FAST MAPPING ABILITIES IN YOUNG BILINGUAL CHILDREN

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ALL INDIA INSTITUTE OF SPEECH AND HEARING

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May, 2016

CERTIFICATE

This is to certify that this dissertation entitled **"*Fast mapping abilities in young bilingual children"*** is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 14SLP009. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore

May, 2016

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CERTIFICATE

This is to certify that this dissertation entitled "***Fast Mapping abilities in young bilingual children***" has been prepared under my supervision and guidance. It is also been certified that this dissertation has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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DECLARATION

This is to certify that this dissertation entitled **"*Fast Mapping abilities in young bilingual children*"** is the result of my own study under the guidance of Prof. Shyamala K.C, Professor in Language Pathology, Department of SLP, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore,   *Registration No. 14SLP009*
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CHAPTER I
INTRODUCTION

Fast mapping is defined as the phenomenon which forms lexical representation for the newly learned word according to Carey and Bartlett (1978). They explained that fast mapping has two stages of word learning. The first stage is fast mapping, wherein this stage child forms new lexical representation for a novel word which child is not exposed to second stage of fast mapping is the "extended phase", wherein child refines some of the information about that particular novel word which already child has encountered. When child encounters a new word, he gains information about that referent of the novel word, phonetic characteristics and its syntactic frame. For the novel word to be strongly represented in child's memory, child should have a skill of matching a lexical representation of previously exposed word with the newly learned word. Pinker (1982) opined that children may use the strategy of "Ostension", that is, the act of pointing out or the process of showing, to make connection between the word and the entity. Similarly many researchers found out that children use both linguistic as well as non-linguistic strategies to encounter a novel word for the first time. (Bever, 1970; Chapman, 1978; Clark, 1973).Many studies reported that novel word learning is more lexically triggered in earlier stages than in later stages (Kroll &Curley, 1988).

In present scenario, Indian children are often exposed to more than one language from very initial days of schooling. Either they are exposed to two languages or more languages due to influence of schooling, cultural variations or regional diversity. Bilingualism is defined as phenomenon where individual is able to speak or write fluently in both the languages (Canadian Encyclopedia, 2009). It is considered as a sociolinguistic phenomenon by many scholars because of its greater importance in field of communication, political and in demographic consideration.

Further, it was very interesting to know how novel word learning takes place in bilingual children. According to statistical review in 2005, India has over 1652 languages spoken. And bilingual assessment makes a clear understanding of how the particular lexical links or representation is formed and how it is stored.

Novel word learning abilities are different in young children compared to adults because most of the young children learn novel word by giving more focus to the stimulus and particular referent. As children grow older they learn new words with the help of previous encounters of lexical representation (Paris and Lindauer, 1982). Any novel word learning strategies involve learning the lexical label of that particular word and associate meaning for that particular lexical label. In children novel word learning is slower at initial stage but gradually boosted at one particular time(Bloom, Lifter and Broughton, 1985).Younger children learn new L2 language word simply by means of perceptual representation (Appel and collegues, 1972).Children learn L2 vocabulary by means of conceptual representations (Potter, Von Eckardt and Feldman, 1984). Learning a novel word in L2 at younger age helps to retrieve the words faster and they are faster to learn in this age than in adult population (Dijkstra and Brysbaert 2006). Novel word learning in L1 is better in recognition than L2 in bilinguals and where as in multilingual word learning, it is faster in L3 followed by L1 and L2 (Vishnu, Ranjini,Sapnabhat and Shyamala, 2011).The factors which affect novel word learning are word length, complexity of the word, word frequency, taxonomic organisation cultural factors and phonotactic probability (Strokel, 2001; Stroke and Rogers, 2000).Practice effects are very important in learning new word (Newell and Rosenbloom, 1981).Word learning processes involves acquisition process and repeated practice fine tunes the information about the particular novel word which the child was exposed (Rumelhart and Norman, 1978).And also through repeated practice the connections are strengthened between them.

According to the study done on mapping skills in Kannada speaking toddlers, it revealed that the high practice words created a neighbourhood activation which facilitated the rapid learning of low practice words (Sushma, Amulya, Ranjini, and Swapna 2010)

Till date, few literatures predominately give some insight on how novel word learning occurs in monolinguals and to some extent few explain about how novel word learning occurs in bilinguals. Majority of the studies conducted on fast mapping skills are from Western context. India is a pluralist nation, in terms of ethnicity, diversity, culture and language. Bilingualism and Multilingualism are main features of India. Apparently studies related to how novel word learning takes place in younger bilingual children in Indian context are limited. Hence this research is valuable in finding out fast mapping ability in young bilingual children. It is important to know how novel word learning occurs at younger age, since at this age the children's vocabulary boosts up.

Need for the study

In the past, the word learning has been studied in several different ways. But in all of these paradigms; there was no control over the input to the child. The amount of exposure the child has, the information about modality, that is, visual or auditory or in which contexts child had exposure of word is not known. Also young children in their preschool and school age are frequently exposed to novel words through variety of experiences in their day to day life. Hence word learning is a continuous process in children. Most of the studies related to fast mapping are in the Western context. There is a dearth of literature related to fast mapping in Indian children. In Indian scenario, children are often exposed to more than one language and hence there arises the need to study novel word learning ability in bilingual children. This study will also help us to know how practice effect enhances novel word learning process and also know how fast word learning can

occur in bilingual group. Further, the novel word learning can be delineated to clinical population of impaired language children in their lexical acquisition process.

Aim

Present study aims to explore the fast mapping abilities in novel word learning in bilingual children using naming and recognition task.

Objectives of the study

- To study the novel word Acquisition in bilingual children whose L1 is Kannada and L2 is English.

- To study the practice effect in bilingual children in novel word learning.

- To study and compare immediate and delayed recall abilities of novel word in bilingual children.

- To compare novel word learning in recognition and production task in bilingual children.

Hypothesis

- There is no effect of L1 vs. L2, no effect of 5 vs. 10 repetitions and no difference in immediate and delayed recall on fast mapping abilities.

- There is effect of L1 vs. L2, effect of 5 vs. 10 repetitions and difference in immediate and delayed recall on fast mapping abilities.

CHAPTER II

REVIEW OF LITERATURE

2.1 Language Acquisition

Language is unique to human beings, especially in the form of speech. It is the prime means through which people express ideas, learn new information, and establish and maintain social relationships in their respective society. Language acquisition begins right from infancy and continues till several years of developmental life. Along with language development speech of the child also changes and both are ideally meant to develop hand in hand in typical individuals. It is the child's expression in terms of speech which serves as one of the important a venue for language evaluation. According to Glietman and Wanner, (1982) developmental process of language was defined as "mysterious" and according to Bloom (1983) as "Magic". Overall, the development of language and speech is a dynamic constructive process (Thelen, 2005).

For any individual to learn new words or develop language one of the contributing factors that is prerequisite is the cognitive abilities. Cognition comprises of those mental activities that are involved in comprehension of perceived information, including acquisition, organisation and storage, memory and use of knowledge. Traditionally cognition has been believed to be the foundation upon which language develops. It represents the underpinnings for language (Bloom &Lahey, 1978; Muma, 1978). Hence there is an intricate relationship between cognition and language, especially the cognitive processes like attention, memory and organisation which are important for comprehending and producing language (American Speech Language Hearing Association, 1987).

Language development is sub served with other functions. Language is merely a specific event of semiotic or symbolic function (Piaget, 1969), which includes imaginary play activities, the gestural symbols, the written or drawn picture, etc. Several researchers suggest that cognition, symbolic play develop in parallel (Bates, Benigni, Camaioni&Volterra, 1979; mc Cune- Nicolich, 1981; Ogura, 1991; Lytenin & Laakso, 1997). Vygotsky believed that language development in children is important for communication as well as regulation of behaviour by themselves (Berk & Winsler, 1995). In the course of language development along with communication there is a lot of enrichment in the cognitive processes and other psychological functions (Vygotsky, 1978).

ASHA in 1983 defined language into 3 components; form, content and use. According to ASHA (1983), language is a "complex and dynamic system of conventional symbols that is used in various modes for communication and expressing thoughts". ASHA proposed five parameters of language; phonology, morphology, syntactic, semantics and pragmatics.

Language acquisition occurs across various stages and it is explained by several researchers using different approaches. This knowledge of acquisition helps in differentiating between typical individual and disorder, where it has implications in language assessment and planning therapy.

Skinner (1957) says, "Language is a learnt behaviour and it can be modified according to the environmental stimulation". Children acquire language with the help of modelling and reinforcement by the parents. Chomsky (1969) in contrast to Skinner's belief explained the rule based device known as Language Acquisition Device for learning language. In language development vocabulary development is considered as one of the important yardstick to measure.

2.2 Vocabulary development

It is surveyed that more than 60,000 words' comprehension his achieved by the time of graduation. According to Bloom (2000) to gain this vocabulary size a child must be involved in learning of new words on everyday basis throughout his/her childhood. Vocabulary development in children is highly variable across individuals. It is dependent on so many factors like exposure to language, education, socio-economic status, dialect and native language (Mallikarjun, 2002). Learning novel words in children varies across age wherein younger children learn these words by focusing the particular stimulus that is in and around their environment. Gradually these styles of learning will be replaced with more matured form of learning novel word where children start linking to the previous episodes of events and try to link with lexical –semantic map. Learning L2 (second language) also differs across age. Older children may use different learning strategies than younger children. Potter et al, (1984) researched that vocabulary development in younger children is more lexically mediated than in older children.

Measuring the child's vocabulary development is crucial in the period of language development to both clinician as well as researchers. Learning language is one of the important components of cognition. Hence several researchers who studied language acquisition have emphasised on cognition, working memory and IQ because it's all interrelated to each other (Marchman& Fernald, 2008).

The skill to learn novel words is particularly exponential and is one of the crucial aspects in speech and language development. Children in the age range of 2-3 years old are estimated to learn approximately 2 new words per day; on contrary 8- 12 year old children learn as many as 12 words per day (Bloom, 2000). When a child learns a new word, he/she assigns meaning to the particular word. Several studies have reported that children between age of 2.5 -4 years select

unfamiliar object as a novel word referent and with repeated exposure they map that word. Few theories explain that novel word learning is happening by linguistic experience in the developmental period. The strategy of learning word through novel mapping is one such example. (Lederberg & Prezbindowski, 2000).

Word learning links the connection between conceptual and linguistic organisation in infants (Bloom, 2000; Gelman, Coley,Rosengren,Hartman, & Pappas, 1998). In conceptual domain the linkage between objects and events will be taking place and in linguistic domain phrases and words are learned through melody of human language. Several researchers have proved that during infant's stage word learning takes place through a strong linkage of conceptual and linguistic domain. To become a successful word learner, infants must identify relevant linguistic units, conceptual units and make a strong mapping between linguistic and conceptual units. And each of these domains require certain amount of abstraction for example a given word or utterances must be related to abstract phonological representation and should have abstract concept related to it. And vocabulary development is measured through a skill called fast mapping.

2.3 Fast mapping

Fast mapping is defined as the phenomenon which forms lexical representation for the newly learned word. This came into field of child language acquisition around 3 decades ago (Carey and Bartlett, 1978). The word fast mapping is believed to be critical in the first stage of learning new words or novel words, which requires intact phonological and semantic processing skills (Ellis Weismer & Evans, 2002; Gray, 2005). Few researchers investigated novel word learning and opined that with single exposure to a new phonological form and semantic value of the word, children create a 'map' (Form meaning), which is pre requisite or initial stage to the

learning of novel word. During this stage there is phonological, syntactic or semantic information represented. In typically developing child novel word learning creates particular lexical semantic map and this is refined through various experiences across communicative contexts. (Alt, Plante, & Creusere, 2004; Capone & Mcgregor, 2006; Dollaghan, 1987; Ellis Weismer & Evans, 2002; Ellis Weismer &Hesketh, 1993, 1996, 1998; Gray, 2003, 2004, 2005, 2006; Hwa-Froelich & Matsuo, 2005).

