learn the correct attributes leaving behind false attributes and contextual meaning. When the same word is read in varying context the phonological, semantic, syntactic, morphologic, and orthographic features of words become more strongly connected resulting in complete word knowledge.

The phenomenon of word learning ranges from partial to complete word knowledge increasing the repertoire of an individual. The path to complete word knowledge is variable in children with language learning disability from typically developing children. Hence, the primary aim of the present study is to investigate the

process of novel English word learning from context while reading in children with Language learning disability (LLD).

CHAPTER 2: Review of Literature

Language acquisition is the individualistic human capacity that allows us to use words and sentences for communication. The successful use of language can be compartmentalized to the acquisition of phonology, morphology, syntax, semantics and an extensive vocabulary. The processing of language by a human brain is a complex phenomenon and there are several factors involved in the lexical buildup. This vocabulary acquisition takes place through different routes. Children are taught how to communicate using language at home and school under formal teaching programs. In between these informal and formal methods of vocabulary development, incidental learning through listening and reading play a major role. Thus, off late it is seen that reading for academics and leisure purposes leads to significant growth in word knowledge.

2.1 Vocabulary acquisition through written context

Vocabulary and reading comprehension are inextricably linked. The ability to decode, identify, pronounce and know the meaning of the word has a direct effect on knowing what any specific passage means. Novice readers with a smaller vocabulary comprehend less of what they read and improving vocabulary helps in improving comprehension and vice-versa.

Shared book reading (Brett, Rothlein, & Hurley, 1996) and independent reading (Nagy et al., 1987) pave the way for vocabulary acquisition in the early school years.

This joint action of common book reading used in initial age can also be an efficient means for teaching vocabulary to school-age children. Shared book reading allows adults natural opportunities for scaffolding. They can provide definitions and explanations of new words in meaningful contexts. Elley (1985) compared word learning during oral story-book reading for 8-year-old children. Children who heard words with an explanation (e.g. providing a synonym, role playing or pointing to a picture) made greater receptive gains than children who did not receive an explanation. Children made the greatest gains on high frequency words, were illustrated by a picture and had an adjoining context with useful clues to the meanings of novel words. Similar positive results were found with US grade 4 pupils (typically developing 9–10 years old). In comparison to pupils who heard a story lacking explanations, children who were given definitions of target words during shared reading made greater vocabulary gains, which remained at that elevated level after a delayed post-test six weeks later (Brett et al., 1996).

Incidental word learning during independent reading is significant for school-age children. Nagy, Herman & Anderson (1987) tabulated that a typical 10- to 11-year-old child could study approximately 800 to 1,200 words per year from independent reading, although the potential number of words learned depended on the child's amount of independent reading behavior. Reading gives children the opportunity to encounter words several times in various contexts. Repeated exposures help children refine their mental representations by adding correct details and eliminating incorrect details (Fukkink, Blok & de Glopper, 2001). Schwanenflugel, Stahl, & McFalls (1997) found multiple word aspects that were related to increase in vocabulary; especially, words that were concrete had high imageability, were nouns or were more easily learned in written contexts.

In addition to reading behavior, the ability to learn new words incidentally during reading was found to be dependent on the child's reading comprehension skills and oral language ability. Children with deficits in either of these areas were reported to have more difficulty with incidental word learning during reading (Cain, Oakhill & Elbro, 2003; Cain, Oakhill & Lemmon, 2004; Steele & Watkins, 2010; Steele, 2010) which could be observed in children with Language based learning disability. Language based learning disability are defined as children who have problems with age appropriate reading, spelling, and/or writing. Academic difficulties with problems in speaking, listening, mathematical calculations are part of the heterogeneous disorder (ASHA, 2010).

Steele and Watkins (2010) studied 9- to 10-year-old children with and without language impairments (LI) to explore inference to new word meanings from contexts. It was suggested peers with typical language, regardless of frequency and position of informative context learned more words incidentally than children with LI. A subsequent analysis of errors that they made during the assessment indicated that children with LI made fewer gains in partial, as well as complete word knowledge compared to typical peers (Steele, 2010). Cain et al. (2004) reported that children with weak vocabulary and poor reading comprehension struggled during a direct instruction task, in which they were directly, told the meaning of some of the target words that appeared in the reading passages. Thus, primary school-age children with LI are not as skilled as their same-age typically developing peers at incidental word learning during reading, which is likely to negatively impact their independent vocabulary growth.

2.1.1. Partial word knowledge (PWK)

Children's vocabulary acquisition in the school-age years is intriguing phenomenon, especially considering that child's exposures to most words occurs through their natural, incidental experiences with the words, rather than through formal teaching of individual vocabulary items (Bloom, 2000; Nagy & Herman, 1987; Sternberg, 1987). A primary issue related to the idea of incidental word learning is the nature of the word learning that occurs, if any, from a unitary or multiple exposures to a word. Carey (1978) provides a useful framework in considering this question, making a distinction between "fast mapping," the knowledge that develops from a single exposure, and "full mapping," the complete knowledge of a word that develops over time.

Literature on PWK has although shown more interest on the process that occurs *in between* this fast mapping and full mapping from multiple disclosures to novel words (Dickinson, 1984), however, Carey's structural skeleton enables hypotheses, about the types of learning detectable from only one disclosure to a novel word. PWK is defined as an incomplete identification of a word. For example, a child who does not know the meaning of the word *fib* may know that it has to do with talking or communicating (general semantic PWK) and that the word refers to something negative (emotional content PWK). The child has some knowledge of the word but not a full understanding of it. Using this definition, many studies would qualify as including PWK probes, even though the intent in most has been to develop a vocabulary measure sensitive enough to detect learning.

Several studies of young children with typically developing language including fast mapping (Carey & Bartlett, 1978; Dollaghan, 1985; Jaswal & Markman, 2001; Markman & Wachtel, 1988; Mervis & Bertrand, 1994) and quick incidental learning studies (Rice & Woodsmall, 1988) have been reported. On the other hand, studies have experimented with older typically developing children, probing word learning through numerous conditions (e.g., Dickinson, 1984) or specifically through an incidental word learning condition (Gordon, Schumm, Coffland, & Doucette, 1992; Herman, Anderson, Pearson, & Nagy, 1987; Konopak, 1988a, 1988b; Konopak et al., 1987; Nagy, Herman, & Anderson, 1985; Schwanenflugel, Stahl, & McFalls, 1997; Shu, Anderson, & Zhang, 1995; Swanborn & de Glopper, 1999). In contrast, a number of studies have focused on the word learning of children with language impairment, through a fast mapping task (Dollaghan, 1987), quick incidental learning task (Oetting, 1999; Oetting, Rice, & Swank, 1995; Rice, Buhr, & Nemeth, 1990; Rice, Buhr, & Oetting, 1992; Rice, Oetting, Marquis, Bode, & Pae, 1994), or similar vocabulary learning procedure (e.g., Ellis Weismer & Hesketh, 1993, 1996; Gathercole, Hitch, Service, & Martin, 1997; Horohov & Oetting, 2004; Kiernan & Gray, 1998; Leonard, Schwartz, Chapman, Rowan., 1982).

Dickinson's (1984) study puts light on the unitary disclosure situation alone with typical language learners, including school-age children. In his study, 4- to 11-year-olds with seemingly normal language listened to a new word in three contexts: a conversation (essentially a fast mapping task), a story, and paired with a definition. Following the aforementioned situations, the children were checked for their knowledge of (a) whether the target words were real words, (b) on the correct syntactic usage of the words, and (c) providing definitions or sentences for the words. Regardless of age, children

demonstrated manifold PWK growth given a single exposure to a novel word. However, it was reported that the children did not benefit equally from all conditions. Though the younger children performed in a similar fashion as the older children in the learning demonstrated across tasks, the older children evidenced more learning when given a definition of the word than from the other situations. Of the types of PWK perceived across tasks, one type in particular was reliably detected: that a word is, in fact, a real word as opposed to a nonword (i.e., word discrimination PWK). Each of Dickinson's learning conditions were oral, and, with the exception of the oral story condition, they were not incidental reading tasks. Nevertheless, Dickinson's (1984) study provided crucial insight into the learning that occurs from a single exposure, demonstrating that word discrimination knowledge and, to a lesser extent, other forms of PWK can be detected from one exposure to a word presented orally.

2.1.2. Types of partial word knowledge

Overtime, it has been realized that attempts to measure word knowledge, partial or complete are dependent on the sensitivity of the vocabulary acquisition tools being used. The more sensitive the measures of vocabulary employed, the more able these means are to perceive PWK growth. Traditionally (Brown & McNeill, 1966; Eysenck, 1979; Hart, 1965; Koriat & Lieblich, 1974; Trembly, 1966) and more recently (Durso & Shore, 1991; Shore & Durso, 1990), some researchers have described knowledge as developing in a linear fashion through a series of steps or levels. For example, Trembly's notion of "frontier" word knowledge (i.e., familiarity with a word without complete knowledge of it, implies that knowledge growth occurs in a discrete, stepwise fashion. Although in some cases conceiving of PWK growth as a series of levels is appropriate, it

is not appropriate in all cases. In contrast to this notion of word knowledge levels, Carey (1978) suggested that the vocabulary acquisition occurs non-linearly *across* domains (e.g., phonological, morphosyntactic, semantic). That is, phonological word knowledge growth might be expected to occur simultaneously with the development of semantic and morphosyntactic information about a word. For researches of unitary disclosure, it seems imperative to accept Carey's schema, because it reveals the assumption that more than one form of PWK may develop while coming across a novel word.

2.1.3. Factors affecting word learning on a unitary disclosure

Besides gaining the knowledge of different forms of learning that originates from one exposure, a thorough inspection of the factors that may impact word learning is important as well. Among these factors, language abilities seem to play a particularly important role. Though there have been conflicting views about how language abilities are instrumental in vocabulary acquisition. Several studies comment on the relationship between children's language abilities and their incidental word learning, revealing an insignificant relationship between measures of reading comprehension and incidental word learning from text (Nagy, Anderson, & Herman, 1987; Nagy et al., 1985; Shu et al., 1995). Contrastively, some researchers have suggested that reading ability plays a role in learning (Gordon et al., 1992; Konopak, 1988a, 1988b). In fact, Swanborn and de Glopper's (1999) meta-analysis of studies of incidental word learning through reading have shown that ability to read was a significant factor in explaining the learning that happened on encounters with novel words.

An array of linguistic variables, comprising of word frequency (Herman et al., 1987; Nagy et al., 1985; Schwanenflugel et al., 1997; Shu et al., 1995), adjoining context

(Gordon et al., 1992; Herman et al., 1987; Konopak, 1988a, 1988b; Schwanenflugel et al., 1997), readability of the content (Herman et al., 1987; Nagy et al., 1987), the density of unfamiliar words within a passage (Swanborn & de Glopper, 1999), the specific part of speech of the target word (Schwanenflugel et al., 1997), and the number of word exposures provided (Konopak et al., 1987; Schwanenflugel et al., 1997) have been stated in studies explaining the position of linguistic characteristics in incidental word learning. A direct relation of word length has not been accounted so far; however, some studies have investigated word frequency, a variable that correlates highly with word length. Amongst the aforementioned linguistic controls, besides number of exposures, the part of speech of an unfamiliar word was assumed to be the most vital to conceive how word learning process differs with the variations language forms; this is in some way contributing partly to the ample research proposing young children appear to learn concrete nouns more easily than abstract verbs in English language (e.g., Bates, Marchman, Thal, Fenson, Dale, Reznick, Reily, Hartung, 1994). Although two studies of incidental word learning from reading investigated the role of part of speech, they produced contradictory revelations. One study found that the interplay between word learning and part of speech was insignificant (Nagy et al., 1987); while the other suggested that non-nouns were actually more easily learned than nouns (Schwanenflugel et al., 1997). Thus, there is a need of a close and intensive investigation of PWK with respect to part of speech.

Children show some PWK growth even in unfavorable conditions especially in the form of word discrimination PWK. Language ability, vocabulary and the level of reading did not play a role in the extent of word discrimination PWK exhibited by the

children (Wagowich & Newhoff, 2004). PWK developmental patterns varied for different parts of speech; verbs were different from nouns. On comparing the performance of children to familiar and unfamiliar words in a story, it was seen that for verbs there was increased word discrimination PWK than on nouns.

