FAST MAPPING ABILITIES OF NOUNS AND VERBS IN MULTILINGUAL CHILDREN

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April, 2018

CERTIFICATE

This is to certify that this dissertation entitled ***"Fast mapping abilities of nouns and verbs in multilingual children"*** is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 16SLP006. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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CERTIFICATE

This is to certify that this dissertation entitled "***Fast Mapping abilities of nouns and verbs in multilingual 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 of nouns and verbs in multilingual children"*** is the result of my own study under the guidance of Dr.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.

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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 process. The first stage of fast mapping starts from the stage at which the child forms a new lexical representation for the novel word and its meaning, which child is not exposed before. The second stage is the "extended phase", wherein the child cultivates some of the information about a particular novel word which the child has already encountered. Typically developing children as young as 13 months of age acquire new words through fast mapping (Woodward, Markman, & Fitzsimmons, 1994; Schafer & Plunkett, 1998; Kay-Raining Bird & Chapman, 1998). A similar study done by Bion, Borovsky & Fernald (2013) revealed that novel words were fast mapped and retained by 18- 30 month old typically developing children. Learning a word, which is a multifactorial process, begins with the association between a phonetic input and a corresponding action or object in the environment. This first association, which involves an incomplete representation of the word is named as fast mapping.

Many studies reported that novel word acquisition is more lexically triggered in the earlier stages compared to the later stages (Kroll & Curley, 1988). Children were able to fast map words which were more concrete, particularly nouns or descriptors, including color and shape with a significant amount of practice (Heibeck & Markman, 1987). However, there is evidence that some aspects of novel word acquisition vary, which depends on the type of word being acquired. Only a few exposures are required by the

young children to comprehend (or “fast map”) a new noun (Carey & Bartlett, 1978; Woodward, Markman, & Fitzsimmons, 1994; Markson & Bloom, 1997). Fast mapping of nouns requires establishing an association between the word and the entity, a process that plays a major role in early lexical acquisition. However, in the fast mapping of verbs, such a direct association is inadequate (Tomasello, 1995).

A verb indicates the occurrence or performance of an action or the existence of a state and a noun refers to a person, place or thing (Collin’s English dictionary, 1998). Verbs are more broadly defined, harder to remember, less stable in translation among languages, more prone to be changed in meaning when a conflict of meaning occurs, and slower to be acquired than nouns by children (Gentner, 1981). Nouns tend to represent objects and are more concrete whereas verbs tend to represent actions and are abstract (Chiarello, Shears, & Lund, 1999).

Very few studies have investigated verb acquisition, thus, less is known about the general character of verb learning (Tomasello & Akhtar, 1995). Although verbs are present in children's earliest expressive vocabularies, their vocabularies contain more number of nouns than verbs (Gentner, 1982; Jackson-Maldonado, Thal, Marchman, Bates, & Gutiérrez-Clellen, 1993; Au, Dapretto, & Song, 1994; Tardif, Shatz, & Naigles, 1997, Tardif, Gelman, & Xu, 1999; Caselli, Casadio, & Bates, 1999). It is not evident, whether children fast map verbs as they do nouns, and may have biases or constraints that direct early verb learning (Merriman, Marazita, & Jarvis, 1995; Golinkoff, Jacquet, Hirsh-Pasek, & Nandakumar, 1996). Many studies of verb learning, based on naturalistic observation and in the laboratory, propose that children are very conservative in the use of new verbs, and tend to express verbs only in the syntactic context in which they have

heard it (Tomasello, 1992; Tomasello & Olguin, 1993) and resist their extension to some new events (Behrend, 1990; Forbes & Farrar, 1993, Forbes & Farrar, 1995). There are very few studies that have included both nouns and verbs in a single study (Oviatt, 1980; Schwartz & Leonard, 1984; Tomasello & Akhtar, 1995), and only one study (Schwartz & Leonard, 1984) shows a difference in the learning of nouns and verbs, that is, favoring nouns. Some studies have tried to expand the principles of word learning to both nouns and verbs (Golinkoff, Mervis, & Hirsh-Pasek, 1994; Golinkoff, Hirsh-Pasek, & Mervis, 1995); however, more evidence in favour of this type of approach is required. Additional information for fast mapping of verbs is needed because actions indirectly involve either an object undergoing change or two or more objects with dynamic relationships (Slobin, 1978). As a result, often the action is over before the verb is heard, or is still impending (Tomasello, 1995; Gleitman, 1990), making ostensive reference much more difficult than for nouns. It is assumed that the processes underlying noun and verb learning are different.

India is a multilingual country, and children are often exposed to more than one language. According to statistical review in 2005, India has over 1652 languages spoken. Either the children are exposed to two languages or more languages due to the influence of schooling, cultural variations or regional diversity. Thus, multilingual assessment makes a clear understanding of how the particular lexical links or representation is formed and how it is stored. Multilingualism, according to the International Expert Panel on Multilingual Children's Speech (2012) is defined as the ability to "comprehend and/or produce two or more languages in oral, manual, or written form with at least a basic level of functional proficiency or use, regardless of the age at which the languages were

learned". It is the presence and use of two or more languages within a modern nation-state (Asher & Simpson, 1994). According to some studies, younger children learn new L2 language word simply by means of perceptual representation (Apel, 1972). Whereas, other studies state that children learn L2 vocabulary by means of conceptual representations (Potter, So, Von Eckardt, & Feldman, 1984). The typically developing bilingual children showed better fast mapping skills in their native language compared to the second language (Deepak, 2016). In bilinguals, novel word learning in L1 is better than L2, in recognition, whereas, in multilingual word learning, it is faster in L3 language followed by L1 and L2 (Nair, Ranjini, Bhat, & Shyamala, 2011).

Till date the literature, insights more information on how novel word learning takes place in monolinguals and to some extent on 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 of nouns and verbs takes place in younger multilingual children in the Indian context are limited. Hence, this research is valuable in finding out fast mapping ability of nouns and verbs in young multilingual children. It is important to know how novel word learning of nouns and verbs occurs at a younger age since at this age the children's vocabulary boosts up.

1.1 Need for the study

Building vocabulary provides a base for language growth. Young children in their preschool and school age are frequently exposed to novel words such as nouns and verbs through a variety of experiences in their day to day life. Thus, word learning is a continuous process in children. India is a multilingual country, children are often exposed

to more than one language in which relatively they have no proficiency. While, the literature provides some findings that are related to the lexical learning in the context of monolingual and bilingual subjects, comparable studies involving multilingual subjects are scarce and the research on similar lines in the Indian context is limited. Also, multilingual children are often exposed to more than two languages due to the influence of schooling, cultural variations or regional diversity and hence, the need for studying multilingual children. Considering the lack of information regarding the acquisition and use of verbs, the present study aimed to compare the functional use of verbs and nouns by multilingual children to verify whether their use of these word classes is different. Hence, there arises the need to study novel word learning ability of nouns and verbs in multilingual children. Further, the novel word learning of nouns and verbs can be delineated to a clinical population of impaired language children in their lexical acquisition process.

1.2 Aim of the study

The present study aims to explore the fast mapping abilities of nouns and verbs in multilingual (Hindi, English, Marathi, Sindhi, etc) children using naming and recognition task.

1.3 Objectives of the study

1. To study the novel word acquisition of nouns and verbs in L1 and L2 in multilingual children.
2. To study and compare novel word learning of nouns and verbs in recognition and production task in L1 and L2 in multilingual children.

3. To study and compare immediate and delayed recall abilities of nouns and verbs in L1 and L2 in multilingual children.

1.4 Hypothesis

There is no significant difference in the performance of nouns and verbs on fast mapping abilities in multilingual children.

- There is no effect of L1 vs. L2 and no difference in immediate and delayed recall on fast mapping abilities of nouns and verbs in multilingual children.
- There is no significant difference in novel word learning of nouns and verbs in recognition and production task in multilingual children.

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 until several years of developmental life. Along with language development, the 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 avenues for language evaluation. According to Wanner and Glietman (1982), the 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).

Language development is subserved 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; McCune-Nicolich, 1981; Ogura, 1991; Lyytinen, Poikkeus, & Laakso, 1997). Vygotsky (1978) believed that language development in children is important for communication as well as regulation of behavior 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 using 3 components; form, content, and use. According to ASHA (1983), language is a “complex and dynamic system of conventional symbols that are used in various modes of communication and expressing thoughts”. ASHA proposed five parameters of language; phonology, morphology, syntactic, semantics and pragmatics.

Skinner (1957) says, “Language is a learned behavior and it can be modified according to the environmental stimulation”. Children acquire language with the help of modeling 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 a language.

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 individuals and disordered population, where it has implications in language assessment and planning therapy.

For any individual to learn new words or develop language, one of the contributing factors that are a prerequisite is the cognitive abilities. Cognition comprises of those mental activities that are involved in the comprehension of perceived information, including acquisition, organization 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 a complex relationship between cognition and language, especially the cognitive processes like attention, memory, and organization which are important for comprehending and producing language (American Speech Language Hearing Association, 1983).

2.2 Vocabulary development

It is surveyed that more than 60,000 words' comprehension is achieved by the time of graduation. According to Bloom (2000), to gain this vocabulary size, a child must be involved in the learning of new words on an everyday basis throughout his/her childhood. Most toddlers acquire 10-15 words at around 1 1⁄2 years of age (Nelson, 1973). By the age of 2 years, their vocabularies extend to around 200-300 words; and by 3 years of age, they will be having a vocabulary of 900-1000 words. They enter kindergarten with the capacity to comprehend or potentially utilize more than 2,000 words (McLaughlin, 1998).

Vocabulary development in children is highly variable across individuals. Learning novel words in children varies across age, wherein younger children learn these words by focusing on the particular stimulus that is in and around their environment. Nouns are generally easier to acquire than verbs (Gentner, 1982; Bornstein, Cote, Maital, Painter, Park, Pascual, & Vyt, 2004; Bornstein & Cote, 2005; Maguire, Hirsh-Pasek, & Golinkoff, 2006). Gradually, these styles of learning will be replaced with a more matured form of learning a novel word where, children start linking to the previous episodes of events and try to link it with a 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. Thus, nouns tend to be acquired before verbs (Gentner, 1982) and dominate the early lexicons of the children (Goldin-Meadow, Seligman, & Gelman, 1976; Fenson, Dale, Reznick, Bates, Thal, & Pethick, 1994).