According to Lederberg (2000), two types of word learning exist rapid word- learning (fast mapping) and novel mapping (quick incidental learning). Child is given an explicit reference in rapid word- learning whereas in the second type, the child has to establish link among the novel word and unfamiliar object. In the present study fast mapping is employed.

In ideal situations, fast mapping tasks includes two phases, exposure phase and probe phase. In exposure phase child listens to a novel word and looks into the corresponding referent which would be in the form of pictures or real objects. In probe phase child has to name a particular picture which he has learned in the exposure phase. Further probe phases are evaluated with two tasks namely, recognition and expression probes (Ellis Weismer & Evans, 2002). Ideally fast mapping task is carried out without specific feedback or teaching over very short duration. In the present study above mentioned phases have been evaluated.

Studies on monolingual preschool children found that receptive probe is better than expression probe. Gray in 2003 exclaimed that children' fast mapping receptive scores might be a strong predictor of child's capability to express the learnt novel word. Hence, reception becomes eternal part for expressing the word.

A study revealed that there was significant correlation between fast mapping producing skills and vocabulary production scores of participants on the MacArthur- Bates Communicative Development Inventories (Fenson et al., 1993), a parental report instrument of language development, and the expressive portion of the Preschool Language Scale- 3 (Zimmerman, Steiner & Pond, 1992). Similar correlation was found on fast mapping performance and score of Peabody Picture Vocabulary Test, in monolingual English speaking preschoolers (PPVT-III; Dunn, Dunn& Williams, 1997), Gray (2004). And performance of fast mapping is influenced by several variables.

2.4 Factors affecting fast mapping:

Several studies have found that there are various and potentially influencing aspects of learning skills in typically developing young children. First, age becomes the primary contributing factor in the process of novel word learning. Fast mapping and age have direct one to one relationship, with evidence of older children outperforming better than young children (Alt et al., 2004; Gray, 2005, 2006). Second influencing factor in the process of fast mapping is cohesion of child's underlying language system. Children diagnosed with specific language impairment perform poorer than their peers with intact language skills in fast mapping task (Alt et al., 2004; Alt &Plante, 2006; Dollaghan, 1987; Ellis Weismer &Hesketh, 1993, 1996, 1998; Ellis Weismer & Evans, 2002; Gray, 2004, 2005, 2006).

The third important learning factor influencing the child's learning skills is their persistent language knowledge (Gray, 2003, 2004).

Fourth important novel word learning factor is phonotactic probability. It refers to frequency of occurrence of individual sounds and sounds combination it is believed that behavioral effects of phonotactic probability provides insight about the role of phonological representation in

language processing (Vitevitch and Luce,1999). Children learn words which have high phonotactic probability easily than low phonotactic probability words (Storkel, 2001; Storkel & Rogers, 2000).

Bilingualism is one of the important variables which tend to influence fast mapping skills in order to understand the effect of bilingualism on fast mapping, review of basic aspects of bilingualism is essential.

2.5 Bilingualism

Bilingualism is a phenomenon where individual masters in two languages. Factors like proficiency, social interaction, psychological etc., all these factors have to be considered to define the phenomenon called bilingualism.

Defining bilingualism

Haugen (1953) defined bilingual individuals are the ones who can speak fluent in one language and also can express in meaningful utterances in other language. Bloomfield (1993) defined bilingualism as native-like control of two languages. However, this is a rather strict view of bilingualism and one that limits the number of individuals or group that could be classified as bilinguals. Mac Namara (1967) defined bilingual where the individual should know L2 (2ndlanguage) at least minimal degree of the language skills i.e. speaking, reading, writing and listening. However to call that particular individual as bilingual he or she should use more than one language to communicate in his routine life according to current approach in linguistic, psychological and neurolingustic domains. According to several neuropsychological studies bilingual persons need not have perfect knowledge in all the languages. He/ she use either of the

languages for various purposes in a regular basis without knowing all aspects of the particular language (Fabbro, 1999).

2.6 Bilingualism in India

Bilingualism is more prevalent in India than western country. This seems to have originated from various parts of the world and not primarily from India. Ferguson (1968) believed that majority of bilingualism prevailing in western world comprised of accentuating immigrants and their off springs, the western natives and students of foreign language. This is not the scenario in India. India has been multilingual country right from the earliest times and English bilingualism has become an integral part of modern Indian consciousness.

According to Srivastava (1980) in India, not a single state is completely monolingual, modern Indian speakers do use minimum of three contact languages and there is not a single a speech community that has less than at least 3 different linguistic codes in its verbal repertoire. Hence in India, bilingualism is a natural phenomenon of language behaviour which requires more studies on normal and disordered populations in Indian linguistic context. Also the lexical representation, semantic mapping abilities, processing abilities and learning vocabulary vary across many language communities in India. Several models have been proposed to explain lexical organisation in bilingual.

2.7 Models of   Bilingual Lexical Organisation.

Research on bilingualism is majorly concerned with the nature of bilingual lexical organisation (Snodgrass, 1984). Theoretical view point has been documented to explain bilingualism. First in bilingual person, lexical knowledge of particular language will be stored in

specific memory system .i.e. each language has specific memory system. Second hypothesis says that there is no specific memory system that represents languages.

Various models have been proposed to explain these two hypotheses. Out of these, several models support the first hypothesis and other models support second hypothesis.

2.7.1 Word Association Model (Potter, So,Von Eckhardt& Feldman,1984).

This model assumes that L2 (Refers to the language acquired later most often after native language) concept are learnt by using the knowledge of L1 (Refers to language acquired first i.e. native language).
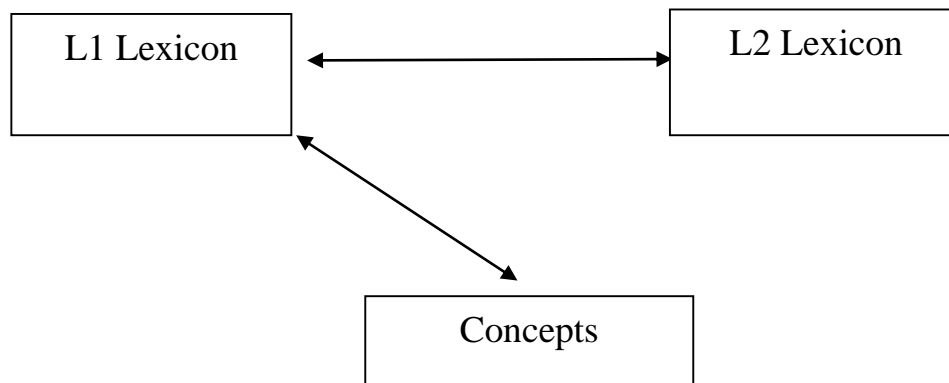
Figure 1: Word association Model

This model explains about the links between L1 and L2, and tries to explain about the nature of tasks and speed of processing of those tasks. First they talk about translation from L1 to L2 and opine that it will be faster than picture naming in L2, because translation mainly relies on conceptual access. Thus this model concludes that cross language processing occurs at lexical level through links between them.

2.7.2 *Concept Mediation Model* (Potter et al.1984)