Wagowich & Newhoff (2004) in consonance with Carey's (1978) framework proposed that some word discrimination PWK was seen in typically developing children but the expressive knowledge of the target words was deficient. In agreement with Dickinson's (1984), who demonstrated word discrimination PWK in oral language tasks, Wagowich & Newhoff (2004) also described significant learning of verbs instead of nouns. The presence of derivational prefixes in some of the target words especially verbs were easier to understand. These prefixes aided in recall of the prior exposure of these target words in stories read by the children. Also, it is possible that word discrimination knowledge growth is influenced by the presence of a syntactic cue, such as a determiner or the presence of a marked infinitive.

Young children use syntactic markers, such as articles, to distinguish a word's part of speech (Katz, Baker, Macnamara, 1974). These easily accessible syntactic markers make it possible for better comprehension and recall of verbs in the case of the detection of word discrimination PWK. A second probable reason for the pattern of learning in a single exposure relates to the semantic role of verbs. Although, few of the verbs refer to action or movement (most are verbs of cognition or emotion), it is possible that, as a category, verbs are *perceived* as being of greater importance in the comprehension of story events than nouns. This perception could cause the reader to focus more on unfamiliar verbs than nouns. Related to this idea, it is possible that,

relative to nouns, the verbs *are* of greater importance for comprehending the sentences in which the words were embedded. Greater focus on the verbs than the nouns, therefore, may be necessary for sentence comprehension. Wagowich & Newhoff, 2004 concluded that when school-age children encounter a word in the course of natural reading, they do glean some PWK from that one exposure. At a minimum, at least for verbs, they can demonstrate knowledge that the word is an actual lexical entry. This PWK growth appears unrelated to the language and reading skills a child possesses. They do not rule out the possibility that there are other forms of PWK that may also develop from a single exposure.

2.2 The process of reading

Reading is the process of constructing meaning through the dynamic interaction among (1) the reader's existing knowledge; (2) the information suggested by the text being read; and (3) the context of the reading situation (Wixson, Peters, Weber & Roeber, 1987). It involves a precise interplay of cognitive, visual and motor functions (Gough & Hillinger, 1980). Efficient reading requires extraction of visual information from the environment, activation of the stored phonological and semantic representations and simultaneous engagement of higher order integration and inferencing processes.

2.2.1. Cognitive processing in reading

The interplay of cognitive factors in reading make this process as complex and as simple at the same time. The knowledge of these cognitive aspects will enlighten the arena of the ability to learn to decipher the orthographic script and make meaning out of it. Learning to read is an unnatural task (Gough & Hillinger, 1980). While spoken

language has many systematic features that are consistent across different languages, writing systems and scripts have many idiosyncratic features (Perfetti, Liu, & Tan, 2005; Rayner & Pollatsek, 1989). English falls in the category of the alphabet writing system. Learning to read an alphabetic script involves mastering two related principles. The principle of *phonemic awareness* (Yopp, 1992) says that children should have the knowledge that words can be broken down into subparts. The *alphabetic principle* (Connie, 1996) refers to the understanding that specific patterns of letters go with specific speech sounds. Phonemic awareness is an important precursor of reading. It is thought to play a causal role in reading success. Phonemic awareness can be assessed in a variety of ways including the *elision, sound categorization and blending* tasks (Torgesen, Wagner, Rashotte, Rose, Conway, Lindamood, 1999) among others, but the best assessments of phonemic awareness involves multiple measures. Children's composite scores on multiple tests of phonemic awareness are strongly correlated with the development of reading.

Once children are aware that words are made up of separable speech sounds, they can begin to assign letters and patterns of letters to individual speech sounds and combinations of speech sounds. This process of mapping letters to sound is complicated for English as it has deep orthography. Given the random nature of the deep orthography of English, instruction method like systematic phonics emphasizing explicit instruction in letter-sound correspondences produces the greatest increase in reading skill.

The cognitive processes in reading include taking perceptual input and using it to recognize individual words and access their meanings. The interactive-compensatory model of reading (Stanovich, 1980) proposes that word recognition occurs via the

simultaneous processing of information from different sources with one critical assumption that deficits at any one level of the processing hierarchy can be compensated for by the interaction of information from all the other level and this compensation takes place irrespective of the deficit level. This model (Stanovich, 1980) is based on the two process model of expectancy (Neely, 1977; Posner & Snyder, 1975a, 1975b). The interactive compensatory model comprises of two contextual mechanisms. One is an automatic spreading activation process operating in semantic memory. This has quick activation consuming less cognitive resources causing facilitatory effects. The other mechanism is a process of specific contextual prediction which is slow, uses attentional capacity causing both facilitatory and inhibitory effects (Neely, 1977; Stanovich & West, 1983).

This model postulates that both the context mechanisms operate simultaneously and that both can result in a compensatory interaction. The larger context effects are displayed by the less skilled readers (Stanoivich, Nathan, West, Vala-Rossi, 1985). An obligatory interaction is caused by the spreading-activation mechanism especially when the word identification is slow. When the semantic features are identified slowly, factors that affect the evidence requirements of logogens (e.g., contextual clues, Morton, 1969) necessarily have a greater effect on performance (Sanford, Garrod, & Boyle, 1977; Seymour, 1976). Initially, the time locked version of this model was considered where both the context mechanism-spreading activation and attentional expectancy mechanism had an obligatory reaction on word recognition. However, later it was revised that compensatory actions of the attentional expectancy mechanism were optional and did not necessarily occur when word recognition was slow.

2.3 Reading in context: Sentence processing–Syntactic parsing

Syntactic parsing is a mental process or a set of processes that take sequences of words and organizes them into hierarchical structures. A syntactic parser uses a mechanism that carries out processes to identify relationships between words and sentences.

2.3.1 Models of Parsing: Two-Stage Models

Frazier's (1987) garden path theory is considered a two stage model of syntactic parsing, because she proposes that syntactic parsing takes place in two distinct processing stages. In the first stage, the incoming sequence of words is analyzed to determine what categories the words belong to. Once the categories have been identified the parser can build a syntactic structure for the sequence. No other information besides word category information is used in the initial structure building process. In the second stage of the sentence interpretation, standard meaning is computed by applying semantic rules to the structured input.

Garden path theory assumes that people can only build one semantic structure at a time. It represents a kind of serial processing system. Second, garden path theory says that the parser relies on simplicity. That is, the parser seeks to build the least complicated structure that it can. The classic version of garden path theory proposes two heuristics: *Late closure* and *minimal attachment.* Late closure says that the parser continues to work on the same phrase or clause as long as possible. Minimal attachment says that when more than one structure is consistent with the input, the structure with the fewest nodes is

selected. The special heuristics that are used at any given point in time depend on the characteristics of the sentences that are being processed.

2.3.2 Models of Parsing: Constraint based models

Constraint based parsing models constitute the most prominent alternative model to two stage models (MacDonald, Pearl Mutter, & Seidenberg, 1994; Spivey – Knowlton & Sadivy, 1995; Tiueswell, Tanenhaus, & Kellow., 1993). There are two critical differences between the garden path and constraint based models. The first is that, constraint based parsers are capable of pursuing multiple structural possibilities simultaneously. They often adapt parallel distributed processing/neural network architecture. The second critical difference between the garden path and constraint based parser is that they can draw on a much wider variety of cues to decide what structure to build and the relative emphasis to place on each alternative structure. Constraint based parsers are often referred to as one stage models because lexical, syntactic and semantic processes are all viewed as taking place simultaneously.

Constraint based models support the idea that human sentence parsing processes are affected by multiple sources of information in addition to category information.

2.3.3. Story context effects

Constraint based parsers use referential based contexts for syntactic and semantic disambiguation (Altmann, Garnham, & Dennis, 1992; Altmann, Garnham, & Henstra, 1994; Altmann & Steedman, 1988). According to Traxler (2012), a constraint based

parser uses the word category information along with the syntactic structure to comprehend a sentence like (1) *The robber blew up the safe with the rusty lock.* When the sentence appears by itself, readers have no indication that there could be more than one safe. The sentence only mentions one safe and the definite article *the* strongly implies that there is only one safe. So, whether the syntactic structure of a sentence is complicated or not, the sentence creates challenges for readers. In particular when readers get to *rusty lock*, they need to revise some of their semantic assumptions. They have to change from assuming only a single safe to assuming at least two safes and they have to assume that the implicitly introduced safe or safes do not have rusty locks. These semantic changes have to be made regardless of the syntactic structures that readers initially build for the sentence. If, a referential context –

(2) The robber was scheming for his next task. He knew that the warehouse had two safes. Although one was brand new from the factory, the other had been sitting out in the rain for ten years. *The robber blew up the safe with the rusty lock.*

According to the referential context a parser can use contextual information to decide which syntactic structure it will favor in a given point in time. Readers need additional information to figure out which of the two safes the noun phrase (NP) *the safe* is supposed to point to. If, readers attach *with the rusty lock* to *the safe* that will create a phrase that is semantically unambiguous and fits well with the preceding story context. If they build the simpler syntactic structure, *the safe* will remain ambiguous – It could refer to either of the safes introduced previously in the story. Referential theory thus predicts

that, in the context of stories like (2), readers will build the more complicated structure rather than the simpler one for sentence like (1).

2.3.4. Sub category frequency effects

Constraint based theory says that structural information is associated with individual words in the lexicon and this information influences which structural hypothesis will be pursued as sentences that are being processed. For example, the words *took* and *put* are similar in that neither one can appear all by itself without any gain coming after, but they are different in other ways. *Took* is fine with just a direct object, but *put* requires both a direct object and a goal. Thus, they are both in the category verb, but they belong to different sub categories because they have different requirements for different kinds of partners, and so different requirements for syntactic structures. In particular, a constraint based parser will use sub category information to determine which structural analysis to favor when more than one structure is consistent with the input.

2.3.5. Semantic effects

Constraint based parser also uses semantic information associated with specific words in sentences to anticipate the upcoming syntactic structure. At a sentence called a *reduced relative:*

(3) The defendant examined by the lawyer went to prison.

This sentence can be made easier to process by introducing the relative clause with a relativizer *who.*

(4) The defendant who was examined by the lawyer went to prison.

The beginning of sentence (3) appears like a main clause and readers begin to build a syntactic structure that is appropriate for a *main clause* continuation making it difficult for comprehension of a *reduced relative.* Constraint based parser theory also predicts that the reduced relative clause in (3) will be hard to process but for a different reason. Constraint based theory says the problem of figuring out that *examined* is a part of a relative clause is made worse by the fact that *defendant* refers to a person and people are very likely to *examine* things. That is, *defendant* falls in the category of inanimate things. Animate things have goals and initiate actions. Inanimate things do not have goals, do not initiate actions. So, semantics aids at making structural decisions, helping the parser make structural choices for sentences with animate or inanimate initial nouns.

Hence, it is important to understand how contextual effects working for vocabulary acquisition in typically developing children are varying in children with language based learning disability (LLD). Children with reading and language disorders differ in their ability of learning new word meaning from written contexts (Cain, Oakhill, & Elbro, 2003; Steele & Watkins, 2010). They are unable to infer the meanings of new words or decode them as well as their typically developing peers (Cain et al., 2003; Cain, Oakhill, & Bryant, 2004). The acquisition of semantic and phonological information of new words is the problem instead of retrieval in children with LLD (Alt et al., 2004). Thus, detailed assessment of partial or complete word knowledge is essential. This increase in partial word knowledge growth is realized by analyzing the students' definition of novel words during reading. This analysis leads to understanding the process and errors made by children during reading acquisition.

Relevant to this study, it will provide insight into why these patterns of error occur in typically developing and children with language learning disability (LLD). Additional information about the kinds of errors that older children make during reading would be a helpful addition to this body of literature and would allow speech-language pathologists and other educators to make informed decisions about appropriate intervention. Most of the previous research has reported that after minimal exposure to novel words, children with LLD gain very little information and in many instances gain incorrect information. The present study would highlight the novel word acquisition through reading in children with LLD in the Indian context where English is a second language yet is indispensable for formal communication. This study is an attempt at understanding the vocabulary acquisition through oral definitions of low frequency words assessing the role of context in reading comprehension.

Aim of the study

The primary aim of the present study is to investigate the process of novel English word learning from context while reading in children with Language learning disability (LLD).