Recent studies on Multilingualism have depicted that the mental lexicon of a multilingual language learner does not exists separately, but consists of a system which is intertwined in which the languages can interact with one another (Cenoz, 2013; Szubko-Sitarek, 2016). Thus, in a number of studies, multilingual language learners have been considered to be different from second language learners. There is an increasing evidence that the differences between monolinguals, bilinguals, and multilinguals can be necessary from a language development perspective. Bialystok, Craik and Luk (2008) found that bilinguals from different language backgrounds outperform their monolingual counterparts on word naming and letter fluency tasks due to their executive control. Similarly, Barac and Bialystok (2011) assessed a monolingual group and different bilingual groups on verbal and non-verbal tasks and concluded that bilinguals outperformed monolinguals on tasks of executive control, irrespective of language background. However, on the expressive and receptive vocabulary tasks, an advantage was shown only by the Spanish-English bilinguals because of the similarity among the languages.

Molnar (2010) measured the L3 vocabulary in the Hungarian - Romanian bilinguals using the Vocabulary Levels Test. Her study investigated whether similarities in structure between English and Romanian cognates have any influence on the vocabulary scores in English. The findings suggested that there was a significant

correlation between English lexical knowledge and Romanian proficiency and also between L2 and L3. Thus, children having high proficiency in L2 are more likely to achieve greater scores in L3. This supports previous research, that all previously known languages will interact with the target language and this will be very evident in the domain of vocabulary (De Angelis, 2007). Szabo (2016) also found a close relationship in the vocabulary scores between L2 Romanian and L3 English. Thus, it is seen that there is a significant correlation between L2 Romanian and L3 English lexical knowledge, suggesting that the higher the vocabulary size in one language, the higher it is likely to be in the other language. Szabo (2016) stated that additional language acquisition is influenced by the prior lexical knowledge.

Hall (1993) assumed that these lexical connections are due to a default cognitive process which is based on the individuals' motivation to decrease the complexity of the learning task by noticing the similarity between the novel and already represented structures. The Parasitic Model (PM) of vocabulary acquisition, which he developed made certain predictions about the vocabulary acquisition process that included the associated representational levels and learning stages (Hall, 1993). The most recent version of the PM (Hall & Ecke, 2003) explains not only the acquisition of L2 words but also L3 words, and takes into account the primary role that previously acquired vocabulary of other foreign/second languages (L2s) plays in the learning of new words (Ringbom, 2007). According to the Parasitic Model of vocabulary acquisition (Hall, 2002; Hall & Ecke, 2003), new L3 representations behave as 'parasites' on the pre-existing L1 and L2 items with which they share features of form, meaning or (syntactic) frame.

Hall and Ecke (2003), added that the parasitic connections are regulated by a number of lexicon-external factors which can be divided into learner factors like metalinguistic awareness and psychotypology; learning factors like the order of acquisition, L2 status and proficiency in each language; language factors like degree of contact and typological distance; event factors like language style, mode, task and interlocutor; and word factors like the number of frame/form/concept competitors, degree of frame/form/concept similarity with competitors, frequency of competitors, abstractness vs. concreteness, etc.

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

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

Word learning links the connection between the conceptual and linguistic organization in infants (Gelman, Coley, Rosengren, Hartman, Pappas, & Keil, 1998; Bloom, 2000). In the conceptual domain, the linkage between objects and events will be taking place and in linguistic domain, phrases and words are learned through the melody of human language. Several researchers have proved that during the infant stage, word learning takes place through a strong linkage of the conceptual and linguistic domain. To become a successful word learner, infants must identify relevant linguistic units, conceptual units and make a strong mapping between conceptual and linguistic units. And each of these domains requires a certain amount of abstraction, for example, a given word or utterance must be associated to abstract phonological representation and should have an abstract concept related to it. Both linguistic and conceptual factors play a major role in the early lexical acquisition and also contribute to the noun advantage.

2.3 Language acquisition in multilingual children

Language acquisition in multilingual children follows the same principal stages as those seen in the respective monolingual children: the babbling stage, proceeding to the one-word stage, which is followed by the two-word stage and the multiple word stage.

Tabors and Snow (1994) reported that language acquisition in bi / multilingual children passes through four distinct stages:

1. First, the child starts using the home language. When everybody around the child is using a different language, only two options are available - either to speak the already known language or entirely stop speaking. Most of the children move ahead with the first option for some interval of time (Saville-Troike, 1988). This increases the

frustration, and in due course, children give up attempting to make others comprehend their language.

2. The next stage is the nonverbal period. The children enters a phase where they do not talk at all after abandoning the attempt to communicate in their first language. This can be a brief period, or it may last for some time. Although, the children do not talk during this period, they try to communicate non-verbally in order to obtain objects or to seek help from the adults. Furthermore, during this period children begin to actively solve the code of the second language. Saville-Troike (1988) reported that children would practice the desired language by repeating whatever the other speakers speak in a low voice and by experimenting with the sounds of a new language.

3. The next stage starts when the child is ready to use the new language, publicly. This speech has two characteristics - it is formulaic and telegraphic. Formulaic speech indicates to the usage of unanalyzed chunks of words or usual phrases which are repetitions of what the child hears. Children use such chunks way before they start understanding what they mean (Fillmore, 1991). Telegraphic speech is very common in early monolingual language acquisition which involves the use of content words without the use of morphological markers or function words.

4. Finally, the child arrives at the stage where language is used productively. During which, the child is able to go beyond memorized chunks and short telegraphic utterances. At first, children may construct new utterances by using formulaic models such as "I wanna" with the names of objects. Then, the child gradually begins to understand the syntactic structure of the language. Gradually, children use these

formulas and apply the newly learned syntactic rules to master control over the language productively.

Like any other developmental stages, the sequence stated here is also flexible. No research has stated that the sequence of language acquisition is different in bi/multilingual children compared to that of monolingual children. Also, the correlation of the stages with the age remains greatly unaffected. According to Meisel (1986), there is no convincing reason that the fundamental principles and mechanism of language acquisition among bi/multilinguals are qualitatively dissimilar from those seen in monolinguals. The order of phonological and morphosyntactic development and the learning strategies as described in the works of Slobin (1973), the semantic under-extension and over-extension of lexical items, substitutions, avoidance and the acquisition moving from unmarked to marked linguistic structures, is fundamentally identical for both monolingual and bi/multilingual children. Thus, it can be concluded that bi/multilingual language acquisition is not qualitatively different from monolingual first language acquisition and leads to the same type of grammatical competence. Researchers also state that the initial vocabularies of children's contain a relatively larger number of nouns and a smaller number of verbs (MacNamara, 1972; Gentner, 1982; Woodward & Markman, 1998; Gentner & Boroditsky, 2001; Waxman & Lidz, 2006). There is a considerable variation in the vocabulary acquisition in typically developing children. It is dependent on many factors like the exposure to the language, education, socio-economic status, dialect and native language (Mallikarjun, 2002).

2.3.1 Models of multilingualism and multiple language learning

Multilingualism researchers have proposed some models concerning third language acquisition and multilingualism, each relating to a different aspect, and hence complementing each other. All the models are language independent.

1. The Dynamic Model of Multilingualism (DMM) as described by Jessner's (1997), Herdina and Jessner's (2002) was developed on the basis of the Dynamic Systems Theory and provides a new holistic perspective on multilingualism. It is a psycholinguistic model that perceives the change in language at an individual level as a function of time. It focuses on the dynamics and variability of the multilingual speakers, who are perceived as complex psycho-linguistic systems which comprise a number of individual language systems (LS1, LS2, LS3, etc.) (Herdina & Jessner, 2002). Parameters involved in the development of these multilingual systems include non-linearity, variability, connectivity, unpredictability, irregularity, self-renewal, and self-organization. The DMM is based on the assumption that the multilingual systems are not simply the sum of a number of language systems but they are qualitatively and quantitatively unique. According to DMM, multilinguals due to their metalinguistic awareness and monitor system are at an advantage compared to monolinguals. The multilingual seems to possess a unique set of skills which comprises language learning, management and maintenance skills. The acquisition of these skills in the multilingual speakers co-occurs with the qualitative changes in the system, which in turn results in heightened metalinguistic awareness in the multilingual users. Also, they assume that multilinguals possess an enhanced multilingual monitor (EMM), whose development is believed to be consistent with the number of language systems

available to the speaker and with the frequency of use of each of these systems. The EMM is part of the M-factor which has facilitative effects on the L3 acquisition process. The M-factor has described as "a function of the interaction between more than one language systems" and as a "dispositional effect which will have priming or catalytic effect in TLA". The authors assume that the M-factor is associated with extreme changes in language awareness and strategy development.

2. Role-function Model by Williams and Hammarberg (1998), is a developmental model of L3 production. L1 versus L2 status is incorporated into the model of speech production. According to the authors, an individual's L2 plays a primary role in L3 acquisition and development. They state that in the early stages of L3 development, an individual's L2 is more likely to be activated as the supplier language than L1. The authors hypothesize that the acquisition mechanisms, that were functional during the acquisition of L2 may be reactivated during L3 acquisition. This model predicts role assignment to each of the languages that are involved. Whenever three languages are involved, one language which is usually the speaker's L2, functions as default supplier language, while the Ll plays only a negligible role in L3 lexical acquisition process. Williams and Hammarberg (1998) also presumed five variables which could be involved in identifying a given language as the default supplier. The variables include typology, proficiency, L2 status, recency of use and individual learner situation. Thus, in this model L2 status appears to outweigh any influence of L1 during L3 acquisition. Also, as the learner's proficiency increases in L3, the role of L2 and L1 reduces.

3. The factor model by Hufeisen (2000), states that the third language acquisition process is qualitatively dissimilar from that of second language acquisition. The model

chronologically explains the individual factors that account for the following four stages: the acquisition of Ll, learning of a first foreign language (L2), the learning of a second foreign language (L3) and the learning of other foreign languages (Lx). It also depicts the richness of multilingual acquisition, by demonstrating that the process of acquisition of L1, L2, L3, Lx is unique as it is influenced by a novel, specific set as well as configuration of individual factors, and is not restricted only to linguistic factors. These factors get added as the number of languages increases, and which did not apply to the development of the previous foreign language. Accordingly, the L3 acquisition process (Hufeisen, 2000) will comprise of neurophysiological, affective, cognitive, foreign language-specific factors and linguistic factors: L1, L2. The model assumes that a huge qualitative jump in the learning process occurs between the development of the first (L2) and second foreign language (L3).