This model contradicts the word association model and explains that L2 has its contribution in accessing the concepts of both the languages. This model assumes that the translation from L1 and L2 and picture naming in L2 might be similar since both need to access the concepts in order to retrieve the L2 vocabulary. Hence there are no lexical links and processing of cross language is necessarily mediated by a concept.

```
┌─────────────┐          ┌─────────────┐
│  L1 Lexicon │          │  L2 Lexicon │
└─────────────┘          └─────────────┘
           ↖                  ↗
              ┌──────────────┐
              │   Concepts   │
              └──────────────┘
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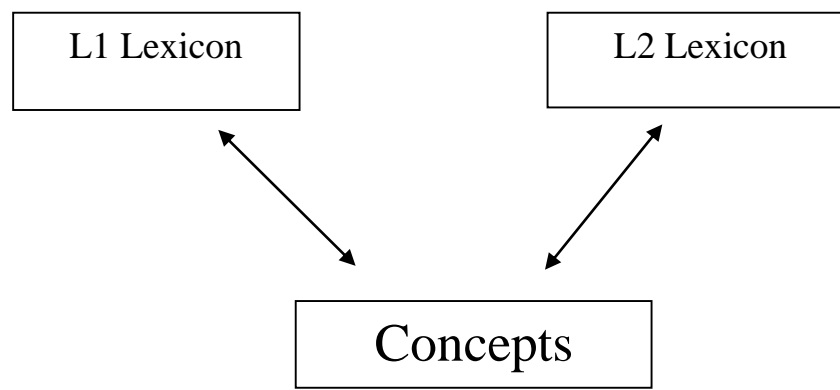
Figure 2: Concept mediation Model

Potter et al (1984) studied picture naming and translation in Chinese –English bilingual groups and results showed that there was no difference among these two tasks. Few studies have been carried out to support both these models. Kroll and Curley (2002) concluded that individual with low proficiency in second language (L2) follow *word association model* and similarly those who have high second language (L2) proficiency follow the *concept mediation model*.

2.7.3   **Revised Hierarchical Memory (RHM) Model (Kroll and Stewart 1990, 1994).**

This model proposes that bilinguals have a separate memory storage but with interconnected lexicons. Model's expository assumption is that the lexical strength differs

from one another and also that the word will be linked to general concept. The L2 lexicon

links are connected to L1 links strongly. On contrary, L1 with L2 connections are by weak

links. Since bilinguals hardly translate from their L1 to L2, the links between L1 and L2 is

weak. In supplementary to these connections, there is bilingual memory store which

consists of the conceptual store. This store is more abstract form of world and has

connection to both L1 and L2 lexicon. But connections for L1 and L2 vary in terms of

strength. That is, L1 connections to conceptual store is stronger than the L2 language

connections. Thus the bilingual individuals are more likely to access the conceptual store

in the first place than L2 lexicon. Thus RHM model hypothesized that both the lexical and

connection links are active in bilingual memory but it varies with respect to fluency in L2

and also dominance between L1 and L2. Thus few asymmetries assumes that L2- L1
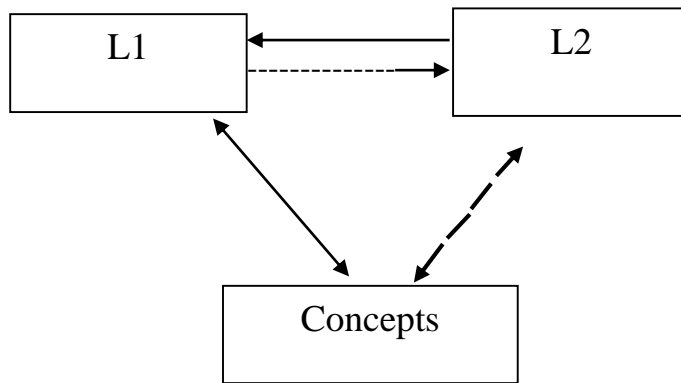
translation is faster than L1-L2.

Figure 3: Revised Hierarchical Model

2.8 Studies on Fast mapping and Bilingualism

There has been extensive research in the attempt to study fast mapping phenomenon in typically developing bilingual children. Apparently most of these have been in western bilingual contexts. Few studies have concentrated on investigating fast mapping skills in monolingual vs. bilingual population. One such study was on bilingual children aged between 3.0 to 5.6 years, who were monolingual English speakers or second language (L2) was English. Results revealed that monolingual English speaking children outperformed their L2 learning peers on the fast mapping task and on standardized vocabulary measure (PPVT- III). In case of English only speaking participants, it was found that novel word learning skills, chronological age and persistent receptive vocabulary skills has positive correlations (with PPVT – III). Surprisingly, there was no correlation in the early sequential bilinguals on tasks like novel word learning and existing vocabulary knowledge in L2 (Wilkinson & Mazzitelli, 2003).On same lines, few studies have found similar results where children outperformed in L1 compared to L2.According to Kan & Kohnert (2008) investigated potential relationships between age, fast mapping skills and existing vocabulary knowledge in both languages of developing bilingual preschool children and found that the scores were similar on L1 and L2. Also, the scores for fast mapping were more for L1 than L2. Hence they concluded that L1fast mapping and L2 vocabulary have significant positive and negative cross- language correlation.

Another investigated Vietnamese-American preschool children to examine language abilities. Fast mapping tasks were employed and reveled that children were tested in English but they switched to Vietnamese when they could not respond in English. Further performance on fast mapping and performance on other language dependent processing measures had positive correlations (Hwa – Froelich& Matsuo 2005).

In novel word learning, for mapping a newly learned word, sufficient amount of exposures are required. If those exposures are not sufficient then they fail to fast map lexical representation for the newly learned word. Hence number of exposure for learning novel word plays a crucial role. Hence to study the effect of exposure on novel word learning several studies have been carried out. According to Sushma M, Amulya P.R, Ranjini M and Swapna. N (2010) studied fast mapping abilities in typically developing toddlers whose age range was in between 16-20 months. These children were taught with names of 24 unfamiliar objects over a period of 12 training sessions that lasted for about 24 days. Children were divided into two groups, where the experimental group underwent both training phase and evaluations in all the sessions. But for control group, training and testing was done only in first and last session. Results revealed significant difference between experimental and control group. Scores were better for experimental group than control. Thus this study concluded that fast mapping occurs in toddlers and significant amount of practice is necessary for mapping the word.

Learning a novel word and creating lexical representation for the particular novel word requires sufficient number of exposures as well as good recall abilities this will be achieved through extended mapping technique where children go through a stage of rehearsal, and try to make strong lexical links. These help the children to recall and retrieve the particular novel word when required. If the child fails to extend the mapping of words he/she will fail to retrieve it. So this process of fast mapping plays a crucial role in recalling and retrieving a word. To study this effect, Trupthi (2009) investigated fast mapping skills in Kannada speaking children in the age range of 2.5-4.5years on a naming task. In this study accuracy of naming was assessed, where initially the names were trained and the subjects were asked to remember the names after 10 minutes and after one week. He found that older children in the group performed better when

compared to younger children and performance of naming was reduced after one week when compared to efficiency of naming tested after 10 minutes.

2.9 Studies related to disordered population

Few researchers were also keen on studying the pattern of how novel words get mapped in language disordered children with comparison to typical developing children it's of great interest to know how the mapping takes place across various disorders like Specific language disorder, hearing impairment etc and these studies give some insight about how the word learning takes place across these disorders and these results will be useful in planning rehabilitation program. In these lines few studies have employed the principle the fast mapping Gilbertson and Kamhi (1995) studied perception and production of nonsense words in typical normal individuals (between 7-10 years) and with hearing impaired individual (between 5-9 years). Results showed that learning of nonsense words were poorer in hearing impaired than typical individuals.

Word learning can take place at 2 conditions; one is rapid word learning and novel mapping. In rapid word learning, child gets the reference for a particular word which he is taught. In novel mapping, child will make lexical connections between referent and new word. In this regard, Lederberg et.al (2000) studied two aspects of language acquisition in hearing impaired, namely; rapid word learning and novel mapping who were 3-6 year old and found that performance was better in rapid word learning than the novel mapping. And also they found that there was a significant correlation between receptive vocabulary and performance.

Stelmachowicz et al. (2004) studied rapid word learning in children with hearing impaired (Moderate hearing loss) in the age range of 6-10 years old and typical individuals. It was found that hearing impaired performed poorer even with adequate training and exposure given.

Margie.G et al 1995 examined rapid word learning on 60 typical hearing children and 37 hearing impaired children with moderate sensorineural hearing lossbetween 5-14years. The task was to watch the animated slideshow which contained nonsense words and it was presented for about 3 times. Child was asked to identify the particular trained word from the slide show. Results revealed that children with hearing impairment performed poorer than typical normal individuals on recognition task.

Studies related to fast mapping on Specific language impairment (SLI) proposed that fast mapping creates association between particular referent and to the word. Dollaghan (1987) examined the fast mapping abilities in the SLI and normal population and found that SLI performed similarly in task of correctly associating nonsense syllable that was learnt but performed poorer in production task of the same.

Rice, Buhr, and Nemeth (1990) presented several unfamiliar items such as action, names of objects, attributes and affective states in the form of video presentation and narrative script and measured target words before viewing a video and after viewing a video in all 3 groups I.e. SLI (specific language impairment), MLU matched control and chronologically matched children. Out of these three groups, SLI performed poorer than MLU matched controls and normal children in these tasks. And interestingly, naming action verbs was difficult for both the groups. Rice, Bhur and Oetting (1992) concluded that SLI performed poorer in associating referent with a particular word when compared to age matched normal children.

There are number of studies carried out in the recent scenario to check for the novel verb interpretation in SLI children. It was found that some cases of SLI had performed at the level of normal children (Hoff-Ginsberg, Kelly and Bhur, 1996; Oetting, 1999). Rice et al. (1994) examined novel verb learning in SLI children and proposed that even if a particular novel verb was trained for 10 times still performance was poorer in SLI than normal children. They explained presuming this might be due to storage deficits, i. e. for these kinds of words the storage abilities is not sufficient.

Study by Vishnu, Ranjini, Sapna&Shyamala (2011) investigated novel word learning in Malayalam – English bilinguals and Tulu- Kannada – English multilinguals in adolescents using referent identification task and picture naming task and found that bilinguals children learned novel words faster in L1 (Malayalam) that L2 (English). Whereas multilingual children learned words faster in L3 (English) followed by L1 (Tulu) and L2 (Kannada). And further they opined that language proficiency, degree of exposure and opportunities to use the language are contributing factors for novel word learning.