Objectives of the study were as follows:

The objectives of the study are,

- To study the pattern of novel English word acquisition for reading in typically developing children (TDC) and children with language based learning disability (LLD) in the age range of 9-10 years.

- To analyse and compare the pattern of novel English word acquisition in children with LLD and TDC.

CHAPTER 3: Method

The primary aim of the present study is to investigate the process of novel English word learning from context while reading in children with Language based learning disability (LLD).

A standard two group comparison research design was used to compare the acquisition of novel English words on reading in typically developing children, TDC (i.e., control group) and children with Language based learning disability, LLD(i.e., clinical group).

3.1 Participants

Participants were classified into two groups- the clinical group and the control group.

***Clinical group*:** The clinical group included a total of 15 children with Language Learning Disability (LLD) who were in the age range of 9-10 years participated in the study.

Control group: The control group included 15 typically developing children age matched to the group with LLD participated in the study.

Participant selection criteria

All the participants spoke Kannada as their native language and their language use of English was similar to Kannada on language use questionnaire (Shanbal & Prema, 2007). An informed consent was taken from all the participants with prior information on

the purpose of study and maintenance of confidentiality. None of the participants had any motor, sensory, and behavioural issues as on the WHO Ten question disability screening checklist (cited in Singhi, Kumar, Malhi & Kumar, 2007)

Clinical group: Fifteen children with LLD who are undergoing or have undergone speech-language therapy and passed the Level I for reading passage on ERS were included in the present study. The group with LLD was expressive type or mixed receptive expressive type only. The diagnosis of LLD was made by a speech-language pathologist on the results of the following tests:

(1) English Language Test for Indian Children (ELTIC; Bhuvaneshvari, 2010)

(2) Early Reading Skills (ERS; Loomba, 1995)

(3) Vocabulary test in English/ Stimulus from Kannada picture vocabulary test (KPVT; Sreedevi, 1988)

(4) Kannada Language Test (KLT; Project by AYJNIHH, Mumbai &RRTC, Chennai, 1990)

(5) Teachers Rating of Oral Language Literacy (TROLL; Merlin, 2011)

Control group: The participants in the control group had no history of hearing loss and poor intelligence quotient. The children had good reading comprehension and speech intelligibility.

3.2 Stimulus material

Stimulus material consisted of two reading passages with ten target words so that each passage had five target words. One passage was adopted from Gray's Oral

Reading Test (GORT; Bryant & Weiderholt, 1991) and another from the study on Oral Definitions of Newly Learned Words: An Error Analysis (Steele, 2010). Each passage was typed in blank font in 'Arial' font type with 10 as the font size, double spaced without illustrations (See Appendix I). The nonsense target words included words generated from 10 nouns and 10 verbs, each one syllable in length in CVC, CVVC, CCVC, CVCC, or CVC word forms (Balota, Cortese, Hutchinson, Neely, Nelson, et al., 2002.) which conforms to the phonotactic rules of English. The passages consisted of five target nouns and five target verbs. Table 3.1 shows the non words included in each stimulus passage. The passages were designed such that the children were able to infer the target word from the context without specific emphasis towards informative context. Informative context appeared once after the first presentation of the each target word.

Table 3.1

Details of the target stimuli

Nonsense target word	Category	Meaning
Passage-My school		
Marn	Noun	Bus
Jine	Verb	Race
Moof	Noun	Art class
Zear	Verb	Bowl
Sape	Verb	Eat
Passage-The Elephant		
Wock	Noun	Jungle
Rell	Noun	Snake
Tean	Verb	Stop
Ging	Noun	Hunter
Lote	Verb	Shoot

3.3 Procedure

The participants were tested individually in a quiet room. After the administration of the screening test, each child was asked to read one of the experimental passages. Immediately after that the oral definition task was carried out. After the oral definition task, the multiple choice task was given. The same procedure was followed for the second reading passage.

***3.3.1 Oral definition assessment*:** The assessment for oral definition was carried out orally. The child was presented with a 4 X 3 note card with one target nonsense word. The following questions were asked to obtain the answers: "Can you say this word?" and "Can you tell me what 'X' means?" Additional prompts, adapted from Nagy et al. (1985) were given to elicit further information as shown in Figure 3.1. On an incomplete response, each participant was told, "That's part of it. Can you tell me something else about 'X'?" If the response was unclear, they were asked "Can you tell me more or give me an example?" If the child refused to answer, "Does 'X' remind you of anything?" was asked.

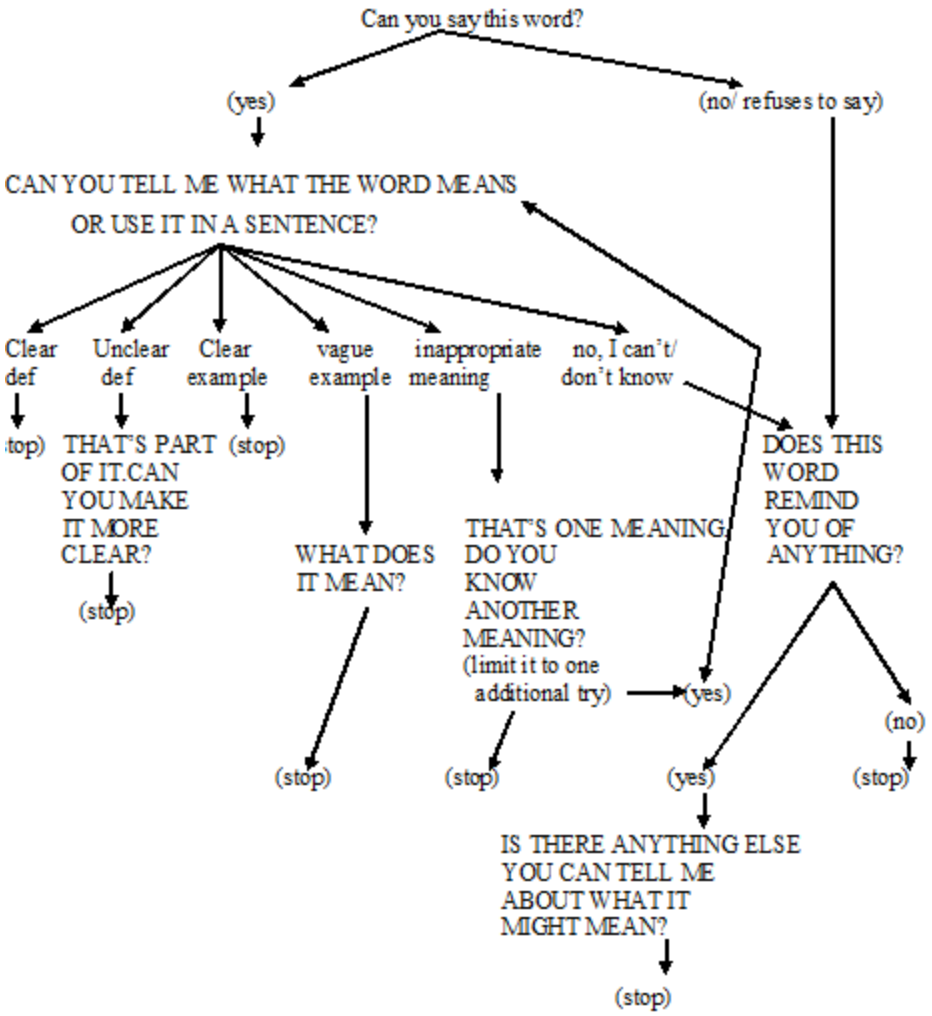

Figure 3.1. Interview Format (cited in Nagy, Herman & Anderson, 1985)

Given these prompts, the most exact and holistic responses were analyzed. If the child refused to answer at all, the word was located for him in the passage and he was asked to read once again. The same pattern of questions was asked again. Responses were audio recorded and then orthographically transcribed for each participant. These responses were later scored by two examiners on a 3 point scale.

Table 3.2

Oral definition scoring checklist

Score	Features	Example responses for *sape*
0	No correct information	'I don't know'
1	Vague response	'What he does'
2	Incomplete response	'Food'
3	Complete response	'Eats a snack at the after school programme'

3.3.2. Matching task/Multiple choice assessment: A multiple choice task was given in written form adapted from Wagovich and Newhoff (2004). Four responses to the phrase: "What is the closest meaning for the word 'X'? were given as follows (a) correct syntactic category and correct semantic information, (b) correct syntactic category and incorrect semantic information,(c) incorrect syntactic category and incorrect semantic information, and (d) none of the above. The first three choices were randomized in order and always thematically related to the reading passage. The fourth option is always "none of the above". For eg., the meaning of the word *zear* is a game similar to bowling. The options are (a) to bowl, (b) to clean up, (c) nasty, and (d) none of the above.

3.4 Scoring and Analysis

The oral definition responses that were not completely correct (received fewer than the full 3 points as indicated in Table 3.2) were examined, resulting in the identification of two broad response types: associated and unrelated. *Associated* responses bore some relationship to the target definition, showing that the participant had gained some partial knowledge. *Unrelated* responses were errors whose content was not related to the target definition. The broad categories of unrelated and associated responses were further divided into subcategories-indeterminate, false, sentence, and

phonological- and three associated subcategories-semantic, syntactic, and substitution. All errors were classified under any one of these categories (Table 3.3). The number and proportion of error responses occurring in each subcategory for children with LLD and typically developing group were coded and tabulated.

Table 3.3

Definition and Example of Error categories

Type			
Broad	Specific	Definition	Example
Unrelated	indeterminate	no definitive response	I don't know; I don't remember; no response
	false	no decipherable connection to the target definition; random guesses	"revenge" for the target definition "to laugh in a mocking way."
	sentence	no definition given; target word used in a sentence	"they mank"
	phonological	rhymes or phonologically related responses	"beetle" for target word "beal"; "dash" for definition of "tash"
Associated	Semantic	related semantically to target	"family" for "younger sibling"
	Syntactic	correct semantic information, but incorrect syntactic category (i.e., noun for verb or vice versa)	"ride a bus" for "alien bus"
	Substitution	definition of another target word	definition of "mank" given for the definition "pive"

The data was coded and tabulated and then subjected for statistical analysis using Statistical Package for Social Sciences (SPSS version 20.0). The data was statistically analyzed for error patterns defining novel words and matching task performance seen across typically developing children and children with LLD. The reliability of the

responses was checked by a post graduate student in Speech Language Pathology who was trained in assigning the categories to definitions. The reliability obtained was 92% (Cronbach's Alpha=0.929) for the broad and the sub-categorical error responses. The data was further analyzed using the following statistical procedures:

- Descriptive Statistics was done to calculate Mean and Standard Deviation (SD) values for the performance of TDC and children with LLD.
- The Mann-Whitney U test was done to compare the performance between TDC and children with LLD on the oral definition and multiple-choice matching task.
- The Mann-Whitney U test was also carried out to compare the performance of TDC and children with LLD for sub-categorical error within multiple-choice matching task (including frontier and unknown words).
- The Wilcoxon Signed Rank test was carried out to observe the significant difference in the sub-categorical errors within each group i.e., within TDC group and the children with LLD on oral definition assessment.
- The Wilcoxon Signed Rank test was also carried out to find the sub-categorical errors in frontier and unknown words in TDC and LLD on multiple-choice matching task.
- Cross tabulation was carried out for each non-word to categorize the responses and the errors in the oral definition task separately for both the groups-TDC and children with LLD.

CHAPTER 4: Results

The aim of the present study was to assess the novel word acquisition while reading. The study also attempts to explore the role of context in defining words which are encountered for the first time. The objectives of the study included:

- To study the pattern of novel English word acquisition for reading in typically developing children (TDC) in the age range of 9-10 years.
- To compare the pattern of novel English word acquisition in children with LLD and TDC in the age range of 9-10 years.

The data was statistically analyzed for correct definitions of the non words. The definitions were also analyzed for error response categories for the non words encountered in the reading passages (See Appendix I). The data on oral definitions and the matching task was correlated to assess the word knowledge in TDC and children with LLD.

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

4.1 Performance of TDC on the oral definition assessment and matching task.

4.2 Comparison of performance of TDC and children with LLD on oral definition assessment and matching task.

4.1 Performance of the TDC on the oral definition assessment and matching task

The data was categorized into performance of TDC on oral definitions and multiple-choice matching task for target non-words. The responses were analyzed to observe development of partial word knowledge in TDC.