4. The Sociolinguistic Ecological Model of Multilinguality given by Aronin and Ò Laoire (2003), is based on Sociolinguistics. In this model, they differentiate between "multilingualism", which is related to the situation, and "multilinguality", which not only relates to an individual's languages and their linguistic behavior and knowledge but also includes their metalinguistic awareness, cognitive behavior, their resources, abilities, personality traits, their identity, self-image and the large amount of socio-cultural influences they are exposed to. The ecological model regards the factors in the learning environment to be deciding.

5. Multilingual role model by Fernandes-Boechat (2000) is based on the principles of the Cognitive Chain Reaction Theory in Foreign Language Learning. It states the role occupied by preceding foreign language during the target language activation. The

learner, unconsciously or involuntarily, links each new foreign language learning experience, to the learning experience of the preceding foreign language. As multilingual learners, target language proficiency increases, the lesser they will refer back involuntarily to their preceding foreign language. Thus, with the increase of target language proficiency, unintentional intrusions decrease.

2.4 Acquisition of nouns and verbs

Novel nouns are learnt more easily and quickly than novel verbs (Golinkoff, Hirsh-Pasek, Bailey, & Wenger, 1992; Golinkoff, Jacquet, Hirsh-Pasek, & Nandakumar, 1996; Childers & Tomasello, 2002). The children have difficulty in learning verbs because verb referents are less imageable or more abstract than noun referents, which are more imageable or concrete (Gentner, 2006; McDonough, Song, Hirsh-Pasek, Golinkoff, & Lannon, 2011). Also, verb referents are momentary or fleeting while noun referents are steady or stable, more tangible and are present in the immediate environment (McDonough et al., 2011). Infants take in information from a large variety of sources (e.g., conceptual, linguistic, perceptual) to recognize words and establish their meaning (Woodward & Markman, 1998; Waxman & Lidz, 2006). Verbs are essentially described by relations among nouns, and thus cannot be learned unless some requisite number of nouns have been acquired (Gleitman, Cassidy, Nappa, Papafragou, & Trueswell, 2005).

This view, however, has been challenged by some researchers, who believe that if verbs predominate in the input then verbs can be learnt faster compared to nouns (Choi & Gopnik, 1995; Tardif, 1996). In languages like Korean, Japanese, and Chinese, arguments for both subjects and objects are often dropped from the sentence. Due to which, verbs are prone to appear more often than nouns in the maternal input (Choi &

Gopnik, 1995; Tardif, 1996; Kim, McGregor, & Thompson, 2000; Ogura, 2001). Thus, they predicted that the children who are acquiring these languages should learn verbs earlier, and more easily, than nouns (Choi & Gopnik, 1995; Tardif, 1996). However, mixed results are observed in respect to whether Japanese, Korean, or Chinese speaking children acquire verbs earlier than nouns. Few studies have reported the dominance of verbs in Korean speaking (Choi, 2000) and Mandarin speaking (Tardif, 1996) children's initial expressive vocabularies. Few other studies reported the roughly similar quantity of nouns and verbs (Choi & Gopnik, 1995). Other studies presented that the percentage of nouns was more than verbs in 'verb-friendly' languages also, including Japanese (Ogura, 2001; Yamashita, 1997), Korean (Au, Dapretto, & Song, 1994; Kim et al., 2000), Italian (Caselli, Bates, Casadio, Fenson, Fenson, Sanderl, & Weir, 1995), and Navajo (Gentner & Boroditsky, 2001) children. Gentner (1982), claimed that the noun bias is universal and nouns are acquired relatively easily than verbs even when the input frequency is controlled (Leonard, Schwartz, Morris, & Chapman, 1981; Rice & Woodsmall, 1988; Merriman, Marazita, & Jarvis, 1993; Imai, Haryu, & Okada, 2005).

Though children use more nouns, they may display lesser noun-bias in reception. Mothers tend to encourage the children to express nouns more frequently than verbs (Goldfield, 1993; Tardif, Gelman, & Xu, 1999) which could lead to a noun bias. Greater research is available on the productive vocabularies of the children than on their receptive vocabularies since, it is easy to assess the words which the children are able to express. Furthermore, it is easier to assess the children's comprehension of nouns than that of verbs, as comprehension of noun requires identification of an object that is static, whereas, comprehension of the verb might require identification of a moving stimulus or

recall of an action. By the age of 2 years, children tend to comprehend almost an equal quantity of nouns that they express (Goldin-Meadow, Seligman, and Gelman, 1976). However, for verbs, the children can comprehend 3 verbs for every 1 verb expressed. Thus, the lag between comprehension and production is relatively greater for verbs than that for nouns (Goldin-Meadow, et al., 1976). Similarly, Childers and Tomasello (2002) also reported that, when the children are taught novel words, they express more number of the nouns, but comprehend an equal number of nouns and verbs. Thus, in early lexical development, it might be possible that the children do not comprehend more number of nouns than verbs, but may show a noun bias in production. This early lexical development can be measured through a skill called fast mapping.

2.5 Fast mapping

Fast mapping is defined as the phenomenon which forms lexical representation for the newly learned word. This came into the field of child language acquisition around 3 decades ago (Carey and Bartlett, 1978). As indicated by Carey and Bartlett (1978), there are two phases of word learning process. Quick mapping is thought to be the primary stage, wherein the child forms a relationship between a novel word and its meaning, which the child is not exposed before. The second stage is the “Extended mapping”, in this stage child refines some of the information about that specific novel word which already the child has experienced. The word, 'fast mapping' is believed to be critical in the first stage of acquiring new words or novel words, which requires intact semantic and phonological processing skills (Weismer & Evans, 2002; Gray, 2005).

Few researchers investigated novel word learning and opined that with a single exposure to a new phonological form and semantic value of the word, children create a

'map' form-meaning), which is a 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 children, novel word learning creates particular lexical semantic map and this is refined through various experiences across communicative contexts (Dollaghan, 1987; Weismer & Hesketh, 1993, 1996, 1998; Weismer & Evans, 2002; Alt, Plante, & Creusere, 2004; Gray, 2003, 2004, 2005, 2006; Hwa-Froelich & Matsuo, 2005; Capone & Mcgregor, 2005).

According to Lederberg, Prezbindowski and Spencer (2000), two types of word learning exist, rapid word learning (fast mapping) and novel mapping (quick incidental learning). The child is provided with an explicit reference in rapid word learning whereas, in the second type, the child has to establish a link between the novel word and unfamiliar object. In the present study, the fast mapping is employed.

In ideal situations, fast mapping tasks includes two phases, exposure phase and probe phase. In the exposure phase, the 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, the 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 (Weismer & Evans, 2002). Ideally, the task of fast mapping is carried out without any specific feedback or teaching over a 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 (2003) exclaimed that children's fast mapping

comprehension scores may be a strong predictor of child's capability to express the learnt novel word. Hence, reception becomes an eternal part of 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., 1994), a parental report instrument of language development, and the expressive portion of the Preschool Language Scale-3 (Zimmerman, Steiner & Pond, 1992). A similar correlation was found between fast mapping performance and the score of Peabody Picture Vocabulary Test, in monolingual English speaking preschoolers (PPVT-III; Dunn & Dunn, 1997), Gray (2004).

2.6 Retention of Fast-Mapped Words

The word learning process occurs step by step over time. After the initial exposure to a word, children probably store some part of the word-meaning mapping they have deduced and expand on it with every exposure. Carey and Bartlett (1978) termed this, generally slow and long process of refining the depiction of a word and its meaning, as slow mapping. Keeping in mind, the end goal to see early word learning, it is important to see how the procedure of slow mapping occurs. Children's retention of the words they have effectively fast mapped after some time is one of the important steps in the slow mapping process. Most of the studies in fast mapping addressed retention abilities of fast map words in young children (Dollaghan, 1985; Golinkoff, Hirsh-Pasek, Bailey, & Wenger, 1992; Wilkinson & Mazzitelli, 2003; Wilkinson, Ross, & Diamond, 2003; Spiegel & Halberda, 201l; Bion, Borovsky, & Fernald, 2013; Zosh, Brinster, & Halberda, 2013).

Few reviews have evaluated the retention of recently mapped words after a significant delay. These reviews have demonstrated that both 1 and 2 year olds were able to remember referents of the novel words which they have been taught by ostensive naming for no less than 24 hours (Tomasello, Mannle, & Werdenschlag, 1988; Waxman & Senghas, 1992; Woodward, Markman, & Fitzsimmons, 1994). Evidences have also shown that young children hold referents of words they have incidentally learned (Carey & Bartlett, 1978; Markson & Bloom, 1997). Horst and Samuelson (2008) found there is no retention of fast mapped words at age 24 months, not withstanding for 5 minutes unless those words were taught extensively.

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. Thus, the 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. Manjunath, Rao and Mohan (2010) studied fast mapping abilities in typically developing toddlers, whose age range was in between 16-20 months. The children were taught the names of 24 unfamiliar objects in a period of 12 training sessions that lasted for about 24 days. Children were divided into two groups, where the experimental group had undergone both training phase and evaluations in all sessions. But for the control group, training as well as testing was done only in the first and last session. Results revealed a significant difference between the experimental and the control group. Scores were better for the experimental group than the control. Thus, this study concluded that fast mapping occurs in toddlers, and a significant amount of practice is necessary for mapping the word.

Learning a novel word and creating a lexical representation for the particular novel word requires a sufficient number of exposures as well as good recall abilities which 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 2.5-4.5 years involving a naming task. In this study, the naming accuracy was assessed, where initially the names were trained and the subjects were asked to remember the names after 10 minutes and after one week. Results revealed that older children performed better when compared to younger children and performance on naming was reduced after one week when compared to the efficiency of naming tested after 10 minutes.