Study by Danielle and Pui (2016) investigated fast mapping skills in preschool children whose L1 was Spanish and L2 was English, across two different context; one is storybook reading and cartoon viewing. These children were exposed to 8 unfamiliar words for a period of 4 sessions in both the contexts which mentioned above. Results revealed that there was no significant difference in learning unfamiliar words in storybook reading or cartoon viewing and the researchers opined that both storybook and cartoon viewing help the children in learning unfamiliar words in both L1 and L2.

To conclude, the above studies cited provide few interesting findings that pertain to fast mapping in different disordered population and also in the context of monolingual and bilingual

children in both western and Indian population, with the latter includes are very few studies related to fast mapping. From all these studies the knowledge of fast mapping skills across different disordered population, normal monolinguals and normal bilinguals is clear though not exhaustive. Further, these studies reflect the significance of number of exposures, influences of L1 vs.L2 and difference in the recall abilities. Literature as elaborated on how the novel words are stored in long term memory using fast mapping strategies and the factors influencing the recall abilities in them.

CHAPTER III

METHOD

The present study aimed to investigate fast mapping abilities in young bilingual children in the age range of 5- 8 years.

Objectives of the study

The main objective of the present study was to investigate fast mapping abilities in young bilingual children whose L1 was Kannada and L2 was English across recognition and naming tasks.

Further, study also examined,

1. Comparison of the novel word acquisition in bilingual children whose L1 was Kannada and L2 was English.

2. Comparison of practice effect (5 vs.10 repetitions) in bilingual children in novel word learning.

3. Comparison of immediate and delayed recall abilities of novel word learning in bilingual children.

3.1 Participants

30 bilingual children aged from 5-8 years were recruited on random basis. All children in this study were native speakers of Kannada and had English as the medium of instruction in their schools. To check their language proficiency, language use questionnaire was administered on all participants (Shanbal and Prema, 2007).

3.1.1 Inclusion criteria.

While selecting these participants it was made sure that the participants were:

- Aged between 5- 8years (males and females).

- Whose L1 was Kannada and L2 was English. Their proficiency was checked using language use questionnaire (Shanbal and Prema, 2007) (Appendix C).

- Free from motor, hearing, neurological, cognitive and psychological illness were ensured using the 'WHO ten question screening checklist' (Singhi, Kumar, Malhi & Kumar, 2007). (Appendix D)

- Checked for compensated vision, if any.

Table 1

Participants' details

Subjects	Age/ Gender	L1 Exposure In terms of %	L2 exposure in terms of %	Education
1	5.9yr/M	66	38	UKG
2	5yr/F	66	38	UKG
3	5yr/F	78	33	UKG
4	5yr/M	61	55	UKG
5	5.8yr/F	67	44	UKG
6	5yr/F	67	44	UKG
7	5.5yr/F	67	44	UKG
8	5.5yr/M	67	44	UKG
9	5.5yr/F	67	44	UKG

10	5.6yr/F	78	50	UKG
11	6.1yr/F	83	61	1st Grade
12	7yr/M	83	67	1st Grade
13	6yr/M	83	61	1st Grade
14	7yr/M	66	61	1st Grade
15	7yr/M	72	61	1st Grade
16	7yr/M	72	66	1st Grade
17	6yr/M	72	66	1st Grade
18	7yr/M	67	67	2nd Grade
19	7yr/M	78	50	2nd Grade
20	7yr/M	78	50	2nd Grade
21	8yr/F	78	67	3rd Grade
22	7.5yr/M	78	67	3rd Grade
23	8yr/M	72	56	3rd Grade
24	8yr/M	88	72	3rd Grade
25	8yr/M	88	72	3rd Grade
26	7yr/F	78	72	3rd Grade
27	8yr/F	78	72	3rd Grade
28	8yr/M	78	67	3rd Grade
29	8yr/M	78	67	3rd Grade
30	8yr/M	72	56	3rd Grade

Notes: L1: Kannada language and L2: English language

All the participants in the study mentioned above in Table 1 were rated for their proficiency based on their language use. That is, how often the subject used L1 and L2 in their daily routine (based on ratings always, sometimes or most of times).

3.1.2 Study design.

Single group comparison

3.1.3 Stimuli preparation.

24 meaningful novel words were selected and it was validated by three Speech language pathologists (Appendix A & B). Out of these, 12 novel words were used for each of the language. These novel words were checked for equal word length, phonological complexity and cultural aspects. For every novel word selected, appropriate colour picture as bmp file and its respective name was recorded as audio file.

3.1.3.1 Selection of novel words:

- Selection of novel word was made with the help of Early language Training Manual (Karanth, Manjula, Geetha and Prema,1999)
- For selection of novel words, set of words were listed and 10 children in the age range of 5-8 years were checked on familiarity of words. The words which were unfamiliar in this group were selected as novel words.

Hence 24 novel words were selected overall in both languages, where 12 novel words were selected for each language. Among twelve novel words, in each language, two sets of novel words were made. One set was trained for 5 times and next set was trained for 10 times. This was followed for both Kannada and English novel words. The design of novel words selection is depicted in Figure 4.
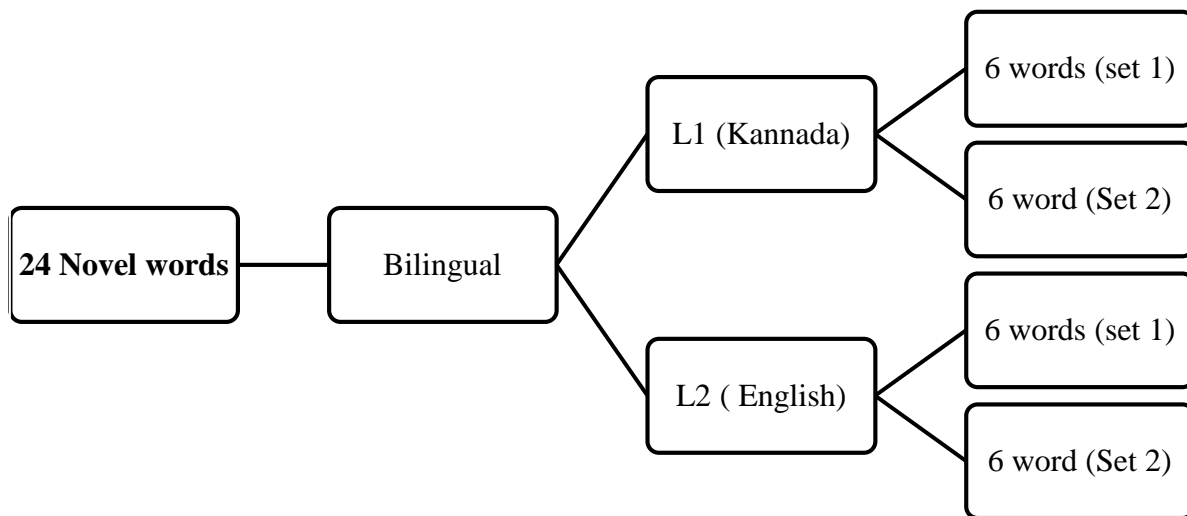
Figure 4: Design of novel words selection

After selection of these 24 novel words, the respective bmp picture and audio file were saved. Three sets of power point presentation files were prepared. One set of power point presentation file varied with number of times the stimuli were repeated (5 and 10 times). Second power point file was used for naming task and the third file used for recognition task. In this manner, three sets of power point files were prepared for both Kannada and English novel words. Slide show option was used to present the stimulus only

in training phase. The stimulus presentation was set to 7,000ms and inter stimulus interval was set to 6,000ms.

3.2 Procedure

3.2.1 Training Phases.

In the present study testing was done in distraction free and quiet environment. Study was carried out in 2 phases.

Training Phase I

In this phase each novel word was introduced in each language for 5 times in visual and auditory mode simultaneously in laptop using Microsoft PowerPoint software (Microsoft office 2013).To check the novelty of the words in the child, set of pictures used in the word sets was introduced to the child and asked to name the picture one by one. If child did not name the particular novel word then those words were assumed as novel and testing was continued. No prompts or visual feedback were given during this training period. After every set of novel words, immediate recall followed by delayed recall were measured with the time gap of 24hours for delayed recall.

Training Phase II

Same procedure was used for the second phase. Here next 6 new set of novel words were presented for 10 times.

3.2.2 Response Phase.

After both the training phases, immediate and delayed recalls were checked. And responses were evaluated for both immediate and delayed recall through

1. Recognition task

2. Production Task

3.2.1 *Recognition task*

In recognition task, children were given 4 pictures consisting of trained target novel words and three other non-trained novel words. Child was asked to say 'Yes' or 'No' response when asked by the examiner for each novel word. For example: Examiner pointed to each of the picture in the set and asked "Is this book? (For trained target novel word-Book).Then the child had to respond "yes" or "no". These trained novel pictures were presented via laptop (Dell Inspiron15 inches with Windows 8 operating system) along with pictures of word which was given as choice. Child scored '1' for every correct response.

3.2.2 Production/ Naming task

Child was presented with each novel word picture through laptop and name it and score '1' was given for correct name. To rule out the familiarity of the responses due to recognition and production task, counter balancing of the task was done. Here 15 children performed recognition task first followed by production task. And next 15 children performed production task first followed by recognition task.

3.2.3 Instructions to participants.

The participants were instructed to listen carefully to the novel word which was played via the headphone. Simultaneously subjects were instructed to carefully watch the picture related to particular novel words and memorise the word.

3.3 Scoring and Analysis

Scores of each participant were noted for naming and recognition tasks across

1. L1 and L2 (Kannada and English)
2. 5 repetitions and 10 repetitions condition
3. Immediate and delayed recall conditions

Score '1' was given for correct response and '0' for incorrect response. After scoring for each task, the scores were averaged for every child across the conditions mentioned above. Data of all thirty participants were entered into SPSS (Version 21) software and subjected to further statistical analysis.

CHAPTER IV

RESULTS AND DISCUSSION

The present study aimed to explore the fast mapping abilities in novel word learning in bilingual children using naming and recognition tasks. Statistical analysis was done to measure naming and recognition responses in bilingual children between 5-8years in the following conditions.

a) Fast mapping abilities in bilingual children across L1 (Kannada) vs. L2 (English).

b) Effect of number of training; 5 (St1) vs. 10 (St2) repetitions in training phase in bilingual children on fast mapping.

c) Immediate (I) vs. Delayed recall (D) abilities of novel word learning in bilingual children. Following statistical measures were applied to the data collected for naming and recognition scores obtained by 30 bilingual children:

a) Descriptive statistical analysis was done for naming and recognition scores across the above mentioned three conditions.

b) Non parametric Wilcoxon Signed rank test was applied on the data to examine pair wise difference between the conditions.

c) Descriptive statistics was applied for measures of naming and recognition across age groups 5-8 years. Mean, Median and Standard deviation were calculated.

Consequently, the data obtained for analysing naming and recognition scores across all the three conditions mentioned above (L1 vs. L2, St1 vs. St2 and I vs. D) were subjected to verify skewness using Shapiro- Wilk's test. The test results indicated that the data was skewed ($p<0.05$), which signified that the scores were not normally distributed. Since the data did not abide to the properties of normal distribution, Non Parametric tests were applied in order to see if there was any

30

significant difference in within subject effects, between subject effects across conditions. To observe effects of languages (L1 vs.L2), Practice effect (5 vs.10) and immediate vs. Delayed recall abilities on recognition and production tasks, Wilcoxon Signed rank test was applied on the data to examine the statistical significance between the conditions.

There were eight variables studied.

Table 2