4.1.1. Performance of TDC for oral definitions

Analysis of results revealed that all the 15 participants gave definitions for every non-word amounting to ten definitions per subject. The TDC showed 51 (34%) correct responses on the oral definition task. Once the correct definitions were obtained they were excluded and the rest of the definitions were taken up for further analyses of error response categories.

4.1.2. Performance of TDC on error response categories in the oral definition task

The oral definitions receiving less than '3' on the checklist (Table 3.2) were considered for analysis of error response categories. Error responses on the oral definitions were broadly categorized as *associated* and *unrelated.* The definition falling under *associated* bore some relation to the target non-word while the definition which had no relation to the target non-word was kept under the *unrelated* category. The two broad categories (associated and unrelated) were divided into three and four subcategories respectively. Associated category included semantic, syntactic and substitution errors and unrelated category included indeterminate, false, sentence, phonological sub-categories. All the error responses after exclusion of the correct definitions fell amongst these seven subcategories.

The analysis of results revealed that the TDC showed 68 (45%) unrelated error responses and 37 (25%) associated errors on the oral definitions. The results of Wilcoxon Signed Rank test did not reveal any significant difference (z=-1.62, p>0.05) in the performance of TDC for unrelated errors and associated errors indicating that in TDC the extent of partial word knowledge gains were seen for less than half the target non-words

on the oral definition task. Each subcategory error response for TDC is summarized in Table 4.1. The analysis of results as indicated in Table 4.1 shows that TDC had greater unrelated error responses than the associated errors while defining non-words.

Table 4.1

Proportion of error types in TDC

Error type	**Mean**	**SD**
Indeterminate	1.27	1.58
False	2.33	1.67
Sentence	0.40	0.91
Phonological	0.53	0.64
Semantic	2.47	1.99
Syntactic	0.00	0.00
Substitution	0.00	0.00

The most prominent sub-categorical error was semantic error and false error closely followed by indeterminate error. Sentence and phonological errors were also seen but syntactic and substitution errors were not seen altogether for TDC (Figure 4.1). The results indicate that unrelated errors were commonly observed in TDC and false type of error had the highest percentage under the unrelated sub categories in TDC.

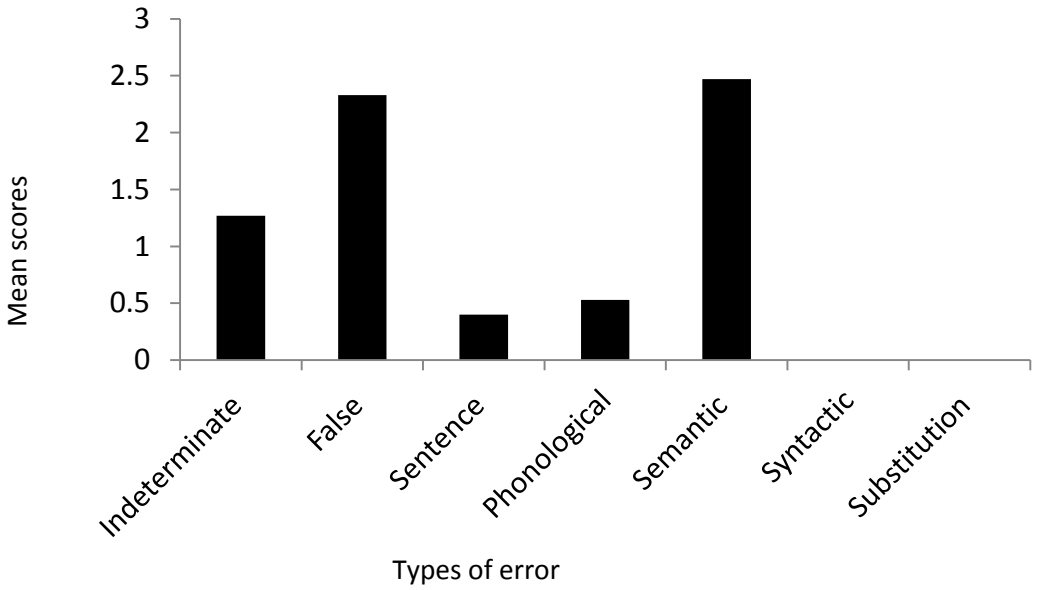

Figure 4.1. Proportion of errors of TDC on oral definition task.

4.1.3. Performance of TDC on partial word knowledge (PWK)

In order to find out the extent of word knowledge growth from context the error responses on the oral definition task for non words were related to the responses on the multiple-choice matching task by each subject. This resulted in *known*, *frontier* and *unknown* words. Each child had a separate set of frontier and unknown words indicating their partial word knowledge growth.

Overall, the analysis of results revealed that the TDC showed 48 (32%) known words and the rest 102 words were categorized as frontier and unknown words. TDC showed 63 (42%) frontier words and 39 (26%) unknown words. A broad analysis of frontier words for TDC resulted in 27 (18%) associated and 31 (21%) unrelated responses and unknown words resulted in 10 (6%) associated and 31(21%) unrelated responses. The Wilcoxon Signed Rank test revealed that there was a significant difference between frontier and unknown words for TDC (z=-2.05, p<0.05). These results indicate that

significant partial word knowledge gains for the target non words after evaluating the definitions and the responses of matching task.

4.2 Comparison of performance of TDC and children with LLD on oral definition assessment and matching task

Children with LLD performed on both the task in a different pattern from TDC. This section will compare the results of performance between LLD and typical group.

4.2.1. Performance of children with LLD on oral definitions

Children with LLD were instructed to provide 10 definitions for each non word. Overall, the analysis of results on oral definitions revealed that children with LLD showed 24 (16%) correct definitions in comparison to TDC who showed 51 (34%) correct responses. This finding indicates that children with LLD performed relatively poorer than TDC on oral definition task meaning that *known words* signifying complete word knowledge was found to be lesser in children with LLD than TDC.

4.2.2. Comparison of performance of children with LLD and TDC on error response categories in oral definition task

Analysis of results within the performance of children with LLD revealed that children with LLD showed 80 (53%) unrelated errors and 40 (27%) associated error responses on the oral definition task. The Mann Whitney U test (z=-2.32, p>0.05) results showed no significant difference between the performance of TDC and children with LLD on broad analysis of errors in the oral definition task. Overall, it can be seen that

children showed greater unrelated errors on definitions when they encounter a word for the first time in a passage.

The Wilcoxon Signed Rank test showed that children with LLD had a significant difference (z=-2.01, p< 0.05) between unrelated and associated errors. The findings indicated that children with LLD had double the unrelated than associated errors signifying limited vocabulary development. On the other hand, the TDC showed 68 (45%) unrelated and 37 (25%) associated responses on the oral definition task. A greater proportion of unrelated than associated error responses were seen in children with LLD.

Table 4.2 shows the proportion of error types in TDC and children with LLD. A close observation and analysis of the type of sub-categorical errors for children with LLD revealed that false type of error occurred predominantly followed by semantic and indeterminate errors (false>semantic>indeterminate) in comparison to TDC (semantic>false>indeterminate).

Table 4.2

Proportion of error types in TDC and children with LLD

Error type	TDC		LLD	
	Mean	**SD**	**Mean**	**SD**
Indeterminate	1.27	1.58	1.33	1.67
False	2.33	1.67	2.47	1.95
Sentence	0.40	0.91	0.00	0.00
Phonological	0.53	0.64	1.53	0.99
Semantic	2.47	1.99	2.33	1.49
Syntactic	0.00	0.00	0.13	0.35
Substitution	0.00	0.00	0.20	0.41

Syntactic and substitution errors were also seen but none of the children made sentence type of errors in the LLD group. On the other hand TDC showed no syntactic and substitution errors but showed sentence type of error (Figure 4.2).

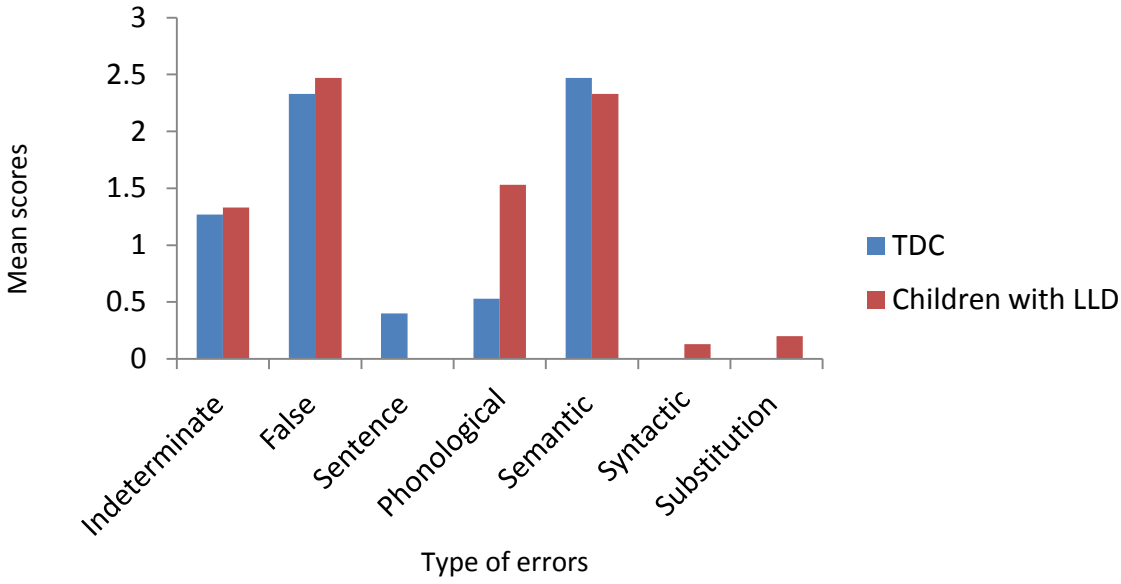

Figure 4.2. Proportion of error types between groups.

Children with LLD had greater phonological errors than TDC using a close phonological relative that would be a real word instead of garnering the meaning of the novel word from the context. The Mann Whitney U test revealed that phonological error was significantly different (z=-2.82, p<0.05) between TDC and children with LLD. On comparison of the errors across groups (Table 4.2), it was observed that semantic, false and indeterminate type of errors were more than sentence, syntactic and substitution errors in both TDC and LLD. There was no significant difference observed for indeterminate, false, sentence, semantic, syntactic and substitution errors in TDC and LLD. Children with LLD also made syntactic and substitution type of errors which were

not observed in TDC. Thus, the findings indicate that the children with LLD showed significantly greater phonological errors than TDC amongst all the error categories.

4.2.3. Comparison of performance of children with LLD and TDC on partial word knowledge

The correlation of the responses on the oral definition and matching task resulted in identification of frontier and unknown words. The children with LLD had 68 (45%) frontier words and 64 (43%) unknown words. Frontier words were broadly analyzed as 27 (18%) associated and 35 (23%) unrelated for children with LLD and unknown words were divided into 16 (11%) associated and 48 (32%) unrelated response. As the data is non-parametric, the Wilcoxon Signed Rank test (z=-1.19, p>0.05) revealed that children with LLD had limited partial word knowledge growth as their frontier and unknown words were almost similar after exclusion of the few known words.

The Mann Whitney U test (z=-1.10 p>0.05) showed that there was no significant difference in the proportion of frontier and unknown words across TDC and children with LLD. But, amongst TDC, frontier words were more than unknown words (z=-2.05, p<0.05) indicating that TDC acquired relatively more partial word knowledge on a single encounter than children with LLD. In other words, after exclusion of the known words, the unknown words were noticeably high for children with LLD revealing poor growth of word knowledge in them.

For frontier words, the unrelated (z=-1.092, p>0.05) and associated error response (z=-0.383, p>0.05) were analyzed between groups and no significant difference was seen.

For unknown words, the unrelated (z=-1.453, p>0.05) and associated error response (z=-0.966, p>0.05) also showed no significant difference. Though overall, it was observed that the unrelated responses were more for both frontier and unknown words between the groups. For frontier words and unknown words, the subcategories of error responses were also analyzed and phonological error (Z= -1.98, p <0.05) was seen to be significantly different across TDC and children with LLD. Amongst unknown words, the most common error seen was using a phonologically close real word for defining and marking on matching task. There was no particular observation of a specific error for frontier words.