Zosh, Brinster and Halberda (2013) assessed 3-year-old children's word learning via direct and inference teaching. They found that the 3-year-old children were more likely to retain a word's meaning when the meaning had been inferred than, when it had been specifically instructed with no distracter. However, taken together these reviews, suggested that children are able to retain the newly learnet words for a considerable length of time, hours, and even weeks. Also, the performance of fast mapping is influenced by several variables.

2.7 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 novel word learning process. Fast mapping and age have a direct one to one relationship, with evidence of older children outperforming better than young children (Alt et al., 2004; Gray, 2005, 2006).

The second influencing factor in the process of fast mapping, is a 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 (Dollaghan, 1987; Weismer & Hesketh, 1993, 1996, 1998; Weismer & Evans, 2002; Alt et al., 2004; Gray, 2004, 2005, 2006; Alt & Plante, 2006).

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

Fourth important novel word learning factor, is the phonotactic probability which is the frequency of occurrence of individual sounds and sounds combination. It is believed that behavioral effects of phonotactic probability provides an insight about the role of phonological representation in language processing (Vitevitch & Luce, 1999). Children learn words which have higher phonotactic probability easily than words with low phonotactic probability (Storkel & Rogers, 2000; Storkel, 2001).

Multilingualism is one of the important variables which tend to influence fast mapping skills. Thus, for understanding the effect of multilingualism on fast mapping, review of basic aspects of multilingualism is essential.

2.8 Studies on Fast mapping of nouns and verbs in different populations

2.8.1 Typically developing children

Carey and Bartlett (1978) studied fast mapping abilities in the typical population. They obliged children to retrieve an object from a field of two, one recognizable and one new object. They found that through brief presentation and contrast with a familiar object, children fast mapped new words. One week later, the children were evaluated in an alternate setting and they were able to demonstrate learning of the fast mapped words. Other studies support Carey and Bartlett's findings (Heibeck & Markman, 1987; Gershkoff-Stowe & Hahn, 2007).

Heibeck and Markman (1987) conducted a similar study in which they assessed three lexical domains: color, shape, and texture. The children were assessed for the retention of unfamiliar words during the same session. For assessing their comprehension, children were asked to identify the target item when it was paired with three unfamiliar items and three familiar items. They found that fast mapping was successful in typically developing children in the age range of 3-4.8 years. The children comprehended more shape and colour words than the texture words. Fast mapping had a larger impact when the children knew some of the words in the same category as the unfamiliar word. Research shows that fast mapping is successful in the typically developing children, as well (Carey & Bartlett, 1978; Heibeck & Markman, 1987). Typically developing children are able to fast map and retain the new vocabulary. Fast mapping is more successful with the concrete vocabulary, such as descriptors or nouns, including shape and colour (Heibeck & Markman, 1987).

2.8.2 Bi/Multilingual children

There has been extensive research in the attempt to study fast mapping phenomenon in typically developing bilingual children. Apparently, most of the studies have been done in western bilingual contexts. Few studies have concentrated on investigating fast mapping skills in monolingual vs. bi/multilingual 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 showed that the monolingual English speaking children performed better than their L2 learning peers on the standardized vocabulary measure (PPVT- III) and on the fast mapping task. In case of only English speaking participants, it was found that chronological age, novel word learning ability, and persistent receptive vocabulary skills haves positive correlations (with PPVT – III). Surprisingly, there was no correlation in the early sequential bilinguals on tasks like existing vocabulary knowledge in L2 and novel word learning (Wilkinson & Mazzitelli, 2003). On same lines, few studies have found similar results where children outperformed in L1 compared to L2. Kan and Kohnert (2008) investigated the relationships between age, existing vocabulary knowledge, and the fast mapping skills in both the languages of typically 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 L1 fast mapping and L2 vocabulary have significant positive and negative cross-language correlation respectively.

Kan and Kohnert (2005), in their study used picture-identification and picture-naming tasks to assess the receptive and the expressive vocabulary of the children in the age range of 3.4-5.2 years in the US. The children were learning both Hmong (L1) and

English (L2). For all the participants, Hmong was used at home, English and Hmong in the preschool, and English was the major language of the community. For older preschool children, they reported stabilization or a plateau in lexical development of L1 (Hmong). Also, there were notable gains in L2 (English) vocabulary, in contrast to the lack of gains in Hmong vocabulary. In other studies, in which systematic support was provided to the minority language, the typically developing children in preschool programs showed gains in both L1 (Spanish) and L2 (English) (Rodriguez, Diaz, Duran, & Espinosa, 1995; Winsler, Diaz, Espinosa, & Rodriguez, 1999; Diaz-Campos, 2004).

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

A study by Nair, Ranjini, Bhat and 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 learnt novel words faster in L1 (Malayalam) than L2 (English). Whereas, multilingual children learned words faster in L3 (English) followed by L1 (Tulu) and L2 (Kannada). Further, they opined that the language proficiency, the degree of exposure and opportunities to use the language are contributing factors for novel word learning.

A study done by Deepak (2016), explored the fast mapping abilities in novel word learning in bilingual children aged from 5-8 years, whose L1 was Kannada and L2 was English, using naming and recognition task. Children learnt new words with a single exposure by fast mapping the new word and results revealed that recognition was especially easier for the children compared to naming task. He also concluded that bilingual children are better off in fast mapping skills in their native language compared to their second language which was attributed to the magnitude of language exposure, the environment he/she is exposed to and proficiency of language.

A study by Van Horn and Kan (2016), investigated fast mapping skills in preschool children, whose L1 was Spanish and L2 was English, across two different contexts; one is storybook reading and the other is cartoon viewing. These children were exposed to 8 unfamiliar words for a period of 4 sessions in both the contexts which are mentioned above. No significant difference was observed during the learning of 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.

De Angelis (2015) examined two factors related to proficiency development in English L3 and school performance in the third language: the education of parents and the exposure to the second language within the community. Participants were Italian L1 students, with German as L2 and English as L3, who were attending school in the multilingual area of South Tyrol, Italy. Results showed parental education was a strong predictor of development in English L3.

2.8.3 Hearing impairment

Few researchers were also keen on studying the pattern of how novel words get mapped in language disordered children with a comparison to typically developing children. It's of great interest to know how the mapping takes place across various disorders like Specific language disorder, hearing impairment, etc. These studies give some insight about how the word learning takes place across these disorders and the 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 typically developing individuals (between 7-10 years) and in individuals with hearing impairment (between 5-9 years). Results showed that learning of nonsense words was poorer in individuals with hearing impairment than typically developing individuals.

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

Stelmachowicz, Pittman, Hoover, & Lewis, (2004) studied rapid word learning in children with hearing impairment (Moderate hearing loss) in the age range of 6-10 years

old and typically developing individuals. It was found that the children with hearing impairment performed poorer even when adequate training and exposure was given.

Gilbertson and Kamhi (1995) examined rapid word learning on 60 typically developing children and 37 children with hearing impairment who had a moderate sensorineural hearing loss between 5-14 years. The task was to watch the animated slideshow which contained nonsense words and it was presented for about 3 times. The child was then asked to identify the particular trained word from the slideshow. Results revealed that children with hearing impairment performed poorer than typically developing individuals on recognition task.

Hansson, Forsberg, Lofqvist, Maki-Torkko and Sahlen (2004) compared children having mild-to-moderate bilateral sensorineural hearing loss, and children with specific language impairment, whose age ranged from 9–12 years, to assess the role played by the working memory in learning new words. Children with hearing impairment outperformed the children with the specific language impairment on tasks testing novel word learning. They found that the best predictor of novel word learning in children with hearing impairment and with specific language impairment is the complex working memory.

2.8.4 Specific language impairment

Studies related to fast mapping on Specific language impairment (SLI) proposed that fast mapping creates a association between particular referent and to the word. Dollaghan (1987) studied the fast mapping abilities in the SLI and normal population and found that SLI performed similarly in the 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. 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 the age-matched typically developing children.

A number of studies have been carried out in the recent scenario to check for the novel verb interpretation in children with SLI. It was found that some cases of SLI had performed at the level of typically developing children (Hoff-Ginsberg, Kelly, & Bhur, 1996; Oetting, 1999). Rice et al. (1992) 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 are not sufficient.

Children with SLI acquire their first words late. At the age of preschool, they could comprehend more object words than action words and produce less ability to extend to newly learned objects unnamed (Leonard, Schwartz, Allen, Swanson, & Loeb, 1989; Leonard, Schwartz, Morris, & Chapman, 1981).

Children with SLI also depict impairment in mapping nouns and verbs. Oetting (1999), in his study found that novel verb retention is poor in children with SLI as

compared to typically developing children. They possess slow mapping skills in terms of recognition and naming tasks. In a study, the school-aged children with SLI had slower than normal response times in picture naming and their recall abilities were poor on memory tasks even when the words used in were those that they could easily identify on the picture pointing tasks (Kail & Leonard, 1986).

Alt, Plante and Creusere (2004) studied the fast mapping abilities in children with SLI. They included children with SLI and typically developing children in the age range of 4-6.5 years. Objects were presented using a computer and a creature figure was used. The children had to click on a smiling creature or a crying creature for correct or incorrect response respectively. Fewer features were recognized by the children with SLI than the typically developing children for both objects and verbs. Gray (2005) also found that children with SLI have difficulty with learning of words during the fast mapping tasks. Results indicated that children with SLI had difficulty in forming phonological representations and phonological-semantic links for word learning. Alt and Plante (2006) emphasized that children with SLI performed poorly during mapping of lexical labels and the nonverbal semantic features during the fast mapping task.

Kambanaros, Grohmann, Michaelides and Theodorou (2013) compared multilingual children with SLI to their peers. They investigated lexical retrieval of verbs (through picture-naming actions) and compared performances for the same children with noun retrieval (through picture-naming objects). It was found that nouns (object names) were better retrieved than verbs (action names) in the multilingual group with SLI, a finding similar to bilingual peers with SLI and typically developing language-matched controls.

Jagacharan (2017) explored the fast mapping abilities in novel word learning in children with Specific language impairment using recognition and production tasks, where 20 children aged between 4-7 years were recruited on the random basis, out of which 10 were children with SLI and 10 included typically developing children (NNKS). The results indicated novel word learning was better in both the groups for recognition task. Poor production skills were expressed more in children with SLI when compared to that of NNKS due to the impaired association of attaining phonological memory and retrieval or access for production. Results for comparing immediate recall condition vs. delayed recall revealed better performance in immediate recall than delayed recall though children with SLI possess limited storage capacity and poor memory.