Expansion of variables measured in the study

Conditions	Expansion
St1Ik	Subtest one Immediate recall Kannada.
St1DK	Subtest one Delayed recall Kannada.
St2IK	Subtest two Immediate recall Kannada.
St2DK	Subtest two Delayed recall Kannada.
St1IE	Subtest one Immediate recall English.
St1DE	Subtest one Delayed recall English.
St2IE	Subtest two Immediate recall English.
St2DE	Subtest two Delayed recall English.

Note:

K: Kannada (L1) and E: English (L2)

I: Immediate Recall and D: Delayed Recall

St1: Subtest 1 and St2: Subtest 2

Subtest 1: Novel words presented to children with 5 repetitions

Subtest 2: Novel words presented for 10 repetitions.

The results of the study are discussed in specific to following objectives.

4.1 Objective 1: Fast mapping abilities in bilingual children in L1 (Kannada) vs. L2 (English): Naming & Recognition

The mean, median and standard deviation measures were compiled for St1IK, St1IE, St1DK, St1DE, St2IK, St2IE St2DK and St2DE. To compare the performance of bilingual group for their fast mapping abilities across Kannada (L1) vs. English (L2) values are tabulated in Table 3.

Table 3

Mean, Median and standard deviation measures for L1 vs. L2 in naming and recognition task across 5- 8 years.

Variables	Naming			Recognition		
	Mean	Median	S. D	Mean	Median	S. D
St1IK	1.93	2.00	1.31	5.23	6.00	0.8172
St1IE	1.53	1.50	1.19	4.80	5.00	1.126
St1DK	1.60	1.00	1.52	5.26	6.00	1.01
St1DE	1.16	1.00	1.26	4.83	5.00	0.88
St2IK	3.00	3.00	1.36	5.46	6.00	0.813
St2IE	2.60	2.50	1.40	5.50	5.00	0.320
St2DK	2.46	2.00	1.40	5.66	6.00	0.606
St2DE	2.03	2.00	1.56	4.93	5.00	0.70
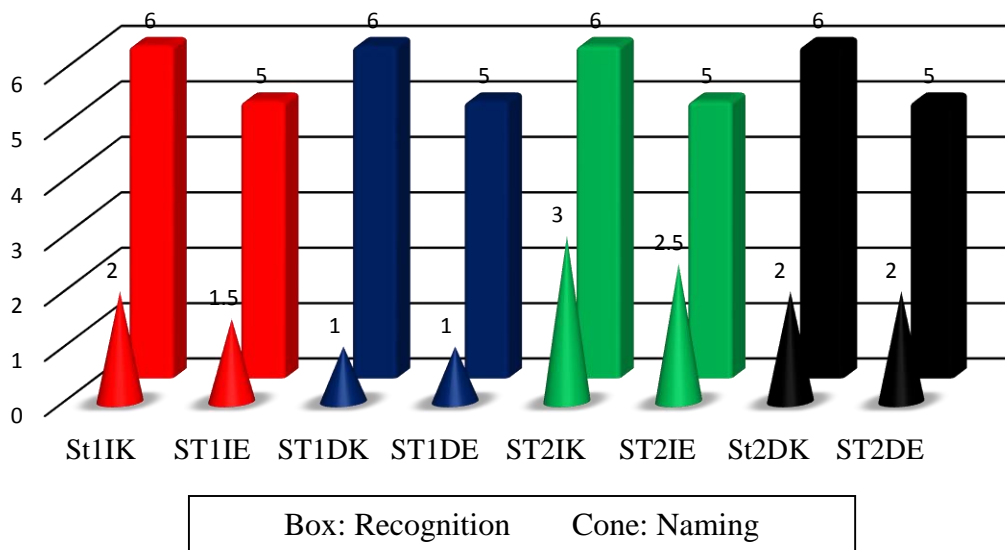
Figure 5: Median of Naming & Recognition in Kannada & English across 5- 8 years bilingual children**.**

From Table 3 and Figure 5 it was noted that there was difference in median values between L1 (Kannada) Vs. L2 (English) in bilingual children between age range of 5- 8 years, wherein median values were higher for L1 than L2 in both recognition and naming task. In recognition performance was better in L1 for all variables like St1IK- St1IE, St1DK- St1DE, St2IK- St2IE and St2DK – St2DE. Similarly in naming, performance was noted to be slightly better in St1IK- St1IE and St2IK- St2IE. Broadly comparing recognition and naming scores in this group, children performed better in recognition than naming based on median measures. Further, specifically to compare effect of L1 vs. L2 (Kannada vs. English). Wilcoxon Signed rank test was applied on the data to examine pair wise statistical significance between subject's effect on the L1 vs. L2 for both naming and recognition in 5- 8 years bilingual children were tabulated in table 4.

Table 4

Comparison of performance across L1 vs. L2 in 5 - 8 year old children in naming and recognition task.

Pairs	Naming		Recognition	
	Z	**p value**	**Z**	**p value**
St1IE - St1IK	-1.536	0.125	-2.056	**0.040**
St1DE-St1DK	-1.316	0.188	-2.012	**0.044**
St2IE - St2IK	-1.390	0.165	-0.372	**0.010**
St2DE-St2DK	-1.702	0.089	-2.870	**0.004**

*p<0.05-significant difference

From Table 4, test results revealed that there was no significant difference found in L1 vs. L2 across 5 - 8 years bilingual children in naming task. In recognition task there was significant difference found in L1 vs. L2 across 5- 8 years bilingual children in following recognition task like St1IE - St1IK ($|Z| = 2.056$, $p = 0.040$) St1DE - St1DK ($|Z| = 2.012$, $p = 0.044$) and St2DE - St2DK($|Z| = 2.870$, $p = 0.004$) & St2IE - St2IK ($|Z| = 0.372$, $p = 0.010$) as observed from the data in Table 4.From median scores and Wilcoxon signed rank test it was evident that L1 scores was better than L2, wherein statistical significance was seen in recognition. Further, performance in both L1 and L2 was better in recognition than production/naming task.

Hence, on comparing recognition skills and production skills across Kannada and English, language had effect on the fast mapping abilities only in recognition, wherein recognition was better in Kannada compared to English, which was evident from median scores. Hence it was clear that children began acquiring the novels word better in their L1 or mother tongue, when compared to second language, which is in consonance with Van Horn and Kan's study in 2016. There are three possible explanations for this; one could be due to language expose at home, since children between 5 – 8 years spend most of the time at home and roughly 6 hours in school. Hence exposure

to English is much restricted compare to Kannada. Further, it could be the effect of how long child is exposed to English language at school and this might also have contributed the group to have good recognition or comprehension abilities of novel words robust in Kannada than English. This finding is consistent with findings of vocabulary development in L1 and L2 studies (Kan & Kohnert, 2012; Kan, 2014). Secondly, language proficiency could have effect on fast mapping abilities across L1 and L2. Wherein, in the present study, children were proficient in Kannada than in English and this could have been one of the contributing factors for better L1 recognition in the group. Child's strong language foundation in a specific language helps in novel word acquisition in that language. With higher language proficiency there may be wider and deeper associations between lexical forms and semantics, this eventually helps in recognising the words (Kroll and Stewart, 1994; Kroll & de Groot, 1997). Overall, the findings suggest that child's L1 skills are critical to children's novel word learning (Simon- Cereijido and Gutiérrez- Clellen, 2009; Gutiérrez- Clellen, 1999; Winsler et al., 1999).

But on contrary it was observed that production or naming skills were not affected by language (L1 or L2). Hence it can be assumed that children in this age range acquire expressive vocabulary in the same pattern irrespective of the language they are exposed to. First, this could be attributed to emerging phonological skills in this age group. Since in this age group the phonological loops and lexical nodes are still strengthening, similar performance was noticed in both the languages. Another influencing factor could be nature of modality of performance of task. Since naming involves active retrieval, it requires more episodes of exposures to the novel words in order fast map these into the lexical memory. And probably the naming effects can be studied much in detail and significant results can be inferred if further studies concentrated on much wider age range. Previous studies showed different findings in fast mapping abilities in naming task,

wherein it was found that L3 novel words were better acquired than L1 novel words (Vishnu, Ranjini, Sapna & Shyamala, 2011), which was attributed to language proficiency in the participants.

4.2 Objective 2: Effect of Training phase - St1 (5 Repetition) vs. St2 (10 Repetition): Naming & Recognition bilingual children on fast mapping.

The mean, median and standard deviation measures were compiled for St1IK, St2IK, St1IE, St2IE, St1DK, St2Dk St1DE and St2DE. To compare the performance of bilingual group in their fast mapping abilities across St1 (5 repetitions) and St2 (10 repetitions) values are tabulated in Table 5.

Table 5
Mean, Median and standard deviation measures for St1 vs. St2 in naming and recognition task across 5- 8 years bilingual children.

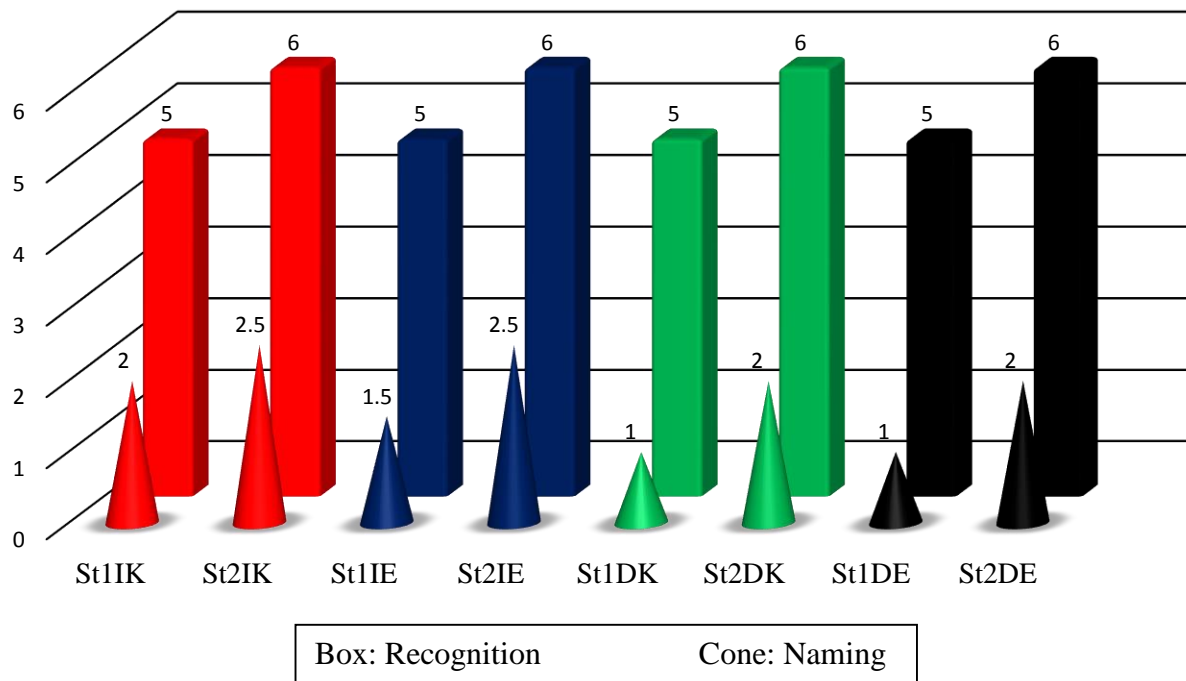| Variables	Naming			Recognition		
	Mean	**Median**	**S. D**	**Mean**	**Median**	**S. D**
St1IK	1.93	2	1.31	5.23	5	0.817
St2IK	3.00	2.5	1.36	5.46	6	0.819
St1IE	1.53	1.5	1.19	4.80	5	1.123
St2IE	2.60	2.5	1.40	5.50	6	0.822
St1DK	1.60	1	1.52	5.26	5	1.012
St2DK	2.46	2	1.40	5.66	6	0.606
St1DE	1.16	1	1.26	4.83	5	1.085
St2DE	2.03	2	1.56	5.39	6	1.201

Figure 6: Median of Naming & Recognition in St1 vs. St2 (5 vs. 10 repetitions) across 5- 8 years**.**

From Table 5 and Figure 6 was inferred that there was difference in median values of naming and recognition between 5 repetitions vs. 10 repetitions across 5 - 8 age group, wherein it was higher for 10 repetitions in both naming and recognition task compared to 5 repetitions training. Specifically median values were better in St2 (10 repetitions) in all the pairs in recognition and naming tasks. Further the performance was overall better for recognition task for 5 and 10 repetitions compared to naming in this group. Further, explicitly to compare effect of St1 vs. St2 (5 vs. 10 repetitions) Wilcoxon Signed rank test was applied on the data to examine pair wise statistical significance between subject's effect on St1 vs. St2 for both naming and recognition in 5- 8 years bilingual children were tabulated in table 6.

Table 6

Comparison of performance across repetitions in 5 - 8 year old children in naming and recognition task.

Pairs	Naming		Recognition	
	Z	**p value**	**Z**	**p value**
St2IK - St1IK	-3.383	**0.001**	-1.238	**0.021**
St2IE - St1IE	-3.573	**0.000**	-3.027	**0.002**
St2DK - St1DK	-2.504	**0.012**	-2.023	**0.043**
St2IE - St1IE	-3.085	**0.002**	-0.284	**0.057**

*p<0.05-significant difference

From Table 6, on analysing practice effect of 5 vs. 10 repetition for naming task significant differences were found across 5 and 10 repetitions in variables like St2IK - St1IK ($|Z|$ = 3.383, p = 0.001), St2IE - St1IE ($|Z|$ = 3.573, p = 0.000), St2DK - St1DK ($|Z|$ = 2.504, p = 0.12) and St2DE - St1DE ($|Z|$ = 3.0805, p = 0.002). Similarly, on observing results of recognition task on 5 vs. 10 repetitions, significant differences were found across variables like St1IK-St2IK ($|Z|$ = 1.238, p = 0.021), St2IE - St1IE ($|Z|$ = 3.027, p = 0.002), St2DK - St1DK ($|Z|$ = 2.023, p = 0.043) and St1IE-St2IE ($|Z|$ = 0.057, p = 0.057). From median measures and Wilcoxon signed ranked test revealed performance for 10 repetitions was better than 5 repetitions across both naming and recognition tasks. Performance was better in both 5 repetitions and 10 repetitions in recognition task than naming.

Hence, when the bilingual children received extended training of novel words, their performance was superior when compared to limited training for both naming and recognition tasks. This finding is in support of Gershkoff- Stowe & Hahn (2007). Their learning of novel words progressed as the training trails increased. This can be assumed to be due in increase in strengthening of lexical activation with repeated trials. Language processing system experiences a