4.2.4. Qualitative analysis of the performance of children with LLD and TDC on non words.

A descriptive (qualitative) analysis of the non-words was done in order to compare the performance between the two groups across word knowledge growth for each target non word. On comparisons of each non-word between the two groups, it was observed that the definitions obtained for 'rell' (Z=-2.312, $p\leq0.05$) and 'ging' (Z= -3.448, $p \leq 0.05$) were the most significantly different. Both these non words were nouns with concrete meanings aiding in easy interpretation. A detailed examination of each word between the groups is explained in the following section.

'wock': 'wock' was a non word used as a noun for 'jungle'(Appendix I). Among the TDC, 5 participants gave correct, 5 gave incomplete and 5 gave incorrect information while defining 'wock'. The most prominent error seen was semantic error (33.3%). For eg., A TDC defined 'wock' as *'It's a place with many trees.'* Amongst children with

LLD, 2 gave complete response, 3 gave incomplete response, 1 gave vague and 9 gave incorrect information with the phonological error (60%) being the most commonly seen in this group. For eg., *'The elephant is walking'* and *'Walking to his family'* shows that children with LLD use a real word 'walk' and define this real word in the place of the target non-word 'wock' even in the presence of supporting context.

'rell': 'rell' was a non word used as a noun for 'snake'(Appendix I). Among the TDC, 6 participants gave correct, 3 gave incomplete, 3 gave vague and 3 gave incorrect information while defining 'rell'. The most prominent error seen was semantic error (40%). For eg., responses like *'The animal following the elephant.'* and *'It's a thin and long scary animal.'* explain few semantic features of the target non word and lacking other features to give completely correct information. Amongst children with LLD, 3 gave complete response, 2 gave vague and 10 gave incorrect information with the indeterminate error (26.7%) followed closely by false (20%) and sentence (20%) error being the most commonly seen in this group. Children with LLD responded with definitions like '*elephant is frightened*.'-false error and '*when frightened called for rell'*-sentence error.

'tean': 'tean' was a non word used as a verb for 'stop'(Appendix I). Among the TDC, 1 participant gave correct, 1 gave vague and 13 gave incorrect information while defining 'tean'. The most prominent error seen was false error (46.7%) along with indeterminate error (26.7%). Amongst children with LLD, 1 gave complete response, 4 gave incomplete response, and 10 gave incorrect information with the false error (33.3%) followed closely by semantic (26.7%) and indeterminate (20%) error being the most commonly seen in this group. The false error made by a TDC *'It means a gang of animals'* varied from the

false error made by child with LLD *'tean means to see slowly'*. A participant from the typical group even while making a false error was relatively closer to the holistic meaning of the passage but a subject from the clinical group picked up a totally different meaning not related to the passage. The quality of these definitions varies individually and is difficult to be commented upon as the methodology of this study allows the child to answer without specifically using the adjoining context for interpreting the target non word.

'lote': 'lote' was a non word used as a verb for 'shoot'(Appendix I). Among the TDC, 4 participants gave correct, 2 gave incomplete, 4 gave vague and 5 gave incorrect information while defining 'lote'. The most prominent error seen was semantic error (33.3%) along with false (20%) and indeterminate error (13.3%). Participants in the typical group varied their responses from semantic error *('Hiding and killing animals.')* to false *('The hunter runs or goes after seeing the snake')* to indeterminate *(I don't know')* Amongst children with LLD, 2 gave complete response, 3 gave incomplete response, 1 gave vague and 9 gave incorrect information with the false error (40%) followed closely by semantic (20%) and indeterminate (20%) error being the most commonly seen in this group. For this non-word, 1 participant gave a syntactic error. The responses in the LLD group varied from false *('The lote is writing the homework')* to semantic *('A man taking animals from the wock').* This was a non word for which a child in the LLD group gave syntactically incorrect information *('lote means gunshot)* where the verb 'shooting with a gun' was changed to a noun 'gunshot'.

'ging': 'ging' was a non word used as a noun for 'hunter'(Appendix I). Among the TDC, 13 participants gave correct, and 2 gave incorrect information while defining 'lote'. The

two incorrect responses were indeterminate errors (13.3%). TDC gave correct responses like '*A hunter is a person who catches animals*' supporting the proposition that high imageability and concreteness of nouns in adjoining context leads to complete word knowledge. Amongst children with LLD, 2 gave complete response, 3 gave incomplete response, 3 gave vague and 7 gave incorrect information with the semantic error (40%) followed closely by phonological (13.3%), false (13.3%) and indeterminate (13.3%) error being the most commonly seen in this group. Children with LLD also gave correct response *('Hunter catches animals by shooting them')* and semantically related definitions for this non word *('A person who roams in the jungle to feed the animals').*

'marn': 'marn' was a non word used as a noun for 'school bus' (Appendix I). Among the TDC, 8 participants gave correct, 2 gave incomplete, 1 gave vague and 4 gave incorrect information while defining 'marn'. The most prominent error seen was semantic error (20%) along with false (13.3%) error. Amongst children with LLD, 5 gave complete response, 3 gave incomplete response, 1 gave vague and 6 gave incorrect information with the semantic error (26.7%) followed closely by false (20%) and phonological (13.3%) error being the most commonly seen in this group. It was observed that participants in the typical group and LLD group made phonological errors for this non word like '*It's a marshy kind of place'* and *'It means morning.'* respectively.

'jine': 'jine' was a non word used as a verb for 'race'(Appendix I). Among the TDC, 4 participants gave correct, 4 gave incomplete, 2 gave vague and 5 gave incorrect information while defining 'jine'. The most prominent error seen was false error (33.3%) along with semantic (26.7%) and indeterminate (13.3%). Amongst children with LLD, 2 gave complete response, 2gave incomplete response, and 11 gave incorrect information

with the false error (40%) followed closely by phonological (20%) error being the most commonly seen in this group. On qualitative analysis of the data it was observed that one of the typically developing child defined 'jine' as 'It means to run' in comparison to a child with LLD as 'Jine means to play a game'. It was observed that participants in the typically developing group were more specific in their definitions in comparison to children with LLD who identified it as a 'game' yet not defining which game.

'moof': 'moof' was a non word used as a noun for 'art class'(Appendix I). Among the TDC, 3 participants gave correct, 6 gave incomplete, 3 gave vague and 3 gave incorrect information while defining 'moof'. The most prominent error seen was semantic error (60%). Definitions ranged from *'Drawing period', 'It's a story lesson', 'Art class',and 'Favorite class'.* Amongst children with LLD, 3 gave complete response, 3 gave incomplete response, 2 gave vague and 7 gave incorrect information with semantic error (20%), phonological (20%), false (13.3%), indeterminate (13.3%), and syntactic (13.3%) error. Different types of errors were seen for this non word in the LLD group from phonological *('We move from one place to another')*, semantic *('Moof is a subject'),* false *('It means three times*') and syntactic *('Moof means to paint').* Children with LLD gathered varied information from a single non word in the same context implying that each individual's ability of reading comprehension is distinct.

'zear': : 'zear' was a non word used as a verb 'to bowl'(Appendix I). Among the TDC, 3 participants gave correct, 3 gave incomplete, and 9 gave incorrect information while defining 'zear'. The most prominent error seen was false error (40%) along with semantic (20%) and indeterminate (20%) error. For eg., semantic error *('Roll and knock the ball down to pin it')* Amongst children with LLD, 1 gave complete response, 2 gave

incomplete response, 4 gave vague and 8 gave incorrect information with the semantic error (40%) followed closely by false (33.3%) error. For eg., semantic error *('They roll the ball and keep it.').* 1 substitution (6.7%), 1 sentence (6.7%) and 1 phonological (6.7%) error was also made for this non word.

'sape': : 'sape' was a non word used as a verb 'to eat'(Appendix I). Among the TDC, 3 participants gave correct, 3 gave incomplete, and 9 gave incorrect information while defining 'sape'. The most prominent error seen was false error (40%) along with semantic (20%) and indeterminate (20%) error. For eg., false error *('It is a floor with grass to sit down')* Amongst children with LLD, 3 gave complete response, 1 gave incomplete response, 1 gave vague and 10 gave incorrect information with the false error (33.3%) followed closely by indeterminate (20%) error. Phonological (13.3%) error and semantic error (13.3%) were also made by 2 participants each in the group with LLD. For eg., false error *('Sape means doing project work during holidays')*.

To summarize the results of the present study, it was observed that partial word knowledge growth varied word to word using context as route while reading in TDC and children with LLD. It was also evident that the partial word knowledge growth was lesser in children with LLD than TDC. The unrelated error definitions of the non words were more as compared to associated error definitions. Children with LLD had relatively more unrelated definitions than TDC. Frontier words were largely more than unknown words for TDC and on comparison children with LLD had a large proportion of unknown words. Based on part of speech the non word stood for, the TDC children were able to understand nouns better than verbs and define them well. No such pattern was seen distinctly for children with LLD.

CHAPTER 5: Discussion

The aim of the current study was to investigate the word knowledge growth on a single exposure of a novel word using context in children with language learning disability. Performance of TDC was compared with children with LLD on oral definition assessment and multiple-choice matching task. The experiment was carried out using ten target non words in two reading passages. The objectives of the experiment were to study:

- The difference in the performance on defining the non words and the error subcategories in TDC and children with LLD.
- The difference in the matching task performance across the groups.
- The proportion of frontier and unknown words and the error responses for them as a measure of word knowledge development across groups.

The results of the present study are discussed in terms of:

5.1 Comparison of performance of children with LLD and TDC on oral definition task and error response categories.

5.2 Comparison of performance of children with LLD and TDC on matching task performances

5.1 Comparison of performance of children with LLD and TDC on oral definition task and error response categories

The results of the current study revealed that the correct definitions for the target non words were poor in children with LLD in comparison to TDC. Correct definitions referring to complete word knowledge with a unitary disclosure in a novel passage can be attributed to the contextual factors. The effect of context has been emphasized in children as they use semantic and syntactic cues to read and comprehend unfamiliar words (Goodman, 1973). For e.g., the presentation of the non word 'wock' in the following context explains the semantic features of the word helping the reader to comprehend the meaning.

> *An elephant was walking through the **wock** alone. Even though the **wock** has many trees and wild animals the elephant was lonely. The trees in the **wock** are thick and the sunlight barely touches the ground. Grass and moss covers the ground making **wock** dark and green. The **wock** is big and full of insects.*

This could be explained in terms of the semantic facilitation effect that could be taking place when an unfamiliar non-word is presented with a supporting context as described in the interactive-compensatory model of reading (Stanovich, 1980). The two processes involved in the model, spreading activation and expectancy based attentional process operate simultaneously for the context '*Even though the **wock** has many **trees** and **wild animals** the elephant was lonely'* to aid in recognition of 'wock'. This can also be substantiated by constraint based model which advocate parallel distributed processing taking in cues from lexical, semantic and syntactic processes simultaneously to

comprehend the meaning of the unfamiliar word in a text (MacDonald, Pearl Mutter, & Seidenberg, 1994; Spivey – Knowlton & Sadivy, 1995; Tiueswell et al., 1993).

The fluency in reading comprehension could also be attributed to the child's basic decoding skill as it is well understood from literature (Perfetti & Roth, 1981) that reading is an interactive process which involves higher order knowledge-based processing and the use of context for deciphering novel words which is dependent on the child's basic decoding skill. For e.g., in the sentence '*Even though the **wock** has many **trees** and **wild animals** the elephant was lonely',* 'trees' and 'wild animals' are possibly playing a role of contextual cues along with their background experiences to decipher the meaning of the word 'wock'. This indicates that probably TDC have developed vocabulary for words such as 'trees' and 'animals' in their lexicon which strengthens the connectivity of their semantic networks to decipher the meaning of the non-word 'wock'. A supporting context leads the information from the semantic memory to influence the developing reading system in young children for facilitating this decoding process (Pring & Snowling, 1989). Decoding ability of the child and the connectivity of the semantic network with the developing lexicon are the two determining factors for the size of the context effect in children's reading. As the proportion of correct definitions were poorer in children with LLD, it can be implied that their ability to decode based on context is restricted and the interconnections between semantic memory and developing lexicon are not strong to lead to a quick and accurate interpretation of unfamiliar words in a passage.