2.8.5 Cognitive impairment

Fast mapping in children with cognitive impairment was assessed with the successive and concurrent introduction of items (Wilkinson & Green, 1998). Individuals in the age range of 5-22 years, who had been diagnosed with moderate to severe cognitive impairment, were included. During concurrent introduction condition, two novel words were introduced using a computer, in both the first and the second session. Participants were tested for acquisition during the last session. They were exposed to each word 12 times. During the successive exposure condition, one word was presented for fast mapping during the first session, and two words (the word from the first session and a new word) were presented for the sessions two and three. Acquisition was assessed after three days. A modified fast mapping trial was used, where the first word was presented 18 times and the second word was presented 6 times. Successive introduction proved to be equal or more successful than the concurrent introduction. Eight out of ten

individuals successfully fast mapped two unfamiliar words when successive introduction was used. Individuals with little expressive language were able to benefit from fast mapping using this approach (Wilkinson & Green, 1998).

In a study by Wilkinson, Ross and Diamond (2003), learning was significantly better following the successive introduction condition for the typically developing individuals; however, for individuals with cognitive impairment, there was no statistical difference between the concurrent and successive introduction conditions. Receptive vocabulary acquisition is challenging for children with cognitive impairment. Some children with receptive age below 60 months did not demonstrate learning under either condition. Children with the autism spectrum may learn better through the concurrent presentation. This research indicated that children with cognitive impairment were successful at fast mapping, but that this was not necessarily leading to learning new vocabulary. Research by Wilkinson (2007), also found similar results that the initial fast mapping was successful, but that retention was poor in children with cognitive impairment.

2.8.6 Down syndrome

Chapman, Bird and Schwartz (1990) compared the performance of adolescents with Down syndrome and typically developing children on a fast mapping task. Individuals with Down syndrome were in the age range of 5.6-20.6 years, while the typically developing children were 2-6 years of age. Both the groups were matched for their nonverbal mental age. Participants were exposed to the target words through a hiding activity. For reception, the older children (16-20 years) with Down syndrome performed significantly better than the 12-16 year old group. Sixty-two percent of the

younger group passed the reception task, while 100% of the older group passed. An expressive measure was also obtained by asking the child to name the target words. Research indicates that fast mapping is successful in children as well as adolescents with Down syndrome. More success has been achieved with older adolescents.

2.8.7 Children with Autism

Few studies have assessed fast mapping in children with autism. McDuffie, Yoder and Stone (2006) studied whether fast-mapping mediates relationship between attention and vocabulary size, in 29 children with autism spectrum disorder who were in the age range of 24-46 months. Eight objects representing brightly colored wooden shapes were presented. Attention trials and fast mapping trials were conducted. During attention trials, the object was labelled and during the fast mapping trials, previously labeled objects were presented with novel objects. For children with autism, successful acquisition of nouns was observed using repeated attention following cues in combination with fast mapping.

Luyster and Lord (2009) addressed fast mapping to assess if children with autism spectrum disorder (ASD) were able to use social information in word-object mapping when compared with typically developing children who had similar expressive vocabularies. The mean chronological age was 30.86 months for children with autism and 20.62 months for typically developing children. The study began with familiar object training, where the children were asked to select the familiar object which was placed next to two distracters. Children who cleared this task were administered word learning tasks, where words for the fast mapping task were randomly chosen from twenty simple nonsense words. During the training phase, the investigator moved an object in front of the child and another non-labelled object was also presented. The testing phase required

the child to choose the named object from a group containing the non-labelled object and the distracter. Results indicated that children with autism did not differ in their ability to learn the name of a novel object when the examiner followed the focus of the child's own attention or when the examiner's focus of attention was different from the child's. This suggested that, compared to typically developing children with the same expressive vocabulary, children with ASD also used social information to guide word object mapping.

The research on fast mapping skills in children with autism suggests that fast mapping of labels is successful when attention cues are given. It also indicates that children with autism who have impairments in joint attention, fast map using their own direction of gaze rather than the examiner's direction of gaze. More recent fast mapping studies of children with autism focused on their use of attention, gaze, and social information, rather than their capacity to learn and retain vocabulary (Brock, Norbury, Einav, & Nation, 2008; Luyster & Lord, 2009). Objects to be fast mapped in these studies were presented individually rather than in a contrasting pair (one familiar and one unfamiliar item). The examiners presented an item and then labeled that individual item.

Norbury, Griffiths and Nation (2010) had investigated novel word learning in typically developing children and children with autism, participants were asked to name and define novel objects (testing phonological and semantic knowledge, respectively), quickly subsequent to learning and after four weeks. For verbal participants with ASD, recall of phonological information was noteworthy at both time focuses. In fact, they perform better than the typically developing controls at mapping phonological forms to novel referents immediately after learning.

Another study done by Barcus (2011) investigated whether fast mapping a useful technique for vocabulary development in school-age children with autism and whether children with autism able to retain the novel words acquired through fast mapping. They included four children with autism in the age range of 6-8 years. Participants 1 and 3 were nonverbal. Little meaningful expressive language was present in participant 3. Participant 2 was verbal and had the largest vocabulary of all participants. However, the cognitive and language levels of participants were different, all participants benefited from fast mapping. Results indicated that fast mapping was successful in children even with such diverse language abilities, fast mapping was successful for all subjects, indicating its effectiveness among children with autism across different levels of cognitive and linguistic ability.

Bincy (2017) explored the fast mapping abilities in novel word learning in children with ASD using recognition and production task. The study also included a control group. Both the groups succeeded at correctly fast-mapping novel words in the recognition task. However, typically developing children had better fast mapping skills in both recognition and production than children with ASD. Results for comparing immediate recall condition vs. delayed recall revealed better performance in immediate recall than delayed recall. To conclude, the above studies cited provide few interesting findings that pertain to fast mapping in Autism spectrum disorder population.

2.9 Multilingualism

Bloomfield (1933) has defined multilingualism as ‘native-like control of two or more languages’. Comanaru and Dewaele (2015) defined multilingualism to ‘proficiency to various degrees in more than one language’. Multilingualism, is the most important

social phenomena of the current age. Although, multilingualism has always prevailed, current multilingualism is different from that of the past, in a way that the society today as a whole is affected by multilingualism (Aronin & Jessner, 2015). Presently, the spread of multilingualism can be attributed to the linguistic, cultural and social changes that are derived from globalisation, immigration or emigration, and trans-national job market which has given rise to a sociolinguistic environment in which the individuals and the communities are exposed to more than one language apart from their mother tongue (NWO programme, 2003).

Multilingualism affects several aspects in the societies: language acquisition, use, education, language learning as well as teaching, language practices, etc. There are several factors involved in each of these aspects, such as the varieties or number of different languages, levels of proficiency and the various kinds of use, etc. For example, in language acquisition, the various parameters involved include the level of proficiency, the number of different languages of instruction, age factor, amount of interaction between L1 and L2, etc. Overall, multilingualism includes a wide range of areas and in each area, a wide range of dimensions. Thus, these factors have to be considered to define the phenomenon called multilingualism.

Defining multilingualism.

Many researchers use the terms ‘bilingualism’ and ‘multilingualism’ interchangeably to relate to the knowledge of more than one language. According to Sridhar (1996), multilingualism is more than just a magnified version of bilingualism. He categorized multilingualism in terms of individual and societal multilingualism. Individual Multilingualism is the capacity of a person to have competence in two or more

languages. Societal Multilingualism refers to the linguistic diversity that is present in the society. Societal multilingualism does not always imply to individuals. Multilingualism can also be classified according to the degree and manner of acquisition.

Degreee of Acquisition: It refers to the level of proficiency an individual has in the languages that he/she knows. If an individual has native-like control in all the languages he/she knows, then it is referred to as Ambilingualism. If an individual has an equivalent degree of competence in the languages he/she uses, is referred as Equilingualism.

Manner of Acquisition: It refers to how an individual is becoming a multilingual. The level at which an individual acquires the other languages is also taken into consideration. Natural bilingualism is when more than one language is acquired by the child, naturally at home. This takes place generally during childhood. When an individual learns other languages in a classroom or an artificial setting, it is termed as Artificial multilingualism. Occasionally, it is also referred to as Elective multilingualism, which can be during childhood and adulthood too.

Mansour (1993) classified multilingualism into two types: Horizontal multilingualism and Vertical multilingualism. Horizontal Multilingualism refers to speakers who stay in their own geographical area and are frequently monolingual. Vertical multilingualism is when, people belonging to different ethnic groups are in direct contact with other as they share a common territory and participate together in all socio-economic activities. The occurance of vertical multilingualism is more in the urban center in the multilingual countries where the individuals interact more routinely in different languages.

Another type of multilingualism is called as receptive multilingualism. It is a broader term and deals with the reading and understanding of other languages. According to ten Thije and Zeevaert (2007), receptive multilingualism is a constellation of language in which the individuals who take part in the conversation use their respective mother tongue while conversing with each other. In India, an individual uses different languages to communicate with different people and yet native-like competence is not a prerequisite for effective communication.

2.9.1 Multilingualism in India

India has been multilingual country right from the earliest times and English bilingualism has become an integral part of modern Indian consciousness. Multilingualism is expanding throughout the world and affecting nearly every community and country, although in extremely different manners. Societal bi/multilingualism is extremely common in India where greater numbers of people have at least two-three languages in their communication routine. Individuals may use one language to communicate at home, some other language at school and a third language to communicate in the community. Hence, today a greater number of young children are exposed to an environment where greater than one language is used. Acquiring multilingual competence has become an important part of every child's socialization.

According to Srivastava (1980), in India, not a single state is completely monolingual, modern Indian speakers do usea 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, multilingualism is a natural phenomenon of language behavior 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.

Few researchers state that when children learn two or more languages simultaneously, there may be mixing of languages to some extent, at the lexical level. There is a huge controversy regarding the amount of mixing that occurs and what is meant by it. A research by Goodz (1994), stated that during early childhood, mixing somewhat increases, peaks around 30 months, and then declines. In a number of communities, part of children's normal linguistic environment involves mixing of languages and switching from one language to another. Code-switching and language mixing are used for explicit communicative needs.