shift to exponential improvements in word retrieval abilities with more exposure to novel words (Gershkoff- Stowe & Hahn, 2007). Secondly it can be due to stages involved in fast mapping phase, wherein in the initial stage child has only partial knowledge of the meaning of the word, whereas in the second phase of acquisition, this information will be gradually expanded and modified as additional experiences with that word clarifies its full meaning, eventually coming to resemble adult meaning. Perhaps second stage requires more exposure and if the child has achieved the second stage of mapping then the learned word will be easier to retrieve. This might be one of the reasons, to say that with increase in number of repetitions recognition and naming of word is easier (Carey, 1978). Similar findings were noted in study done by Soumya (2010). Thirdly, the improved performance seen in these children with respect to increased repetitions can be attributed to strengthening in lexical semantic connections. Further, these links with more and more activation, results in faster, easier and efficient retrieval of newly learnt words (Nelson, McEvoy & Pointer, 2003). According to McClelland, 1995, in Parallel Distributed Model, over the course of the training, the network successively readjusts the connection weights and results in representing information. In this manner, language knowledge is stored in the network connections and these connections are used for processing the information. In consonance with the present study's finding, MacDonald and Christiansen (2002) concluded that number of input frequencies directly strengthens the knowledge representation of the language. Hence greater experiences lead to stronger mappings among input and output.

4.3 Objective 3: Immediate Recall vs. Delayed Recall: Naming & Recognition

The median and standard deviation measures were compiled for St1IK, St1Dk, St1IE, St1DE, St2IK, St2DK, St2IE and St2DE. To compare the performance of bilingual group for their fast mapping abilities across immediate and delayed recall values are tabulated in Table 7.

Table 7

Mean, Median and standard deviation measures for St1 vs. St2 in naming and recognition task across 5- 8 years bilingual children.

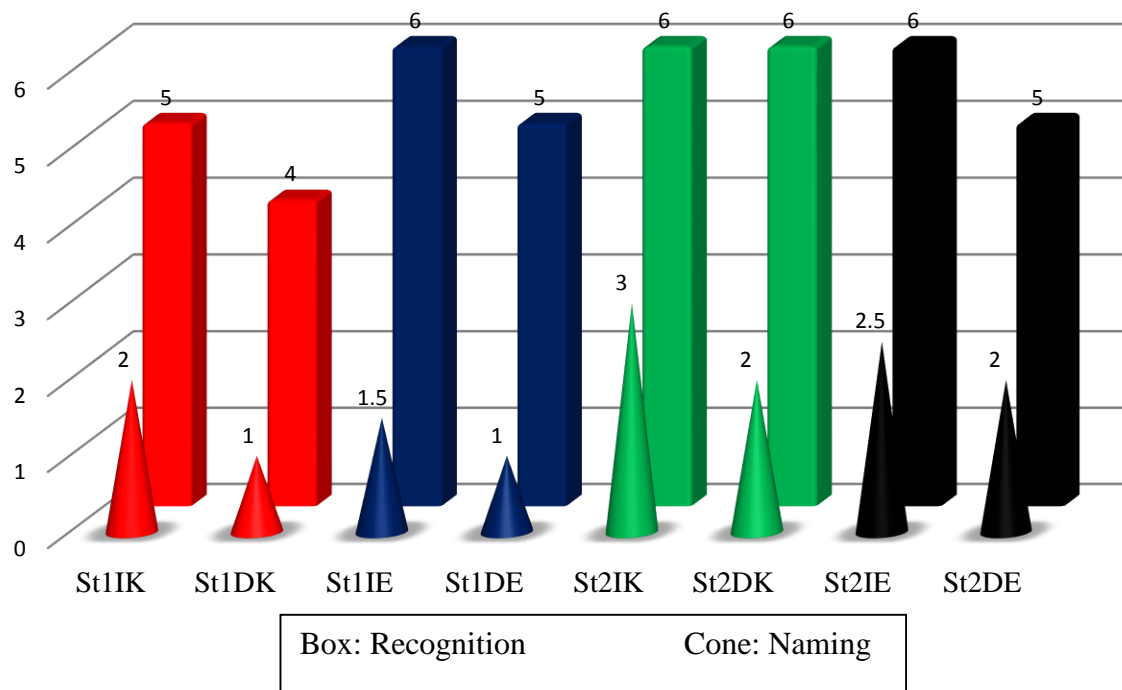| Variables	Naming			Recognition		
	Mean	Median	S. D	Mean	Median	S. D
St1IK	1.93	2	1.31	5.23	5	0.817
St1DK	1.60	1	1.52	4.24	4	0.114
St1IE	1.53	1.5	1.19	5.80	6	1.125
St1DE	1.16	1	1.26	4.83	5	1.085
St2IK	3.00	3	1.36	5.46	6	0.819
St2DK	2.46	2	1.40	4.66	5	0.606
St2IE	2.60	2.5	1.40	5.50	6	0.820
St2DE	2.03	2	1.56	4.93	5	1.201

Figure 7: Median of Naming & Recognition in Immediate and delayed recall across 5- 8 years**.**

From Table 7 and Figure 7 it was inferred that there was difference in median values of naming and recognition between immediate vs. delayed recall task, wherein immediate recall scores are better than delayed recall for both naming and recognition tasks. Overall, recognition scores are superior to naming score for both immediate and delayed recall task. Further, explicitly to compare effect of immediate recall vs. delayed recall, Wilcoxon Signed rank test was applied on the data to examine pair wise statistical significance between subject's effect on immediate and delayed recall for both naming and recognition in 5- 8 years bilingual children results of pair wise comparison are tabulated in Table 8.

Table 8

Comparison of performance in conditions immediate recall vs. Delayed recall in 5 -8 years old bilingual children in naming and recognition tasks.

Pairs	Naming		Recognition	
	Z	**p value**	**Z**	**p value**
St1DK - St1IK	-1.418	0.156	-0.212	**0.032**
St1DE - St1IE	-1.706	0.088	-0.216	**0.029**
St2DE - St2IK	-2.180	0.729	-2.553	**0.011**
St2DE - St2IE	-1.999	0.066	-2.804	**0.005**

*p<0.05-significant difference   **p<0.01-Highly significant difference

From Table 8, results revealed no significant difference in naming tasks across all the conditions. On observing the results of recognition task on immediate and delayed recall, revealed significant difference in conditions St1DK-St1IK ($|Z|$ =0.212, p = 0.032), St1DE-St1IE ($|Z|$ =0.216, p = 0.029) St2DE - St2IK ($|Z|$ = 2.553, p = 0.011) and St2DE - St2IE ($|Z|$ = 2.804, p = 0.005). From the median scores and pair wise comparison of immediate and delayed recall variables it was evident that immediate recall was better than delayed recall and statistically it was significant in recognition task than naming task.

Recognition and naming of novel words in bilingual children in 5 to 8 years was better in immediate recall on comparison with delayed recall. In learning new words and retention of the same requires three memory processes; encoding, consolidation and retrieval. This finding can be attributed to the fact that the new memories are stronger and older memory are more prone to disruptions or they may inference with new memory in order to make older memory stronger requires sufficient amount of exposure, number of rehearsal (Suzuki et al., 2004). Hence increased

exposures to new words result in better memory retention over the older learned words. Immediate recall triggered by short term memory involves fleeting representation of novel lexical knowledge which is independent of any rehearsals, whereas in delayed recall that is actively functional by long term memory is directly dependant on frequent rehearsal. Hence this explained why immediate recall is superior to delayed recall. Secondly, the process of fast mapping may not be adequate for the development of lexicon. Hence, the children may not retain all the words learnt from the process of fast mapping, a subsequent extended slow mapping would also be necessary for word learning. Therefore, it could be inferred that development of lexicon is a process and fast mapping just triggers the process and need not be the complete word learning process. So after stage of fast mapping there should be a stage of slow mapping to make delayed recall abilities stronger, which in turn requires sufficient amount of exposures, rehearsals and result in strong lexical connections. May be this is one of the reasons why immediate recall is better than delayed recall and this finding is in consonance to study by Trupthi (2009).

Considering the main objective of the study as to compare recognition and naming abilities across all the conditions, consistent finding was obtained where recognition was better than naming. This asymmetry in understanding and naming may be attributed to difference in demands imposed by the tasks. The two tasks place different demands on retrieval process that is, the retrieval of a word for production may require activation strengths that are greater than those needed to access a word in comprehension (Capone & McGregor, 2005).This idea is based on a common model of adult lexical access in which the retrieval of a word is not an all or none event but, rather, involves a process of graded activation (Stemberger, 1989). To comprehend the meaning of a word, the listener begins with an auditory cue that activates a phonological representation stored previously in memory. Activation then spreads from the phonological level

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to the semantic level where, given sufficient activation of the associated concept, the word is comprehended. In contrast, the retrieval of a word for production involves the reverse flow of information and derives its initial activation from a set of nonlingustic cues that originates in semantic memory and spreads to the phonological level. Given sufficient strength to activate the associated sound form of a word, the word is accessed for production.

From overall statistical analysis of the study, following results were revealed

1. There was significant difference across naming and recognition in all the conditions. Children outperformed in recognition task compared to naming in all the conditions.

2. Children performed better in L1 compared to L2 in naming and recognition tasks on comparing the effect of L1 vs. L2. Especially it was found that participants performed better in recognition than naming task in both the languages.

3. Children performed better in 10 repetition training phase compared to 5 repetition phase in naming and recognition. Specifically, even here they performed better in recognition task compared to naming task.

4. Children performed better on immediate recall compared to delayed recall in both recognition and production. They performed better in recognition task compared to naming in this condition also.

CHAPTER V

SUMMARY AND CONCLUSION

The present study aimed to explore the fast mapping abilities in novel word learning in bilingual children using naming and recognition task. In this study 30 bilingual children aged from 5-8 years were recruited on random basis, whose L1 was Kannada and L2 was English. Children were trained for set of novel words in both Kannada and English, wherein for each language two set of words, were used. Each set consisted of 12 novel words. Out of twelve words, six words were trained for 5 repetitions and another six words were trained for 10 repetitions. These words were trained with aid of pictures and audio recordings. After the training phase, children were tested for recognition and production task in terms of immediate and delayed recall task. Hence results were unfolded and studied across three conditions; i) Effect of Kannada (L1) and English (L2), ii) Effect of training phase (5 vs. 10 repetitions) and iii) Immediate vs. delayed recall abilities in fast mapping. Each condition scores were separately calculated for each participant and overall data was statistically analysed using SPSS software version IBM 21. The data was subjected to descriptive statistics and based on the normality criteria, non-parametric tests were employed.

On examining effect of language (Kannada vs. English) across recognition and naming tasks, results indicated novel word learning was better in L1 (Kannada) than L2 (English) for recognition task. This was attributed to magnitude of language exposure, the environment he is exposed to and proficiency of language. In the present study children were more proficient in Kannada than English. On examining effect of (5 vs. 10) repetitions, results revealed that novel words when trained for about 10 times had superior scores compared to 5 repetitions and this was attributed to strengthening of lexical activation & lexical semantic connections. Further, when these links experienced more and more activation, retrieval of newly learnt words was faster, easier

and efficient. Thus, it can be said that network successively readjusts the connection weights and results in representing information. Results for comparing immediate recall condition vs. delayed recall revealed better performance in immediate recall than delayed recall. This may be attributed to fleeting representation of novel lexical knowledge which is independent of any rehearsals in case of immediate recall, whereas in delayed recall, it is actively functional by long term memory and is directly dependant on frequent rehearsals. Hence this explained why immediate recall was superior to delayed recall. Henceforth, the ability to learn to recognise, accurately produce and use new words is essential in acquiring language and becoming skilled in that language.

Thus, it can be concluded that bilingual children are better off in fast mapping skills in their native language compared to their second language. The factors that play crucial role in the process of fast mapping any language are extended exposures and longer retention skills. Recognition is especially easier for any children compared to naming, since the nature of demands imposed by the former is least. Although, children learn new words in a single new exposure by fast mapping the new word, it may not be sufficient for the development of lexicon. Hence, the children may not retain all the words learned from the process of fast mapping, a subsequent extended slow mapping would also be necessary for word learning.