A broad analysis of the errors on the oral definition task across groups revealed a greater proportion of unrelated responses (such as 'Its walking in the garden.') than associated responses (e.g., 'Forest is a place consisting of many trees'.) for the non-word

‘wock’ implying incidental learning based on reading did not result in vocabulary development in a single encounter. When children ask for explanation after reading a novel word and are supplied with synonym or a picture explaining the concept, the novel words are retained well than when the word is only read (Dickinson, 1984; Elley, 1985). The frequency of occurrence of the word in a text leads to its familiarity and retention. The high frequency words were easily understood and remembered in presence of adjoining context than words that appeared only once (Brett et al., 1996). Children acquired and retained the novel vocabulary in their repertoire when they were explained the meaning of the new words in a story reading task (Brett et al., 1996).

The results revealed that children with LLD had more unrelated responses (e.g., wock-‘we went by walking’). The unrelated responses in the experimental group can be attributed to diffused representations in the long-term memory of the episodic buffer. This could also be due to a deficit in the interaction between the verbal short-term memory (VSTM) and the central executive mechanism which is often observed in children with dyslexia (Baddeley, 2003). According to de Jong (2006), dyslexia involves deficits in both the phonological loop and central executive functioning. The possible reason could be a relatively poorer cognitive make-up system in children with LLD. Several studies have indeed demonstrated a relationship between working memory and reading comprehension (e.g., Cain, Oakhill, & Bryant, 2004; Perfetti, Landi, & Oakhill, 2005; Swanson, Howard, & Sa´ez, 2006). Children with general learning problems perform poorly in all areas of working memory tasks with a negative impact on their reading development (Pickering & Gathercole, 2004). The role of working memory for reading may be associated with the improved ability to store verbal information as well as

with the link between working memory and control of attention. Comprehension and recall of non word is compromised due to lack of cognitive resources in children with LLD having deficits in their working memory as they use most of their cognitive resources in reading the word alone.

A further analysis of the sub-categorical errors revealed that the false and semantic type of errors were predominantly observed in both TDC and children with LLD followed closely by indeterminate errors. False responses had no observable relation to the target non word. The definition given by the children was found to be simply wrong. The proportion of this response did not differ significantly for both TDC and children with LLD. This finding was not unexpected, as several studies have indicated multiple encounters of words amongst varying context are required for children to learn and add the word to their mental lexicon (Nagy et al., 1987). Single encounters in reading do not lead to gain in specific semantic information leading to limited vocabulary development (Wagovich & Newhoff, 2004). Furthermore, when children's definitions following minimal exposure to novel words during a story reading task were analyzed, it revealed a substantial inclusion of false attributes. The inclusion of this false attributes could have resulted from difficulty in identifying the novel word as an unknown word in the text, problems inferring the meaning of the word from the passage, difficulty remembering the meaning of the word or the location of the word in the text (Fukkink et al., 2001). The other error seen was the indeterminate type of error which is saying some form of "I don't know" when asked to define a novel word. This might suggest children in both the groups did not map or remember enough information to provide an oral definition.

The unexpected finding of this study was an equal proportion of semantic errors seen across TDC and children with LLD. Semantic response was related to the target non word in semantic features (e.g., 'wock'-'Elephant walk in the forest'). This response indicated a small step towards vocabulary development on a low frequency exposure to a novel word in simple adjoining context. These semantic responses can be attributed to the interview format used in this study. The children were probed with four sets of questions and allowed to read the passage again after the word was located and marked for them when asked. This semantic type of error was mostly seen when children were probed to remember the meaning and usually gave an answer in an attempt to get it right. It was also observed that children understood the holistic meaning of the passage and could explain it in simple words but when asked to define it specifically they would be at fault. On probing further with interview format, the response attained was semantically close to the definition of the target non-word.

5.2 Performance of children with LLD and TDC on matching task performances

The responses on matching task were correlated with error responses on the oral definition task to give a set of *known, frontier and unknown* words for each child. The *known* words were greater for TDC. Exclusion of the known words resulted in a set of frontier and unknown words which were seen in similar proportions across the control and experimental group. Similar proportions can be attributed to the difficulty in understanding a non word based purely on context. Children were able to gain few features of the non-word on reading with no added explanations.

Partial word knowledge gains in addition to complete word knowledge were found to be greater in the typically developing children. This could be primarily because of two reasons. First, the majority of responses in the LLD group were unrelated to the target definition, whereas almost half of the typical group's responses were associated. Thus, at the broad level of comparison, the typically developing children were seen to produce significantly more responses that were semantically related to the target definition, which is suggestive of greater growth in partial word knowledge. The investigation into more specific error types, in which the typically developing children produced relatively greater semantic errors, also supported the conclusion of partial word knowledge. Second, the results of the analysis comparing frontier words to unknown words further supported the finding of greater growth in partial word knowledge for the typical children. As afore mentioned, frontier words were defined as those words for which children responded incorrectly on the oral definition task but correctly on the multiple choice task. Typically developing children more frequently responded with a semantic definition error for such frontier words.

Another significant finding in the present study was that children with LLD showed no difference in the error types between frontier and unknown words. Because children with LLD scored similarly as typical group on the multiple choice assessment, this finding cannot be completely explained by random guessing. One possibility may be that children had difficulty recalling the correct meaning. The oral definition task may have been so difficult that they were not able to adequately present their knowledge in this expressive task. Expressive language delays could be a likely contributor to their poor performance on the oral definition task. Using Dale's (1965) steps of knowing a

word to compare the two groups, it may be that the typically developing children were higher on the continuum, such as Stage 3 (i.e., "I recognize the word and know it has something to do with . . ."), whereas children with LLD were lower on the continuum, such as Stage 2 (i.e., "I recognize it, but I don't know what it means.").

The result of poorer overall word learning performance for children with LLD was expected and was in line with previous research on spoken word learning for pre-school and school aged children (Oetting, Rice, & Swank, 1995; Oetting, 1999). The descriptive analysis revealed that children with LLD showed complete learning of less than one-fifth of the words. The oral definition task was also difficult for the typical children, but they outperformed the children with LLD and showed complete learning of about half of the words. Several studies have shown that incidental gains in word knowledge for words presented auditorily are rather difficult for young children. Oetting et al. (1995) carried out an experiment on 6-8 year old children and presented words in a video format. Children with LLD underperformed than the typical group on learning the meanings for novel object, attribute, action, and affective words. When the children were given additional encounters with novel words through repeated presentation of the stimulus video, the typical group gained over the children with LLD in vocabulary development (Oetting, 1999). Thus, it is observed from these two studies that children with LLD showed difficulty in learning spoken word meaning. The findings of the present study indicate that similar responses are seen in children with LLD on orthographic presentation of the words also, suggesting that the underlying process of word learning is impaired in children with LLD regardless of whether words are presented auditorily or visually.

Maturational delay in word learning may be attributed to the underperformance of the children with LLD as a consequence of developmental delay in language development and reading comprehension. Rice et al. (1994) described that the performance of pre-school children was similar to children with LLD on spoken word learning lending support to the possible developmental delay in language as the causative factor. Another possible reason could be that children with LLD have language and reading deficits. Small vocabulary and restricted decoding ability seen in children with LLD (Bishop & Adams, 1992; Catts, 1993) may be the two deficit areas leading to the partial word knowledge outcome.

First, limited vocabulary knowledge may have influenced children's performance on the word learning task. When the novel word is presented in text, children with poorer vocabulary are unable to understand the other words in the passage leading to a poor interpretation of the target words. This supposition is based on studies revealing the importance of vocabulary knowledge in reading comprehension (Stahl, 2003). Though, Steele and Watkins (2010) stated there was no significant correlation between word repertoire and reading ability of a child. Additional research is required to support the complex relationship among word learning, vocabulary knowledge, and reading ability.

Second, deficits in the ability to decode could suffice for the lack in word learning on reading. Children with LLD do show lower reading fluency and reading comprehension ability indicating a decoding insufficiency (Catts, 1993; McArthur et al., 2000). In order to overcome the insufficiencies at the decoding level, children with LLD consume most of their cognitive resources (Just & Carpenter, 1992) leaving fewer cognitive resources for comprehending the passage and interpreting the word.

Also thirdly, children with LLD had poor performance on the oral definition task as they had problem producing correct definitions. The ability to provide a definition itself is poor in children with LLD (Marinellie & Johnson, 2002). The children might have known the word but they were not able to produce in an expressive definition task. To overcome this, multiple-choice matching task was also carried out. Thus, deficits in expression cannot fully explain the poor performance of children with LLD in a word learning task. The effect of context on the oral definition task can be measured through the use of contextual cues for word recall. The oral definition task was a dynamic assessment including supporting context in the reading passage. These cues were designed to provide assistance to the children in word learning but were not sufficient to produce a completely correct definition. The observation made from this analysis was that a higher percentage of typically-developing children received better oral definition scores given contextual cues.

This finding of the present study indicate that a contextual cue was required for recall of meaning of the novel word on the oral definition task even when children had adequately understood the word meaning during the initial reading of the stimulus passage. Based on this assumption, children with LLD also having difficulty at recall should have showed improved results with contextual cues. But, no such improvement was seen indicating a parallel deficit at the inference level itself in children with LLD. Children were unable to infer the word meaning on the initial reading of the passage and even with the aid of contextual cues, it lead to a large proportion of unknown words and unrelated responses for the same. Simultaneously, contextual cues could have been of some help for the recall of the meaning in children with LLD revealing that along with

word inference, word recall may also be a deterring factor in word knowledge development.

Summary and conclusion

Semantic and syntactic processing of words in a young brain is a complex phenomenon. Various models and theories have been speculated to explain the process of vocabulary development in young children. Incidental learning through reading is deemed to be a major route for partial and complete word knowledge during the early years. The decoding ability, reading fluency, reading comprehension, receptive and expressive language abilities, vocabulary level, and the consumption of the cognitive resources are interconnected factors for the success of complete word knowledge. Assessment procedures such as "Show me X" picture-pointing format, incidental word learning condition (Gordon et al., 1992; Herman et al., 1987; Konopak, 1988a, 1988b; Konopak et al., 1987; Nagy et al., 1985; Schwanenflugel et al., 1997; Shu et al., 1995; Swanborn & de Glopper, 1999), a fast mapping task (Dollaghan, 1987), quick incidental learning task (Oetting, 1999; Oetting et al., 1995; Rice et al., 1990; Rice et al., 1992; Rice et al,1994) have not been able to measure the extent of word knowledge in entirety in children.

The present study thus aimed to investigate the partial and complete word knowledge in children with LLD. The objectives of the study were,

- To study the pattern of novel English word acquisition for reading in typically developing children (TDC) and children with language learning disability (LLD) in the age range of 9-10 years.

- To analyse and compare the pattern of novel English word acquisition in children with LLD and TDC.

The study was carried out using two tasks-oral definition assessment and multiple-choice matching task. Statistical non parametric test were administered to analyze the data.

The findings of the present study indicated that the performance of TDC and children with LLD were similar on most categories (such as broad analysis-associated and unrelated responses on oral definitions and multiple-choice matching task) but they also differed significantly in few categories (such as sub-categorical error responses on frontier and unknown words). The children with LLD gave more unrelated responses on the oral definition task and had greater unknown words on the multiple-choice matching task than TDC. The unrelated errors for unknown words were also greater in children with LLD than TDC. These variations in the error response patterns of children with LLD and its comparison to the responses on the multiple-choice matching task imply that children with LLD made few gains on partial word knowledge and fewer gains on complete word knowledge compared to the typically developing children.

The pattern of sub-categorical errors on the oral definition task for children with LLD was false > semantic > indeterminate errors while TDC showed semantic > false > indeterminate errors. Children with LLD did not make any sentence error and TDC did not make any syntactic and substitution errors on the oral definition task. Frontier words were largely more than unknown words for TDC. Based on part of speech, the non word stood for, the TDC children were able to understand nouns better than verbs and define

them well. No such pattern was seen distinctly for children with LLD. The sub-categorical error responses for frontier words were similar for both TDC and children with LLD implying that once a child has a identified at least one semantic feature of the word, the connections between the semantic memory and developing lexicon lead to a better understanding of the word with additional context cues. However, lack of recognition of even one feature fails to extract any meaning and children fall back on a phonologically close relative to correlate with the context. The phonological error was seen to be significantly different in TDC and children with LLD on the multiple-choice matching task in unknown words. Amongst the unknown words, children with LLD used a phonologically related real word for marking on the multiple-choice matching task.