As the second language begins to predominate, children sometimes lose their first language skills (Fillmore, 1991). Due to the importance given to a particular language (e.g. English in the schools and society), children tend to gradually lose certain aspects of their first language. Language loss in bi/multilingual children involves more than just analyzing the language performance. Bi/multilingualism is both a linguistic and social phenomenon and involves the studying the sociolinguistic environment of the bi/multilingual child. Due to a variety of social forces, there is a negative impact on the maintenance of the minority languages, thus language loss will, in turn, affect the bi/multilingual children's language skills.

There has been lots of debate among the educators and researchers regarding the effects of bi/multilingualism on the children. Research dealing with bi/multilingualism

has often produced conflicting results (Grosjean, 1989). Some believe that bi/multilingualism has negative effects on the development of language while others argue that it has positive effects in terms of greater cognitive flexibility and creativity. Several models have been proposed to explain lexical organization in multilingual.

To conclude, the above studies cited provide few interesting findings that pertain to fast mapping of nouns and verbs in different populations and also in the context of monolingual and bi/multilingual children, in both western and Indian population. However, with the latter, there are very few studies related to fast mapping. Also, there are very few studies related to the fast mapping of verbs and studies related to fast mapping in multilingual typically developing children as well as the disordered population. From all these studies, the knowledge of fast mapping skills across the different disordered population, typically developing monolingual, and typically developing bi/multilinguals is clear though not exhaustive. Further, these studies reflect the significance of a number of exposures, influences of L1 vs. L2 and difference in the recall abilities. Literature has 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 the fast mapping abilities of nouns and verbs in multilingual (Hindi, English, Marathi, Sindhi, etc) children in the age range of 6-8 years using naming and recognition task.

Objectives of the study

The main objective of the present study was to investigate fast mapping abilities of nouns and verbs in multilingual children whose L1 was Hindi and L2 was English across recognition and naming tasks.

Further, study also examined,

1. Comparison of the novel word acquisition of nouns and verbs in multilingual children whose L1 was Hindi and L2 was English.
2. Comparison of the novel word learning of nouns and verbs in recognition and production task in L1 and L2 in multilingual children.
3. Comparison of immediate and delayed recall abilities of nouns and verbs in L1 and L2 in multilingual children.

3.1 Participants

32 typically developing multilingual children (both males & females) aged from 6-8 years were recruited on random basis. All multilingual children in this study were native speakers of Hindi, had English as the medium of instruction in their schools and were exposed to one or more languages apart from Hindi and English. To check their

language proficiency, language use questionnaire was administered on all participants (Shanbal & Prema, 2007).

3.1.1 Inclusion criteria

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

- Aged between 6-8years (males and females).
- Whose L1 was Hindi, while L2 was English and L3 was any other language. Their proficiency was checked using language use questionnaire (Shanbal and Prema, 2007) (Appendix C), in L1 and L2 only. Although L3 included Gujarati or Marathi language, no attempt was made to check proficiency in those languages nor was the language used in the present experiment.
- 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 visual abilities. Participants with normal vision and corrected to near normal vision.

Table 1:
Participants' details

Subjects	Age	Gender	L1 exposure in terms of %	L2 exposure in terms of %	Education
1	6	M	72	56	1st Grade
2	6	M	44	89	1st Grade
3	6	M	72	72	1st Grade
4	6	M	72	67	1st Grade
5	6	M	83	72	1st Grade
6	6	M	72	72	1st Grade
7	6	M	72	72	1st Grade
8	7	M	72	72	1st Grade
9	7	M	72	72	2nd Grade
10	7	M	61	67	2nd Grade
11	8	M	72	72	3rd Grade
12	8	M	67	67	3rd Grade
13	8	M	50	78	3rd Grade
14	8	M	50	78	3rd Grade
15	8	M	61	72	3rd Grade
16	8	M	72	72	3rd Grade
17	6	F	56	56	1st Grade
18	6	F	67	78	1st Grade
19	6	F	72	72	1st Grade
20	6	F	44	83	1st Grade
21	7	F	67	61	2nd Grade
22	7	F	50	67	2nd Grade
23	7	F	50	56	2nd Grade
24	7	F	61	67	2nd Grade
25	8	F	83	72	2nd Grade
26	8	F	61	83	3rd Grade
27	8	F	67	67	3rd Grade
28	8	F	72	72	3rd Grade
29	8	F	61	72	3rd Grade
30	8	F	72	83	3rd Grade

31	8	F	72	72	3rd Grade
32	8	F	72	72	3rd Grade

Notes: L1: Hindi 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 cross conditional comparison

3.1.3 Stimuli preparation

1. 24 novel words (nouns and verbs) were randomly selected from the ICSE Hindi and English text books of grade III to grade V (Appendix A & B). Objects or actions which were commonly named in their second language were excluded to minimize the inaccurate responses.
2. These novel words were given to two speech language pathologists and two teachers to rate using a two point rating scale (0-Familiar and 1-Unfamiliar).
3. 6 nouns and 6 verbs which were rated as '1-Unfamiliar' by at least one speech language pathologist and one teacher, in each language were selected for the current study.
4. In addition to the familiarity rating, 10 children in the age range of 6-8 years were checked on familiarity of the words. The children were asked to name the pictures in L1, L2 and L3. The words which were unfamiliar to the participants were selected as novel words.

5. Novel word is any word which is new and not present in the vocabulary of a group of 6 to 8 year old typically developing children. These novel words were checked for equal word length, phonological complexity and cultural aspects.

Thus, 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 for nouns and next set for verbs. This was followed for both Hindi and English novel words. The design of novel words selection is depicted in Figure 1.

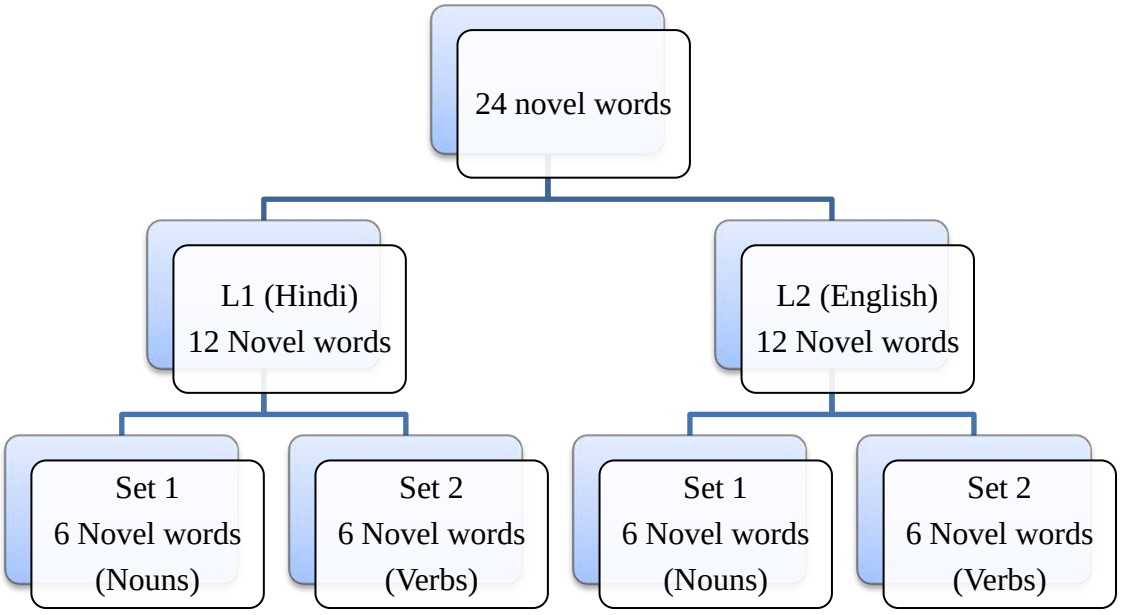

Figure 1: Design of novel words selection

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 was varied with the type of stimuli (nouns or verbs). Second power point set was used for naming task and the third set was used for recognition task. In this manner, sets of power point files were prepared for both Hindi 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. The study included three phases i.e., the evaluation phase, the training phase and the response phase. The training phase was further divided into two phases i.e., phase I and phase II and the response phase included two tasks namely, the recognition task and the production task.

Evaluation Phase.

In this phase, to check the novelty of the words, each participant was asked to name the pictures one by one either in L1, L2 or any other language. If child was not able to name the particular novel word then those words were assumed as novel words for further procedures and testing was continued. Prompts or visual feedback was not provided during this period.

Training Phase.

Phase I.

In this phase, each novel word (nouns) was introduced in each language for 5 times in visual and auditory mode simultaneously in laptop using Keynote software version 7.2 (4582). The participants were instructed to listen and watch carefully the novel word. After every set of novel words, immediate recall followed by delayed recall was measured with the time gap of minimum 4 hours for delayed recall.

Phase II.

Same procedure was used for the second phase. Here next 6 new set of novel words (verbs) were presented for 5 times.

Counter balancing of the task was done. Where 16 children underwent phase I training first followed by phase II training. And next 16 children underwent phase II training first followed by phase I.

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

Recognition task.

In recognition task, children were given 4 pictures consisting of a trained target novel word and three other non-trained novel words. Child was asked to give a '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 a book? (For trained target novel word- Book). Then the child had to respond "yes" or "no". These trained novel pictures were presented via laptop (Macbook Pro 13 inches with macOS Sierra operating system) along with pictures of word which was given as choice. Child scored '1' for every correct response.

Production/ Naming task.

Child was presented with each novel word picture through laptop and was asked to name it and score '1' was given for naming the picture in the desired language correctly. To rule out the familiarity of the responses due to recognition and production task, counter balancing of the task was done. Here 16 children performed recognition task first followed by production task. And next 16 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.