Implications of the study

- The results of the study can be used to study the effects of practice trials in clinical population since it results in strong lexical connections to the particular novel word through both visual and auditory modes.
- This study can be utilised as reference for further studies to see how learning of novel word takes place in language disordered population like Specific language impairment, Expressive language disorder and receptive language disorder.

- The process of fast mapping can be employed in order to further enhance the vocabulary of children.

- The results of the study can be used to design intervention procedure in language disordered population.

- This study gives an insight about how novel word learning takes place in bilingual children.

Future directions

- Fast mapping abilities can be studied on wider age range and checked for how those words are acquired by children in each age group.

- Fast mapping abilities can be compared between Bilingual vs. Multilingual children.

- Fast mapping abilities can be compared between successive and simultaneous bilinguals.

- Fast mapping abilities can be studied across different grammatical categories like noun vs. verbs across different age groups.

Limitations of the study

- Better conclusions could have been obtained about fast mapping abilities in bilingual children if large number of subjects were recruited.

- 1 syllables and 2 syllable words were selected as novel words, if the word length was maintained for one particular syllable length study could have eliminated the influence of word length.

- Number of repetition rates could have been varied to see wider variations in recognition and naming.

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*(2), 407-420.

American speech hearing association. (1983).In Buckley, B. (2003).Children's Communication Skills: From birth to five years, 1ˢᵗ Ed., Pp.3.Routledge publication.

American Speech-Language-Hearing Association. (2007). Scope of practice in speech-language pathology.

Apel, K., &Kamhi, A. (1987).Fast mapping skills of language impaired children: A muke is a muke. *Annual Convention of the American Speech-Language-Hearing Association*, New Orleans, L.A.

Baddeley, A., Gathercole, S., & Papagno, C. (1998). The phonological loop as a language learning device. *Psychological review*, *105*(1), 158.

Bates,E., Benigni., Bretherton. I., Camaioni. & Volterra, V. (1979).The emergence of symbols: Cognition and Communication in infancy. New York: Academic press.

Berk,L.E and Winsler, A.(1995).Scaffolding Children 's Learning: Vygotsky and early childhood education. Washington, D C: National Association For the education of young children between lexical and grammatical domains. *Applied Psycholinguistics* 30: 315–37.

Bever, T. G. (1970). The Cognitive Basis for Linguistic Structures', JR Hayes (ed.), Cognition and the Development of Language, 279-362.

Bird, E. K. R., & Chapman, R. S. (1998). Partial representations and phonological selectivity in the comprehension of 13-to 16-month-olds. *First Language*, *18*(52), 105-127.

Bloom, L. and Lahey, M. (1978). Language development and language disorder. New York; John Wiley and Sons.

Bloom, L., Lifter, K., & Broughton, J. (1985). The convergence of early cognition and language in the second year of life: Problems in conceptualization and measurement. *Children's single-word speech*, 149-180.

Bloom, P. (2000). *How children learn the meanings of words* (pp. 1-23). Cambridge, MA: MIT press.

Bloomfield, L. (1993). Language. New York: Holt, Rinchart and Winston. *Boston University Conference on Language Development*. Somerville, MA: Cascadilla.

Canadian Encyclopaedia, (2009).Retrieved from: http; //www. The Canadian encyclopedia.com/index.cfm? pg Nm=TCE & Params=AlA.RTA0000740

Capone, N. C., & McGregor, K. K. (2005). The effect of semantic representation on toddlers' word retrieval. *Journal of Speech, Language, and Hearing Research*, *48*(6), 1468-1480.

Capone, N. C., & McGregor, K. K. (2005). The effect of semantic representation on toddlers' word retrieval. *Journal of Speech, Language, and Hearing Research*, *48*(6), 1468-1480.

Carey, S., & Barlette. (1978). Acquiring a single new word. In papers and reports on *child language development,* 15, 17-29.

Chapman,R. (1978).Comprehension Strategies in Children. In J. Kavanagh &W. Strange (Eds), *Speech and language in the laboratory, school and clinic*308-327.

Chomsky, C. (1969). Acquisition of syntax in Children from 5 – 10. Cambridge, MA: MIT Press.

Chomsky, C. (1969). Acquisition of syntax in children from 5-10, Cambridge, MA:MIT press.

Colunga, E., & Smith, L. B. (2005). From the lexicon to expectations about kinds: a role for associative learning. *Psychological review*, *112*(2), 347.

D. Cahana-Amitay, E. Hughes and A. Zukowski (eds) *Proceedings of the 20th Annual*

De Bot, K., Lowie, W., & Verspoor, M. (2007). A dynamic systems theory approach to second language acquisition. *Bilingualism: Language and cognition*, *10*(01), 7-21.

Dijkstra, T., & Brysbaert, M. (2006). Cited in Morais, J., & d'Ydewalle, G. (2006).*Bilingualism and second language acquisition* distance? *Journal of Experimental Psychology: Learning, Memory, and Cognition,* 29, 42-52.

Dollaghan, C. (1985). Child Meets Word Fast Mapping in Preschool Children. *Journal of Speech, Language, and Hearing Research*, *28*(3), 449-454.

Dollaghan, C. A. (1987). Fast mapping in normal and language-impaired children. *Journal of Speech and Hearing Disorders*, *52*(3), 218-222.

Dollaghan, C., (1987). Fast mapping in normal and language-impaired children. *Journal of*

Dunn, L. M., & Dunn, L. M. (1997). *Examiner's manual for the PPVT-III Peabody picture vocabulary test: Form IIIA and Form IIIB*. AGS.

Fabbro, F. (1999).The neurolinguistics of bilingualism: An   Introduction. Hove, sunsex: Psychology press.

Fabbro, F., Naatanen, R., & Kujala, T. (1999). The neurolinguistics of bilingualism. *Nature*, *398*(6728), 577-577.

Fenson, L., Dale,P.S., Reznick, J.S., Bates, E., Thal, D. J. & Pethick, S.J., (1994).Variability in early communicative development. Monographs of the society for research in child development, 59(5), (Serial No.242).

Ferguson, C. A., (1968).Language development. In F. Fishman & A. Das Gupta (Eds), Language problem of developing nations (pp.200-216). New York: Collins and Harper.

Fishman, J. A., Ferguson, C. A., & Gupta, J. D. (1968). *Language problems of developing nations* (pp. 39-51). New York: Wiley.

Gelman, S. A., Coley, J. D., Rosengren, K. S., Hartman, E., Pappas, A., & Keil, F. C. (1998). Beyond labeling: The role of maternal input in the acquisition of richly structured categories. *Monofigures of the Society for Research in Child development*, i-157.

Gershkoff-Stowe, L., & Hahn, E. R. (2007). Fast mapping skills in the developing lexicon. *Journal of Speech, Language, and Hearing Research*, *50*(3), 682-697.

Gershkoff-Stowe, L., & Hahn, E.R. (2007). Fast mapping skills in the developing lexicon. *Journal of Speech, Language and Hearing Research, 50,*682-697.

Gilbertson, M., & Kamhi, A. G. (1995). Novel word learning in children with hearing impairment. *Journal of Speech, Language, and Hearing Research*, *38*(3), 630-642.

Gray, S. (2003). Word-Learning by Preschoolers with Specific Language Impairment What Predicts Success? *Journal of Speech, Language, and Hearing Research*, *46*(1), 56-67.

Gray, S. (2003). Word-Learning by Preschoolers with Specific Language Impairment What Predicts Success? *Journal of Speech, Language, and Hearing Research*, *46*(1), 56-67.

Gray, S. (2004). Word Learning by Preschoolers with Specific Language Impairment Predictors and Poor Learners. *Journal of Speech, Language, and Hearing Research*, *47*(5), 1117-1132.

Gray, S. (2005). Word Learning by Preschoolers with Specific Language Impairment Effect of Phonological or Semantic Cues. *Journal of Speech, Language, and Hearing Research*, *48*(6), 1452-1467.

Gray, S. (2006). The relationship between phonological memory, receptive vocabulary, and fast mapping in young children with specific language impairment. *Journal of Speech, Language, and Hearing Research*, *49*(5), 955-969.

Gutiérrez-Clellen VF (1999) Language choice in intervention with bilingual children. *American Journal of Speech Language Pathology* 8: 291–302.

Haugen, E. (1950). The analysis of linguistic borrowing. *Language*, *26*(2), 210-231.

Heibeck, T. H., & Markman, E. M. (1987). Word learning in children: An examination of fast mapping. *Child development*, 1021-1034.

Hoff-Ginsberg, E., Kelly, D. and Buhr, J., 1996, Syntactic bootstrapping by children with

Hwa-Froelich, D. A., & Matsuo, H. (2005). Vietnamese children and language-based processing tasks. *Language, Speech, and Hearing Services in Schools*, *36*(3), 230-243.

Julia A. E., Laurence B. L. , Lisa M. B and Karla K .A clinical linguistics & phonetics, 2002, vol. 16, No. 1, 59-77.

Kan PF (2014) Novel word retention in sequential bilingual children. *Journal of Child Language* 41: 416–38.

Kan PF and Kohnert K (2012). A growth curve analysis of novel word learning by sequential bilingual preschool children. *Bilingualism: Language and Cognition* 15: 452–69.

Kan, P. F., & Kohnert, K. (2008). Fast mapping by bilingual preschool children. *Journal of child language*, *35*(03), 495-514.

Kan, P. F., & Kohnert, K. (2012). A growth curve analysis of novel word learning by sequential bilingual preschool children. *Bilingualism: Language and Cognition*, *15*(03), 452-469.

Kroll, J. F., & Curley, J. (1988). Lexical memory in novice bilinguals: The role of concepts in retrieving second language words. *Practical aspects of memory*, *2*(389-395), 8.

Kroll, J. F., & De Groot, A. (1997). Lexical and conceptual memory in the bilingual: Mapping form to meaning in two languages. *Psycholinguistic perspectives, 169-199.*

Kroll,J.F.,& Stewart,E.(1990).Concept Mediation in bilingual translation. Paper presented at the 31[st] Annual meeting of the Psychonomics Society, New Orleans, LA.

Kroll,J.F.,& Stewart,E.(1994). Category Interference in translation and picture naming; Evidence for asymmetric connections between bilingual memory representations. *Journal of memory and Language*, 33,149-174.

Lederberg, A. R., Prezbindowski, A. K., & Spencer, P. E. (2000). Word-Learning Skills of Deaf Preschoolers: The Development of Novel Mapping and Rapid Word-Learning Strategies. *Child development*, *71*(6), 1571-1585.

MacDonald, M., & Christiansen, M. (2002). Reassessing working memory: Comment on Just and Carpenter (1992) and Waters and Caplan (1996). Psychological Review, 109, 35–54.

Macnamara, J. (1967). The bilingual's linguistic performance—a psychological overview. *Journal of social Issues*, *23*(2), 58-77.

Marchman, V. A., & Fernald, A. (2008). Speed of word recognition and vocabulary knowledge in infancy predict cognitive and language outcomes in later childhood. *Developmental science*, *11*(3), F9-F16.

McClelland, J. (1995). A connectionist perspective on knowledge and development. In T. Simon & G. Halford (Eds.), Developing cognitive competence: New approaches

Muma,J.R. (1978)."Language Handbook Book Concepts: Assessment, Intervention. Prentice Hall, Inc, Englewood Cliffs, New Jersey.