Implications of the study

This study concluded that children with LLD gain very little or incorrect information for a word on a single exposure during reading. Intervention should aim at giving multiple encounters to the word for the children to gain word knowledge. (Jenkins, Stein, & Wysocki, 1984; Rice, Oetting, Marquis, Bode, & Pae, 1994). The phenomenon of complete word knowledge takes place when children learn the meaning of the word in a context different from what they have read. (Fukkink et al., 2001). And to further stabilize the concept the children should refine their mental representations by neglecting the false attributes. (Fukkink et al., 2001). A meta-analysis of vocabulary development revealed that multiple exposures in different context is a primary tool for improving word knowledge (Stahl & Fairbanks, 1986). Clinicians can provide multiple encounters by using classroom vocabulary items, preteaching core curricular vocabulary, and

collaborating with classroom teachers to provide contextually rich, multiple exposures to target vocabulary items.

One of the error categories shown by children with LLD is using the target non word in a sentence rather than defining it. This is in line with previous research that children with LLD provide immature definitions (Marinellie & Johnson, 2002) than TDC. These results bring out that intervention should be focused on definition production. The skill to produce a definition is a requirement at elementary age as students are often assessed on their curricular vocabulary through definitions. Providing a definition for a novel word requires a complete understanding of the semantic features of the word and the ability to reflect on the needs of the communication partner. Thus, intervention should also aim at development of definitions for vocabulary development.

The dynamic assessment of partial word knowledge in children with LLD is another significant clinical implication. Alternative assessments for children in India who come from culturally and linguistically diverse backgrounds (Gutiérrez-Clellen & Peña, 2001; Laing & Kamhi, 2003) is essential for determining the overall repertoire and the extent of partial word knowledge in them. A hierarchy of task involving graduated prompting like oral definitions without assistance, with questions, with contextual cue and selecting definitions in multiple-choice task can be used for interpreting word meanings in a context. However, it should be noted that dynamic and informal assessments are only a part of the complete assessment of the child's language level. These assessments may help clinicians in identifying appropriate instructional techniques and predicting and assessing therapy outcomes (Laing & Kamhi, 2003).

The present study contributes to the existing evidence of the pattern of vocabulary development in children with LLD. Most of the previous research has reported that after minimal exposure to novel words, children with LLD gain very little information and in many instances gain incorrect information. The present study highlights the novel word acquisition through reading in children with LLD in the Indian context where English is a second language yet is indispensable for formal communication.

Limitations of the study

The present study addresses the growth of partial word knowledge but the results are to be generalized with caution due to small sample size. The methodology of this study provides an alternative assessment procedure to gauge word knowledge in children with LLD though complete word knowledge requires elaborate and detailed assessment procedures. Future research will be required to investigate and establish intervention strategies for improving complete and partial word knowledge on reading comprehension in children with LLD.

References

Alt, M., Plante, E., & Creusere, M. (2004). Semantic features in fast-mapping: Performance of preschoolers with specific language impairment versus preschoolers with normal language.*Journal of Speech, Language, and Hearing Research*, *47*, 407–420.

Altmann, G. T. M., Garnham, A., & Dennis,Y. (1992). Avoiding the garden path: Eye movements in context. *Journal of Memory & Language, 31*, 685-712.

Altmann, G. T. M., Garnham, A., & Henstra, J. A. (1994). Effect of syntax in human sentence parsing: Evidence against a structure-based proposal mechanism. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 20,* 209-216.

Altmann, G. T. M., & Steedman, M., (1988). Interaction with context during human sentence processing. *Cognition, 30,* 191-238.

Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature Reviews Neuroscience*, *Oct, 4*, 829-839.

Balota, D. A., Cortese, M. J., Hutchinson, K. A., Neely, J. H., Nelson, D., Simpson, G., & Treiman, R. (2002). *The English Lexicon Project: A web-based repository of descriptive and behavioral measures for 40,481 English words and nonwords*. Retrieved from http://elexicon.wustl.edu/

Bates, E., Marchman, V., Thal, D., Fenson, L., Dale, P., Reznick, J. S., Reilly, J., & Hartung, J. (1994). Developmental and stylistic variation in the composition of early vocabulary. *Journal of Child Language, 21*, 85–123.

Bishop, D. V. M., & Adams, C. (1992). Comprehension problems in children with specific language impairment: literal and inferential meaning. *Journal of Speech and Hearing Research, 35,* 119–129.

Bloom, P. (2000). *How children learn the meanings of words.* Cambridge, MA: MIT Press.

Brett, A., Rothlein L., Hurley, M. (1996). Vocabulary acquisition from listening to stories and explanations of target words. *The Elementary School Journal*, 96, 415–422.

Brown, R., & McNeill, D. (1966). The "tip of the tongue" phenomenon. *Journal of Verbal Learning and Verbal Behavior, 5,* 325–337.

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

Cain, K., Oakhill,J. V., & Elbro, C. (2003). The ability to learn new word meanings from context by school-age children with and without language comprehension difficulties. *Journal of Child Language*, *30*, 681–694.

Cain, K., Oakhill J. V., & Lemmon, K. (2004). Individual differences in the inference of word meanings from context: The influence of reading comprehension, vocabulary knowledge, and memory capacity. *Journal of Educational Psychology*, *96*(4), 671–681.

Caramazza, A. (1997). How many levels of processing are there in lexical access? *Cognitive Neuropsychology*, *14*(1), 177–208.

Carey, S. (1978). The child as word learner. In M. Halle, J.Bresnan, & G. A. Miller (Eds.), *Linguistic theory and psychological reality* (pp. 264–293). Cambridge, MA: MIT Press.

Carey, S., & Bartlett, E. (1978). Acquiring a single new word. *Papers and Reports on Child Language Development* (Stanford University), *15,* 17–29.

Catts, H. W. (1993). The relationship between speech-language impairments and reading disabilities. *Journal of Speech and Hearing Research, 36,* 948–958.

Connie, J. (1996). *Handbook of Reading Research, II,* Kansas University.

Dale, E. (1965). Vocabulary measurement: Techniques and major findings. *Elementary English, 42*, 895–901; 948.

deJong, P. (2006). Understanding normal and impaired reading development: A working memory perspective. In S. Pickering (Ed.). *Working memory and education,* 33-60. London: Academic Press.

Dickinson, D. S. (1984). First impressions: Children's knowledge of words gained from a single exposure. *Applied Psycholinguistics, 5*, 359–373.

Dollaghan, C. A. (1985). Child meets word: "Fast mapping" in preschool children. *Journal of Speech and Hearing Research, 28,* 449–454.

Dollaghan, C. A. (1987). Fast mapping in normal and language impaired children. *Journal of Speech and Hearing Disorders, 52,* 218–222.

Durso, F. T., & Shore, W. J. (1991). Partial knowledge of word meanings. *Journal of Experimental Psychology: General, 120,* 190–202.

Elley, B.W.(1985). Vocabulary acquisition from listening to stories. *Reading Research Quarterly, 24, 2,* 174-187.

Ellis Weismer, S. E., & Hesketh, L. J. (1993). The influence of prosodic and gestural cues on novel word acquisition by children with specific language impairment. *Journal of Speech and Hearing Research, 36,* 1013–1025.

Eysenck, M. W. (1979). The feeling of knowing a word's meaning. *British Journal of Psychology, 70*, 243–251.

Frazier, L. (1987). Sentence processing: A tutorial review. In. M. Coltheart (Ed), *Attention on performance 12:The psychology of reading* (pp.559- 586). Hillsdale, NJ: Erlbaum.

Fukkink, R. G., Blok, H., & de Glopper, K. (2001). Deriving word meaning from written contest: A multicomponential skill. *Language Learning*, 51, 477–496.

Gathercole, S. E., Hitch, G. J., Service, E., & Martin, A. J. (1997). Phonological short-term memory and new word learning in children. *Developmental Psychology, 33,* 966–979.

Goodman, K.S. (1973). Psycholinguistic universals in the reading process. In F. Smith (Ed.), *Psycholinguistics and reading*, 1-29. New York: Holt, Rinehart, & Winston.

Gordon, J., Schumm, J. S., Coffland, C., & Doucette, M. (1992). Effects of inconsiderate versus considerate text on elementary students' vocabulary learning. *Reading Psychology: An International Quarterly, 13,* 157–169.

Gough,P.B., & Hillinger,M.L.(1980) Learning to read: An unnatural act ,*Bulletin of the Orton Society, 30,* 179-196.

Gutiérrez-Clellen, V. F., & Peña, E. (2001). Dynamic assessment of diverse children: a tutorial. *Language, Speech, and Hearing Services in Schools, 32,* 212–224.

Hart, J. T. (1965). Memory and the feeling-of-knowing experience. *Journal of Educational Psychology, 56,* 208–216.

Herman, P. A., Anderson, R. C., Pearson, P. D., & Nagy, W. E. (1987). Incidental acquisition of word meaning from expositions with varied text features. *Reading Research Quarterly, 22*, 263–284.

Horohov, J. E., & Oetting, J. B. (2004). Effects of input manipulations on the word learning abilities of children with and without specific language impairment. *Applied Psycholinguistics, 25*, 43–65.

Jaswal, V. K., & Markman, E. M. (2001). Learning proper and common names in inferential versus ostensive contexts. *Child Development, 72*, 768–786.

Jenkins, J. R., Stein, M. L., & Wysocki, K. (1984). Learning vocabulary through reading. *American Educational Research Journal, 21,* 767–787.

Just, M. A., & Carpenter, P. A. (1992). A capacity theory of comprehension: individual differences in working memory. *Psychological Review, 99,* 122–149.

Katz, N., Baker, E., & Macnamara, J. (1974). What's in a name? A study of how children learn common and proper names. *Child Development 45*, 469–473.

Kiernan, B., & Gray, S. (1998). Word learning in a supported learning context by preschool children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 41,* 161–171.

Konopak, B. C. (1988a). Effects of inconsiderate vs. considerate text on secondary students' vocabulary learning. *Journal of Reading Behavior, 20*, 25–41.

Konopak, B. C. (1988b). Eighth graders' vocabulary learning from inconsiderate and considerate text. *Reading Research and Instruction, 27,* 1–14.

Konopak, B. C., Sheard, C., Longman, D., Lyman, B., Slaton, E., Atkinson, R., & Thames, D. (1987). Incidental versus intentional word learning from context. *Reading Psychology: An International Quarterly, 8,* 7–21.

Koriat, A., & Lieblich, I. (1974). What does a person in a "TOT" state know that a person in a "don't know" state doesn't know. *Memory and Cognition, 2,* 647–655.

Laing, S. P., & Kamhi, A. (2003). Alternative assessment of language and literacy in culturally and linguistically diverse populations. *Language, Speech, and Hearing Services in Schools*, *34*, 44–55.

Leonard, L. B., Schwartz, R. G., Chapman, K., Rowan, L. E., Prelock, P. A., Terrell, B., Weiss, A. L., & Messick, C. (1982). Early lexical acquisition in children with specific language impairment. *Journal of Speech and Hearing Research, 25,* 554–564.

MacDonald,M. C., Pearl Mutter, N. J., & Seidenberg, M. S. (1994). Lexical nature of syntactic ambiguity resolution. *Psychological review, 101,* 676-703.

Marinellie, S. A.,&Johnson, C. J. (2002). Definitional skill in school-age children with specific language impairment. *Journal of Communication Disorders, 35*, 241–259.

Markman, E. M., & Wachtel, G. F. (1988). Children's use of mutual exclusivity to constrain the meaning of words. *Cognitive Psychology, 20*, 121–157.

Marshall, J.C., & Newcombe, F.(1973). Patterns of paralexia: A psycholinguistic approach. *Journal of Psycholinguistic Research,2*, 175-199.

McArthur, G. M., Hogben, J. H., Edwards, V. T., Heath, S. M., & Mengler, E. D. (2000). On the 'specifics' of specific reading disability and specific language impairment. *Journal of Child Psychology and Psychiatry, 41,* 869–874.

Mervis, C. B., & Bertrand, J. (1994). Acquisition of the novel name-nameless category (N3C) principle. *Child Development*, *65*, 1646–1662.

McGregor, K. K., Newman, R. M., Reilly, R. M., & Capone, N. C. (2002). Semantic representation and naming in children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 45*, 998–1014.