3.3 Scoring and Analysis

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

1. L1 and L2 (Hindi and English)
2. Nouns and verbs 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 two participants were entered into SPSS (Version 17) 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 of nouns and verbs in multilingual children using naming and recognition tasks. Statistical analysis was done to measure naming and recognition responses in multilingual children between 6-8 years in the following conditions:

a) Fast mapping abilities of nouns and verbs in multilingual children across L1 (Hindi) vs. L2 (English).
b) Effect of nouns and verbs on fast mapping abilities for recognition and production task across L1 (Hindi) and L2 (English) in multilingual children.
c) Immediate (I) vs. Delayed recall (D) abilities of novel word learning of nouns and verbs in L1 and L2 in multilingual children.

Following statistical measures were applied to the data collected for naming and recognition scores obtained from 32 multilingual children:

a) Descriptive statistical analysis was done for naming and recognition scores across the above mentioned three conditions.
b) Non parametric Wilcoxson Signed rank test was applied on the data to examine pair wise difference between the conditions.

Descriptive statistics was applied for measures of naming and recognition across age groups 6-8 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, N vs. V 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 significant difference in within subject effects, between subject effects across conditions. To observe effects of languages (L1 vs. L2), Nouns vs. Verbs and Immediate vs. Delayed recall abilities on recognition and production tasks, Wilcoxson Signed rank test was applied on the data to examine the statistical significance between the conditions.

There were sixteen variables studied.

Table 2:

Expansion of variables measured in the study

Conditions	**Expansion**
ENI	English Nouns Immediate Recall
END	English Nouns Delayed Recall
EVI	English Verbs Immediate Recall
EVD	English Verbs Delayed Recall
HNI	Hindi Nouns Immediate Recall
HND	Hindi Nouns Delayed Recall
HVI	Hindi Verbs Immediate Recall
HVD	Hindi Verbs Delayed Recall

Note:
H: Hindi (L1) and E: English (L2), N: Nouns and V: Verbs
I: Immediate Recall and D: Delayed Recall

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

Objective 1: Fast mapping abilities of nouns and verbs in multilingual children in L1 (Hindi) vs. L2 (English): Naming & Recognition

The mean, median and standard deviation measures were compiled for ENI, HNI, END, HND, EVI, HVI, EVD and HVD. To compare the performance of multilingual group for their fast mapping abilities across Hindi (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 6-8 years.

Variables	**Naming**			**Recognition**		
	Mean	**S.D**	**Median**	**Mean**	**S.D**	**Median**
HNI	1.969	1.2044	2.000	5.938	0.2459	6.000
ENI	2.281	1.6111	2.000	5.875	0.3360	6.000
HND	1.844	1.2472	2.000	5.688	0.4709	6.000
END	2.094	1.5316	2.000	5.438	0.7594	6.000
HVI	0.688	0.9651	0.000	5.969	0.1768	6.000
EVI	2.000	1.7227	1.000	5.938	0.2459	6.000
HVD	0.594	0.9456	0.000	5.719	0.4568	6.000
EVD	1.906	1.6136	1.000	5.656	0.4826	6.000

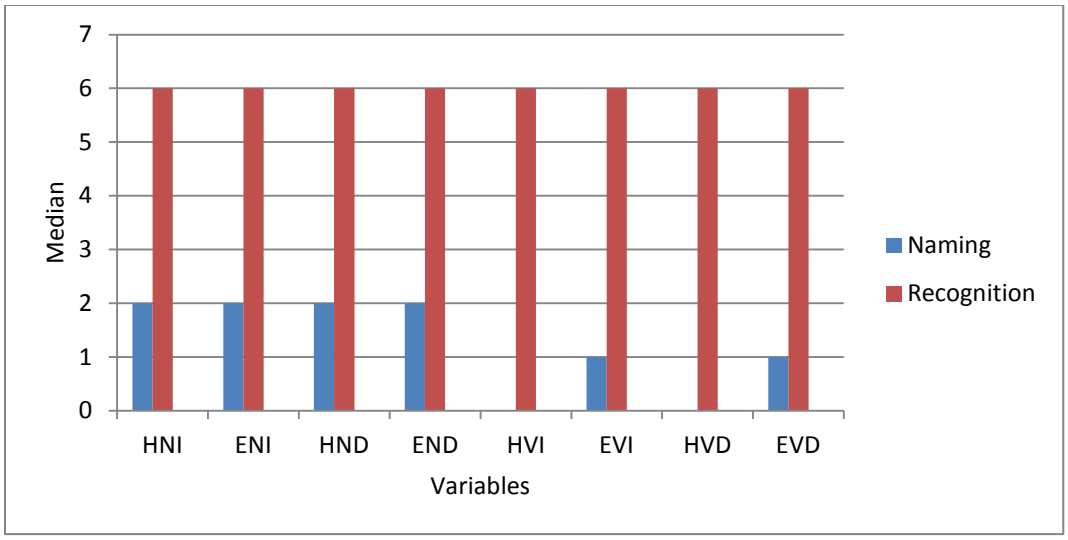

Figure 2: Median of Naming & Recognition in Hindi & English across 6-8 years multilingual children**.**

From Table 3 and Figure 2, it was noted that there was no difference in median values between L1 (Hindi) Vs. L2 (English) for nouns in multilingual children between age range of 6-8 years, wherein median values were equal for L1 and L2 in both recognition and naming task. Also, there was no difference in the median values between L1 (Hindi) and L2 (English) for verbs in multilingual children between age range of 6-8 years in the recognition task. However, there was a difference in the median values between L1 (Hindi) and L2 (English) for verbs in multilingual children between age range of 6-8 years for the production task, wherein the median values were greater for L2 (English) than L1 (Hindi). The performance was better in L2 for variables like HVI-EVI and HVD-EVD. Broadly comparing recognition and naming scores in this group, children performed better in recognition than naming based on median measures. Further, 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 6-8 years multilingual children were tabulated in table 4.

Table 4:

Comparison of performance across L1 vs. L2 in 6-8 year old children in naming and recognition tasks.

Pairs	Naming		Recognition	
	Z	**P value**	**Z**	**P value**
HNI - ENI	-1.34	0.179	-1.000	0.317
HND - END	-1.080	0.280	-1.795	0.073
HVI - EVI	-3.720	0.000*	-1.00	0.317
HVD - EVD	-3.765	0.000*	-0.707	0.480

Note: *p<0.05-significant difference

From Table 4, test results revealed that there was no significant difference found in L1 vs. L2 for nouns in 6-8 years multilingual children across naming and recognition task. Also, test results revealed that there was no significant difference found in L1 vs. L2 for verbs across 6-8 years multilingual children in recognition task. However, a significant difference was found in L1 vs. L2 for verbs in 6-8 years multilingual children in the naming task for variables like HVI-EVI ($|z|=3.720$, $p=0.000$) and HVD-EVD ($|z|=3.765$, $p=0.000$). From median scores and Wilcoxon signed rank test it was evident that L2 scores was better than L1 for verbs, wherein statistical significance was seen in the naming task. Further, performance in both L1 and L2 was better in recognition than in the production/naming task.

Hence, on comparing recognition skills and production skills across Hindi and English, language had effect on the fast mapping abilities only in naming, wherein the naming was better in English compared to Hindi for verbs, which was evident from median scores. There are three possible explanations for this; one could be due to language exposure at home as well as in school. The children are exposed to English,

both at home and in school whereas; they are exposed to Hindi mostly only at home. Hence, exposure to Hindi is much restricted compared to English. Secondly, language proficiency could have effect on fast mapping abilities across L1 and L2. Wherein, in the present study, children were proficient in English than in Hindi and this could have been one of the contributing factors for better L2 naming in the group. The higher scores obtained in L2 supports the view that as language proficiency increases, it becomes easier to retrieve the words faster as there may be a larger association between the lexical forms and semantics (Kroll & Stewart 1994; Kroll & de Groot 1997). Previous studies showed similar findings in fast mapping abilities in naming task, wherein it was found that L3 novel words were better acquired than L1 novel words (Nair, Ranjini, Bhat, & Shyamala, 2011), which was attributed to language proficiency in the participants. Thirdly, the children in the present study had more opportunities to converse in English than in Hindi. Thus, novel word learning is not only an idiosyncratic reflection of a subject's personal linguistic history, but that generalizations are possible involving such factors as language proficiency, degree of exposure and opportunities for frequent conversational use.

Similar results are seen in the study by Kan and Kohnert (2005). In their study, they used picture-identification and picture-naming tasks to assess the receptive and the expressive vocabulary of the children in the age range of 3.4-5.2 years in the US. The children were learning both Hmong (L1) and English (L2). For all the participants, Hmong was used at home, English and Hmong in the preschool, and English was the major language of the community. For older preschool children, they reported stabilization or a plateau in lexical development of L1 (Hmong). Also, there were notable gains in L2 (English) vocabulary, in contrast to the lack of gains in Hmong vocabulary.

In other studies, in which systematic support was provided to the minority language, the typically developing children in preschool programs showed gains in both L1 (Spanish) and L2 (English) (Rodriguez, Diaz, Duran & Espinosa, 1995; Winsler, Diaz, Espinosa & Rodriguez, 1999; Diaz-Campos, 2004).

But on contrary, it was observed that recognition skills were not affected by language (L1 or L2). Hence, it can be assumed that children in this age range acquire receptive vocabulary in the same pattern irrespective of the languages 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 (Gathercole & Baddeley, 1993), similar performance was noticed in both the languages. Another influencing factor could be, the nature of modality of performance of task. Since recognition does not involve active retrieval, it does not require more episodes of exposures to the novel words in order fast map these into the lexical memory. Also, probably the recognition 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 the recognition task, wherein children began acquiring the novels word better in their L1 or mother tongue, when compared to second language. A study by Deepak (2016), which is in consonance with Van Horn and Kan's study in 2016. He explored the fast mapping abilities in novel word learning in bilingual children aged from 5-8 years, whose L1 was Kannada and L2 was English, using naming and recognition task. Children learnt new words with a single exposure by fast mapping the new word and results revealed that recognition was especially easier for the children compared to naming task. He also

concluded that bilingual children are better off in fast mapping skills in their native language compared to their second language which was attributed to the magnitude of language exposure, the environment he/she is exposed to and proficiency of language.

Few studies have found similar results where children outperformed in L1 compared to L2. Kan and Kohnert (2008) investigated the relationships between age, existing vocabulary knowledge, and the fast mapping skills in both the languages of typically 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 and they concluded that L1 fast mapping and L2 vocabulary have significant positive and negative cross-language correlation respectively.