Munro, N., Baker, E., McGregor, K., Docking, K., & Arciuli, J. (2012). Why word learning is not fast. *Frontiers in Psychology*, *3*, 41.

Nair, V., Ranjini, R., & Shyamala, K. C. (2011). LEXICAL LEARNING OF NOVEL WORDS IN BI/MULTILINGUAL CHILDREN. *Journal of the All India Institute of Speech & Hearing*, *30*.

Navitha. U. (2009). Comprehensive language assessment tool for children (3-6 years). Dissertation, AIISH, Mysore.

Nelson, D. L., Mc Evoy, C. L., & Pointer, L. (2003).Spreading activation or spooky action at a

Newell, A., & Rosenbloom, P. S. (1981). Mechanisms of skill acquisition and the law of practice. *Cognitive skills and their acquisition*, *1*, 1-55.

Paris, S. G., & Lindauer, B. K. (1982). *The development of cognitive skills during childhood*. Cognitive Science, University of Michigan.

Piaget, J. (1969). The child‛s Conception Of the world. Paterson, N.J: Littlefield.

Pinker, S. (1982). A theory of the acquisition of lexical interpretive grammars. The mental representation of grammatical relations, ed. by Joan Bresnan, 655-726.

Pittman, A. L., Lewis, D. E., Hoover, B. M., & Stelmachowicz, P. G. (2005). Rapid word-learning in normal-hearing and hearing-impaired children: Effects of age, receptive vocabulary, and high-frequency amplification. *Ear and hearing*, *26*(6), 619.

Potter, M. C., So, K. F., Von Eckardt, B., & Feldman, L. B. (1984). Lexical and conceptual representation in beginning and proficient bilinguals. *Journal of verbal learning and verbal behavior*, *23*(1), 23-38.

Potter, M. C., So, K. F., Von Eckardt, B., & Feldman, L. B. (1984). Lexical and conceptual representation in beginning and proficient bilinguals. *Journal of verbal learning and verbal behavior*, *23*(1), 23-38.

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*(1), 33-42.

Rice, M., Buhr, J. & Oetting, J., 1992, Special-language-impaired children's quick incidental

Rice, M., Buhr, J. and Nemeth, M., 1990 Fast mapping word-learning abilities of language delayed preschoolers. *Journal of Speech and Hearing Disorders*, **55**, 33± 42.

Rumelhart, D. N., & Accretion, D. (1978). Tuning and restructuring: Three modes of learning. In. JW Cotton & R. Klatzky (Eds.), Semantic Factors in Cognition.

Sasisekaran, J., Smith, A., Sadagopan, N., & Weber-Fox, C. (2010). Nonword repetition in children and adults: Effects on movement coordination. *Developmental Science*, *13*(3), 521-532.

Shanbal, J. C., & Prema, K. S. (2007). Languages of School-going Children: A Sample Survey in Mysore. *Language in India*, *7*(6).

Simon-Cereijido G and Gutiérrez-Clellen VF (2009) A cross-linguistic and bilingual evaluation of the interdependence

Singhi, P., Kumar, M., Malhi, P., & Kumar, R. (2007). Utility of the WHO Ten Questions screen for disability detection in a rural community—the north Indian experience. *Journal of tropical paediatrics*, *53*(6), 383-387.

Skinner, B. F. (1957). Verbal Behavior. Englewood, Cliffs, N. J: Prentice Hall.SLI: implications for a theory of special language impairment. In A. Stringfellow,

Smith, A. (2006). Speech motor development: Integrating muscles, movements, and linguistic units. *Journal of communication disorders*, *39*(5), 331-349.

Snodgrass, J. G. (1984). Concepts and their surface representations. *Journal of Verbal Learning and Verbal Behavior*, *23*(1), 3-22.*Speech and Hearing Disorders*, **52**, 218± 222.

Srivastava, R. N. (1980). Societal bilingualism and language teaching in India. *Indian Journal of Applied Linguistics New Delhi*, *6*(2), 13-37.

Stelmachowicz, P. G., Pittman, A. L., Hoover, B. M., & Lewis, D. E. (2004). Novel-word learning in children with normal hearing and hearing loss. *Ear and hearing*, *25*(1), 47-56.

Storkel, H. L. (2001). Learning New Words Phonotactic Probability in Language Development. *Journal of Speech, Language, and Hearing Research*, *44*(6), 1321-1337.

Storkel, H. L., & Rogers, M. A. (2000). The effect of probabilistic phonotactics on lexical acquisition. *Clinical Linguistics & Phonetics*, *14*(6), 407-425.

Suzuki, A., J. S., Frankland, P. W., (2004) Memory reconsolidation and extinction have distinct temporal and biochemical signatures. *Journal of neurosciences*.

Thelen, Owens, R. (2005). Language development: an Introduction, 7[th] Ed., Merill Publication Co.157–204. Hillsdale, NJ: Erlbaum.

Trupthi (2009),Fast mapping in kannada speaking children of 2.5-4.5years,unpublished masters Disseration, university of mysore, Mysore.

Van Geert, P. (1991). A dynamic systems model of cognitive and language growth. *Psychological review*, *98*(1), 3.

Van Geert, P. (1994). Vygotski and dynamics of development. *Human Development*, 37, 346–365.

Van Geert, P. (1995). Dimensions of change: A semantic and mathematical analysis of learning and development. *Human Development*, *38*(6), 322-331.

Van Horn, D., & Kan, P. F. (2016). Fast mapping by bilingual children: Storybooks and cartoons. *Child Language Teaching and Therapy*, *32*(1), 65-77.

Van Horn, D., & Kan, P. F. (2016). Fast mapping by bilingual children: Storybooks and cartoons. *Child Language Teaching and Therapy*, *32*(1), 65-77.

Vitevitch, M. S., & Luce, P. A. (1999). Probabilistic phonotactics and neighbourhood activation in spoken word recognition. *Journal of Memory and Language*, *40*(3), 374-408.

Vygotsky, L. (1978). Mind in society. The development of higher psychological processes. Cambridge, MA: Harvard University press.

Walsh, B., Smith, A., & Weber-Fox, C. (2006). Short-term plasticity in children's speech motor systems. *Developmental psychobiology*, *48*(8), 660-674.

Weismer, S. E., & Evans, J. L. (2002). The role of processing limitations in early identification of specific language impairment. *Topics in Language Disorders*, *22*(3), 15-29.

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, Language, and Hearing Research*, *36*(5), 1013-1025.

Weismer, S. E., & Hesketh, L. J. (1996). Lexical Learning by Children With Specific Language Impairment Effects of Linguistic Input Presented at Varying Speaking Rates. *Journal of Speech, Language, and Hearing Research*, *39*(1), 177-190.

Weismer, S.E., & Hesketh, L. J. (1998). The impact of emphatic stress on novel word learning by children with specific language impairment. *Journal of Speech Language and Hearing Research,* 41, 1444–58.

Wilkinson, K. M., & Mazzitelli, K. (2003). The effect of 'missing' information on children's retention of fast-mapped labels. *Journal of Child Language*, *30*(01), 47-73.

Winsler A, D., Espinosa L, & Rodríguez J.T (1999) when learning a second language does not mean losing the first: Bilingual language development in low-income Spanish-speaking children attending bilingual preschool. *Child Development* 70: 349–62.

Zimmerman, I. L., Steiner, V. G., & Pond, R. E. (1992). *PLS-3: Preschool language scale-3*. Psychological Corporation.

KANNADA NOVEL WORDS

Sl No.	STA (5 repetitions)				ST B(10 repetitions)			
	CB 1	CB 1	CB 2	CB 2	CB 1	CB 1	CB 2	CB 2
1	ಗ್ರಂಥ	/grantha/	ಫಿರಂಗಿ	/pirangi/	ದರ್ಜಿ	/dardʒI/	ಜಲಪಾತ	/dʒalapaṭa/
2	ಫಿರಂಗಿ	/pirangi/	ಉತ್ತತ್ತಿ	/uttattI/	ಶಿಲ್ಪಿ	/ʃIlpI/	ಕೈಕೋಳ	/kaIkOḷa/
3	ಮುಕುಟ	/mUkUṭa/	ಪಲ್ಲಕ್ಕಿ	/pallakI/	ದ್ವೀಪ	/dvipa/	ಸೀತಫಲ	/siṭa:pala/
4	ಪಂಡಿತ	/paḍIṭa/	ಬೀಸೊಕಲ್ಲು	/bIsokallU/	ಬಾವಲಿ	/ba:valI/	ಹಾಸ್ಯಗಾರ	/hasjaga:ra/
5	ಜಿಗಣೆ	/dʒIgaɳe/	ಭೂಮಂಡಲ	/bhumandala/	ತೋರಣ	/ṭo:raɳa/	ಮರುಭೂಮಿ	/marUbhumi/
6	ಮೆಣಸು	/meɳasU/	ಮುಕುಟ	/mUkUṭa/	ಪಂಜರ	/pandʒara/	ಊಸರವಳ್ಳಿ	/usaravaḷḷi/

Note: CB1: Counterbalance 1
CB2: Counterbalance 2
STA: Subtest A (5 repetition)
STB: Subtest B (10 repetition)

ENGLISH NOVEL WORDS

Sl No	STA (5 repetitions)				ST B (10 repetitions)			
	CB 1	CB 1	CB 2	CB 2	CB1	CB 1	CB 2	CB 2
1	Plough	/ploU/	Wrestler	/vreslar/	/fIg/	Fig	/laItning/	Lightening
2	Marble	/marbal/	Desert	/dessarʈ/	/fog/	Fog	/canan/	Cannon
3	Hook	/hUk/	Archery	/artʒerI/	/raft/	Raft	/dʒagari/	Jaggery
4	Dock	/ḍok/	Windmill	/vIndmIl/	/huf/	Hoof	/ha:nḍ pamp/	Hand pump
5	Beaver	/bi:var/	Daliya	/ḍalija/	/joʈ/	Yatch	/volkano/	Volcano
6	Juggle	/dʒagal/	Juggle	/dʒagal/	/lantarn/	Lantern	/joʈ/	Yatch

Note:
CB1: Counterbalance 1
CB2: Counterbalance 2
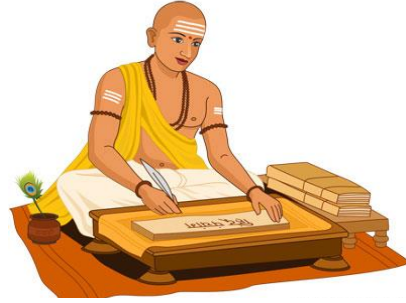STA: Subtest A (5 repetition)
STB: Subtest B (10 repetition)

Pictures used are in Appendix B which are in the same order as the stimuli in Appendix A

Pictures used to teach novel words.

STA (5 repetition in Kannada).

CB 1

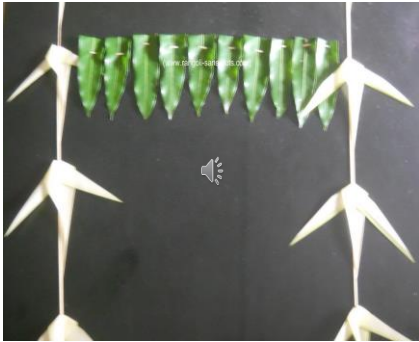## CB 1

CB 2 related pictures
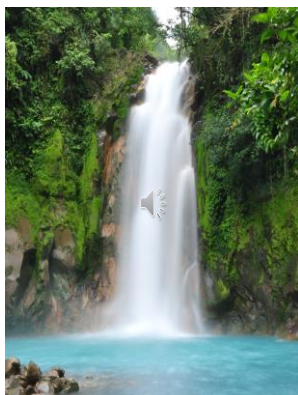
Pictures related to English novel words.

STA (5 Repetition)

CB 1

CB 2 (5 repetition)

CB 1

Appendix (C)

QUESTIONAIRE TO CHECK LANGUAGE PROFICIENCY.

QUESTIONNAIRE FOR PARENTS

Note: Dear Parents the purpose of this questionnaire is to survey children who use two or more than two languages at school and at home. Read each statement carefully and then answer them.

Name of child: Date:

Age/Sex: Grade:

School:

Father's Name:

Phone:

Mother's Name:

Address:

Any significant medical history:

The purpose of this questionnaire is to survey children who use two or more than two Languages at school and at home.

Read each statement carefully and then answer them:

Mother Tongue:

Medium of instruction at school:

1) Language used for communication at school (Please specify):

Most of the time   Sometimes   Always

2) Language used for communication at home (Please specify)

Most of the time   Sometimes   Always

3) Languages spoken by the child (Please specify):
   Most of the time   Sometimes   Always

4) Languages spoken by the family members at home (Please specify):
Most of the time   Sometimes   Always

5) Languages used by the family members to teach literacy skills at home (Please specify):
Most of the time   Sometimes   Always

6) Languages used at school to teach literacy skills (Please specify):
Most of the time   Sometimes   Always

- Languages known by the child :
- Languages taught as subjects at school:
- Language preference of the child (if any) at school and at home:
- Best performance of the child in any particular language at school (For e.g., performs better in language subjects like English or Kannada.

Note:
Always =3, most of time=2, sometimes=1

Appendix (D)

CHECKLIST   1

A TEN – QUESTION DISABILITY SCREENING TEST

These questions can be used in a house-to-house survey to identify children who could benefit from extra stimulation or special care. This could also be used in child centres and schools where teachers might be able to provide direct assistance or refer children with particular needs to special health or educational facilities.

1. Compared with other children, did the child have any serious delay in sitting, standing or walking?
2. Does the child speak at all?
3. Can the child make himself understood in words; can he say recognizable words?
4. Does the child having difficulty seeing?
5. Does the child having any difficulty hearing?
6. When you ask the child to do something does he seem to understand what you are asking?
7. Does the child have any weakness and/or stiffness in the limbs and/or difficulty in walking or moving his arms?
8. Has the child had often fits, become rigid or lost consciousness in the last six months?
9. Has the child had any other serious accidents or illness?
10. Compared with other children his age, does the child appear in any way backward, slow or dull?