Morton, J. (1969). The interaction of information in word recognition. *Psychological review, 76*, 165-178.

Nagy, W. E., Herman, P. A., & Anderson, R. C. (1985). Learning words from context. *Reading Research Quarterly*, *20*, 2, 233–253.

Nagy, W. E., Anderson, R. C., & Herman, P. A. (1987). Learning word meanings from context during normal reading. *American Educational Research Journal*, *24*(2), 237–270.

Nagy, W. E., & Herman, P. A. (1987). Breadth and depth of vocabulary knowledge: Implications for acquisition and instruction. In M. G. McKeown & M. E. Curtis (Eds.), *The nature of vocabulary acquisition* (pp. 19-35). Hillsdale, NJ: Lawrence Erlbaum.

Neely, J. J. (1977). Semantic priming and retrieval from lexical memory: Roles of inhibitionless spreading activation and limited capacity attention. *Journal of Experimental Psychology: General*, 106, 226-254.

Oetting, J. B. (1999). Children with SLI use argument structure cues to learn verbs. *Journal of Speech, Language, and Hearing Research, 42*, 1261–1274.

Oetting, J. B., Rice, M. L., & Swank, L. K. (1995). Quick incidental learning (QUIL) of words by school age children with and without SLI. *Journal of Speech and Hearing Research, 38,* 434–445.

Pickering, S.J., & Gathercole, S.E. (2004). Distinctive working memory profiles in children with special educational needs. Educational Psychology, 12, 80-102.

Perfetti, C. A., Landi, N., & Oakhill, J. (2005). The Acquisition of Reading Comprehension Skill. In M.J. Snowling & C. Hulme (Eds.), *The science of reading: A handbook*. Oxford: Blackwell, 227-253.

Perfetti, C. A., & Roth, S. (1981) Some of the interactive processes in reading and their role in reading skill. In A. Lesgold and C. Perfetti (Eds), *Interactive Processes in Reading*, Hillsdale, NJ: Erlbaum Associates, 269-297.

Perfetti, C.A., Liu, Y., & Tan, L. H. (2005). The lexical constituency model: Some implications of research on Chinese for general theories of reading. *Psychological Review, 112*, 43-59.

Plaut, D. C., McClelland, J. L., Seidenberg, M. S., & Patterson, K. (1996). Understanding normal and impaired word reading: Computational principles in quasi-regular domains. *Psychological reviews, 103*, 56-115.

Posner, M. I., & Snyder, C.R. (1975a). Attention and cognitive control. In R.Solso (Ed.), *Information processing and cognition: The Loyola symposium* (pp. 55-84). Hillsdale, NJ: Erlbaum.

Posner, M. I., & Snyder, C.R. (1975b). Facilitation and inhibition in the processing of signals. In P.Rabbitt & S. Dornic (Eds.), *Attention and performance* (Vol. 5, pp.669-682). New York: Academic Press.

Pring, L., & Snowling, M. (1989). The 'automatic' use of context in children's reading. *Reading and Writing, 1*, 53-60.

Rayner, K., & Pollatsek, A. (1989). *The psychology of reading*. Englewood Cliffs, NJ:Prentice Hall.

Rice, M. L., Buhr, J. C., & Nemeth, M. (1990). Fast mapping word-learning abilities of language-delayed preschoolers. *Journal of Speech and Hearing Disorders, 55*, 33–42.

Rice, M. L., Buhr, J. C., & Oetting, J. B. (1992). Specific language impaired children's quick incidental learning of words—the effect of a pause. *Journal of Speech and Hearing Research, 35*, 1040–1048.

Rice, M. L., Oetting, J. B., Marquis, J., Bode, J. & Pae, S. Y. (1994). Frequency of input effects on word comprehension of children with specific language impairment. *Journal of Speech and Hearing Research, 37*, 106–122.

Rice, M. L., & Woodsmall, L. (1988). Lessons from television: Children's word learning when viewing. *Child Development, 59*, 420–429.

Sanford, A. J., Garrod, S., & Boyle, J.M. (1977). An independence of mechanism in the origins of reading and classification-related semantic distance effects. *Memory & Cognition, 5*, 214-220

Schwanenflugel, P. J., Stahl, S. A., & McFalls, E. L. (1997). Partial word knowledge and vocabulary growth during reading comprehension. *Journal of Literacy Research, 29*(4), 531–553.

Seymour, P. H. K (1976). Contemporary models of the cognitive process: II. Retrival and comparison operations in permanent memory. In V Hamilton & M.D. Vernon (Eds.), *The development of cognitive processes* (pp. 43-108). New York: Academic Press.

Shanbal, J., C., & Prema, K.S. (2007). Languages of School-going Children: A Sample Survey in Mysore. *Language in India, 7,* 1-14.

Shore, W. J., & Durso, F. T. (1990). Partial knowledge in vocabulary acquisition: General constraints and specific detail. *Journal of Educational Psychology, 82,* 315–318.

Shu, H., Anderson, R. C., & Zhang, H. (1995). Incidental learning of word meanings while reading: A Chinese and American cross-cultural study. *Reading Research Quarterly, 30,* 76–95.

Spivey- Knowlton, M., Eberhard, & Sadivy,J. C. (1995). Resolving attachment ambiguities with multiple constraints. *Cognition, 55,* 227- 267.

Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: a model-based meta-analysis. *Review of Educational Research, 56,* 72–110.

Stahl, S. A. (2003). Vocabulary and readability: how knowing word meanings affects comprehension. *Topics in Language Disorders, 23*, 241–247.

Stanovich, K. (1980). Toward an interactive-compensatory model of individual differences in the development of reading fluency. *Reading Research Quarterly, 1*, 32-71.

Stanoivich, K. E., Nathan, G. R., West, F. R., Vala-Rossi, M. (1985). Children's word recognition in context: Spreading activation, Expectancy, and Modularity. *Child development, 56*, 1418-1428.

Stanovich, K.E., & West, R.F. (1983). On priming by a sentence context. *Journal of Experimental Psychology: General,* 112, 1-36.

Sternberg, R. J. (1987). Most vocabulary is learned from context. In M. G. McKeown & M. E. Curtis (Eds.), *The nature of vocabulary acquisition* (pp. 89–105). Hillsdale, NJ:Erlbaum.

Steele, S. C., & Watkins, R. V. (2010). Learning word meanings during reading by children with language learning disability and typically developing peers. *Clinical Linguistics and Phonetics, 24,* 7, 520–539.

Steele, S. C., (2010). Oral Definitions of Newly Learned Words: An Error Analysis *Communication Disorders Quarterly 33, 3,* 157–168.

Swanborn, M. S. L., & de Glopper, K. (1999). Incidental word learning while reading: A meta-analysis. *Review of Educational Research, 69,* 261–285.

Swanson, H.L., Howard, C.B., & Sa´ez, L. (2006). Do different components of working memory underlie different subgroups of reading disabilities? Journal of Learning Disability, 39, 3, 252-269.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Conway, T., Lindamood, P. (1999) Preventing Reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology, 91,* 579-593.

Traxler, J.M. (2012) *Introduction to Psycholinguistic.* Wiley-Blackwell, UK.

Truswell, J., Tanenhaus, M. K., & Kellow, C. (1983). Verb- specific constraints in sentence processing: Separating effects of lexical preference from garden- paths. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 19,* 528-553.

Trembly, D. (1966). Laws of learning general and specialized vocabularies [summary]. *Proceedings of the 74th Annual Convention of the American Psychological Association, 1,* 229–230.

Wagovich, S. A., & Newhoff, M. (2004). The single exposure: Partial word knowledge growth through reading. *American Journal of Speech-Language Pathology, 13,* 316–328.

Wixson, K., Peters, C, Weber, E., &Roeber, E. (1987). New directions in statewide reading assessment. *The Reading Teacher, 40,* 749-754.

Yopp, H.K. (1992). Developing phonemic awareness in young children. *The Reading Teacher, 45,* 696–703.

Appendix I

Stimulus passage

Passage 1

My school is too far away to walk to. I get there on a marn. I wish I could walk to school like some kids do. In the morning, I stand and wait to be picked up. The doors of the marn open and I get in and find a seat by my friend. Then the marn has to go pick up other people, too. Finally, the marn drops us off at school.

I go to the playground to play with my friends. We like to play soccer and kickball. Sometimes, we jine. We line up and take off as fast as our feet can go. When we jine, I usually lose. If I keep trying, I know I will get faster. Usually we can only play for a few minutes. Then the bell rings. It's time to go inside.

In my classroom, my desk is in the very front, next to the window. Mrs. C, my teacher, put me in the front because I talk too much when I sit in the back. First, Mrs. C takes attendance and does the lunch count. Then we listen to announcements. Then it's time for math. We are learning how to multiply and divide. I like math because I'm good at it. But my favorite is moof. Mr. M comes three times a week to teach us. We get to paint and to make things out of clay. When we don't have moof, we have P.E. This week, we zear. We roll the ball and try to knock down the pins. Sometimes when I zear, I only knock down one or two. But next time we zear, I will knock them all down at once. At least I am going to try. It gets very loud in the gym when we zear. Everyone is cheering and shouting. I have so much fun when we zear.

After school, my brothers and sister and I go to the afterschool program. First, we sit down and we sape. It's usually something gross. But I eat the snack anyways because I'm hungry. After we sape, we do our homework. Then, we can do lots of different things. We can read or draw or play games. We stay at the after-school program for an hour. I am so happy when my dad picks us up! That means I don't have to take the marn home.

Passage 2

An elephant was walking through the wock alone. Even though the wock has many trees and wild animals the elephant was lonely. The trees in the wock are thick and the sunlight barely touches the ground. Grass and moss covers the ground making wock dark and green. The wock is big and full of insects.

The elephant was frightened that he might come upon a rell. He had never seen a rell before, but he had heard what terrible creatures they were. They were thin, long and crawled on the ground. The elephant was scared the rell might bite him and poison him. He had not gone very far when a rell with green and yellow stripes crossed his path. Instantly the elephant teaned in his tracks. The elephant stood there and did not make a sound. He looked very quietly to his sides if he had any help. The elephant was still and seeing where he could run away. The elephant thought I should never have come alone this far from my friends.

When the elephant teaned, at that moment a ging stepped out of the bushes, his gun pointing straight at the elephant. The ging liked to go in the wock and look for wild animals. He was known to lote very well. He would lote the wild animals and take them from the wock. The ging would wait and keep looking for the animals in the wock and as soon as he would spot one, the ging would aim his gun right at the animal's head and lote. He would take the animals to the market to sell their skin and meat. But when the ging saw the rell, he dropped his gun and fled. That was how the elephant learned that rell were not what he thought. When the ging suddenly dropped his gun and ran, the rell turned to his side and went behind him.

The elephant was relieved and turned to go back home. He didn't want to wait; he started to walk in the opposite direction and walked till he reached where he had started from. He met his family and was happy to be safe.

List of the test stimuli including the non-words as target words

Nonsense target word	Category	Meaning
Passage-My school		
Marn	Noun	Bus
Jine	Verb	Race
Moof	Noun	Art class
Zear	Verb	Bowl
Sape	Verb	Eat
Passage-The Elephant		
Wock	Noun	Jungle
Rell	Noun	Snake
Tean	Verb	Stop
Ging	Noun	Hunter
Lote	Verb	Shoot

Appendix II

Oral definition scoring checklist

Score	Features	Example responses for *sape*
0	No correct information	'I don't know'
1	Vague response	'What he does'
2	Incomplete response	'Food'
3	Complete response	'Eats a snack at the after school programme'

Definition and Example of Error categories

Type			
Broad	Specific	Definition	Example
Unrelated	indeterminate	no definitive response	I don't know; I don't remember; no response
	False	no decipherable connection to the target definition; random guesses	"revenge" for the target definition "to laugh in a mocking way."
	sentence	no definition given; target word used in a sentence	"they mank"
	phonological	rhymes or phonologically related responses	"beetle" for target word "beal"; "dash" for definition of "tash"
Associated	Semantic	related semantically to target	"family" for "younger sibling"
	Syntactic	correct semantic information, but incorrect syntactic category (i.e., noun for verb or vice versa)	"ride a bus" for "alien bus"
	Substitution	definition of another target word	definition of "mank" given for the definition "pive"