Objective 2: Comparison of the novel word learning of nouns and verbs in recognition and production task in L1 and L2 in multilingual children.

The mean, median and standard deviation measures were compiled for ENI, EVI, END, EVD, HNI, HVI, HND and HVD. To compare the performance of multilingual group in their fast mapping abilities across nouns and verbs, values are tabulated in Table 5.

Table 5:
Mean, Median and Standard deviation measures for Nouns vs. Verbs in naming and recognition task across 6-8 years multilingual children.

Variables	Naming			Recognition		
	Mean	**S.D**	**Median**	**Mean**	**S.D**	**Median**
ENI	2.281	1.6111	2.000	5.875	0.3360	6.000
EVI	2.000	1.7227	1.000	5.938	0.2459	6.000
END	2.094	1.5316	2.000	5.438	0.7594	6.000
EVD	1.906	1.6136	1.000	5.656	0.4826	6.000
HNI	1.969	1.2044	2.000	5.938	0.2459	6.000
HVI	0.688	0.9651	0.000	5.969	0.1768	6.000
HND	1.844	1.2472	2.000	5.688	0.4709	6.000
HVD	0.594	0.9456	0.000	5.719	0.4568	6.000

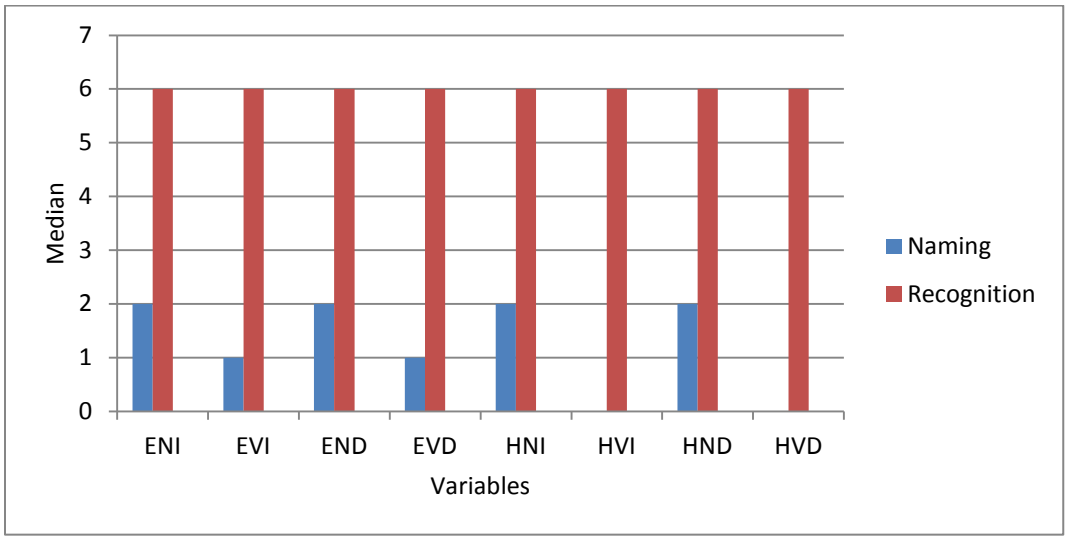

Figure 3: Median of Naming & Recognition in Nouns vs. Verbs across 6-8 years multilingual children**.**

From Table 5 and Figure 3 it was inferred that there was difference in median values of naming task between nouns and verbs across 6-8 years age group, wherein it was higher for nouns in naming task compared to verbs for variables like EVI-ENI, EVD-END, HVI-HNI and HVD-HND. However, there was no difference in median

values between nouns vs. verbs for the recognition task in multilingual children between age ranges of 6-8 years. Further, the performance was better overall for recognition task compared to the naming task for both the nouns as well as for the verbs in this group. Wilcoxson Signed rank test was applied on the data to examine pair wise statistical significance between subject's effect on nouns vs. verbs for both naming and recognition in 6-8 years multilingual children. The scores are tabulated in table 6.

Table 6:

Comparison of performance across nouns and verbs in 6-8 year old multilingual children in naming and recognition task.

Pairs	**Naming**		**Recognition**	
	Z	**p value**	**Z**	**p value**
EVI - ENI	-1.61	0.106	-1.000	0.317
EVD - END	-1.197	0.231	-1.470	0.142
HVI - HNI	-4.557	0.000*	-1.00	0.317
HVD - HND	-4.395	0.000*	-0.447	0.655

Note: *p<0.05-significant difference

From Table 6, on analysing the effect of nouns vs. verbs for naming task significant differences were found across nouns and verbs in variables like HVI-HNI (|Z |=4.557,p= 0.000), and HVD-HND (|Z|=4.395,p= 0.000). However, on observing results of recognition task on nouns vs. verbs, no significant difference was found. From median measures and Wilcoxon signed ranked test revealed performance for nouns was better than verbs for the naming task in L1 (Hindi). Further, the performance was better in recognition task than naming task for both nouns and verbs.

Hence, on comparing the novel word learning of nouns and verbs in multilingual children, it was found that the performance for nouns was superior to that of verbs for the

naming task. This could be due the following reasons: (a) Noun referents are more imageable or concrete than verb referents, which are less imageable or more abstract (Gentner, 2006; McDonough, Song, Hirsh-Pasek, Golinkoff, & Lannon, 2011); (b) Verb referents are momentary and fleeting, whereas noun referents are steady/stable, present at the time, and more definite/ perceptible (tangible) (McDonough et al., 2011); (c) Verbs take arguments and thus, they are essentially described by relations among nouns and are learned after some basic requisite nouns have been acquired (Gleitman, Cassidy, Nappa, Papafragou, & Trueswell, 2005).

Previous studies on novel verb learning suggest that, in children, the representation of verb meanings at the beginning (initial) stages is not complete and therefore, weak (fragile). However, they do learn verbs as early as 18 months but require some time to acquire meaning for many verbs like adults. Studies have shown that children map a novel noun to its referent without any difficulty than they map a novel verb to its referent (Cassasola & Cohen, 2000; Childers & Tomasello, 2002; Werker, Cohen, Llyod, Casasola, & Stager, 1998). Also, noun learning is invariably effortless than verb learning, and is not dependent on the distributional and structural properties of language that the children are acquiring (Gentner, 1982).

Also, vocabulary development is highly variable in typically developing children and is dependent on many factors like exposure to the 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. Studies have shown that nouns are generally easier to acquire than verbs (MacNamara, 1972; Gentner, 1982;

Woodward & Markman, 1998; Gentner & Boroditsky, 2001; Bornstein, Cote, Maital, Painter, Park, Pascual, & Vyt, 2004; Bornstein, & Cote, 2005; Waxman & Lidz, 2006; Maguire, Hirsh-Pasek & Golinkoff, 2006). Potter et al, (1984) researched that vocabulary development in younger children is more lexically mediated than in older children. Thus, nouns tend to be acquired before verbs (Gentner, 1982) and dominate the early lexicons of the children's (Goldin-Meadow, Seligman & Gelman, 1976; Fenson, Dale, Reznick, Bates, Thal & Pethick, 1994).

On the contrary, some researchers, believe that if verbs predominate in the input then verbs can be learnt faster compared to nouns (Choi & Gopnik, 1995; Tardif, 1996). In languages like Korean, Japanese, and Chinese, arguments for both subjects and objects are often dropped from the sentence. Due to which, verbs are prone to appear more often than nouns in the maternal input (Choi & Gopnik, 1995; Tardif, 1996; Kim, McGregor, & Thompson, 2000; Ogura, 2001). Thus, they predicted that the children who are acquiring these languages should learn verbs earlier, and more easily, than nouns (Choi & Gopnik, 1995; Tardif, 1996). However, mixed results are observed in respect to, whether Japanese, Korean, or Chinese speaking children acquire verbs earlier than nouns. Few studies have reported the dominance of verbs in Korean speaking (Choi, 2000) and Mandarin speaking (Tardif, 1996) children's initial expressive vocabularies. Few other studies reported the roughly similar quantity of nouns and verbs (Choi & Gopnik, 1995). Other studies presented that the percentage of nouns was more than verbs in 'verb-friendly' languages also, including Japanese (Ogura, 2001; Yamashita, 1997), Korean (Au, Dapretto, & Song, 1994; Kim et al., 2000), Italian (Caselli et al., 1995), and Navajo (Gentner & Boroditsky, 2001) children. Gentner (1982) claimed that the noun bias is

universal and nouns are acquired relatively easily than verbs even when the input frequency is controlled (Leonard, Schwartz, Morris, & Chapman, 1981; Rice & Woodsmall, 1988; Merriman, Marazita, & Jarvis, 1993; Imai, Haryu, & Okada, 2005).

Though, children use more nouns, they may display lesser noun-bias in reception. By the age of two years, children tend to comprehend almost an equal quantity of nouns that they express (Goldin-Meadow, Seligman, and Gelman, 1976). However, for verbs, the children can comprehend three verbs for every one verb expressed. Thus, the lag between comprehension and production is relatively greater for verbs than that for nouns (Goldin-Meadow, et al., 1976). Similarly, Childers and Tomasello (2002) also reported that when the children are taught novel words, they express more number of the nouns, but comprehend an equal number of nouns and verbs.

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

The median and standard deviation measures were compiled for ENI, END, EVI, EVD, HNI, HND, HVI and HVD. To compare the performance of multilingual 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 Immediate and Delayed Recall tasks for Nouns vs. Verbs in naming and recognition task across 6-8 years multilingual children.

Variables	Naming			Recognition		
	Mean	**S.D**	**Median**	**Mean**	**S.D**	**Median**
ENI	2.281	1.6111	2.000	5.875	0.3360	6.000
END	2.094	1.5316	2.000	5.438	0.7594	6.000
EVI	2.000	1.7227	1.000	5.938	0.2459	6.000
EVD	1.906	1.6136	1.000	5.656	0.4826	6.000
HNI	1.969	1.2044	2.000	5.938	0.2459	6.000
HND	1.844	1.2472	2.000	5.688	0.4709	6.000
HVI	0.688	0.9651	0.000	5.969	0.1768	6.000
HVD	0.594	0.9456	0.000	5.719	0.4568	6.000

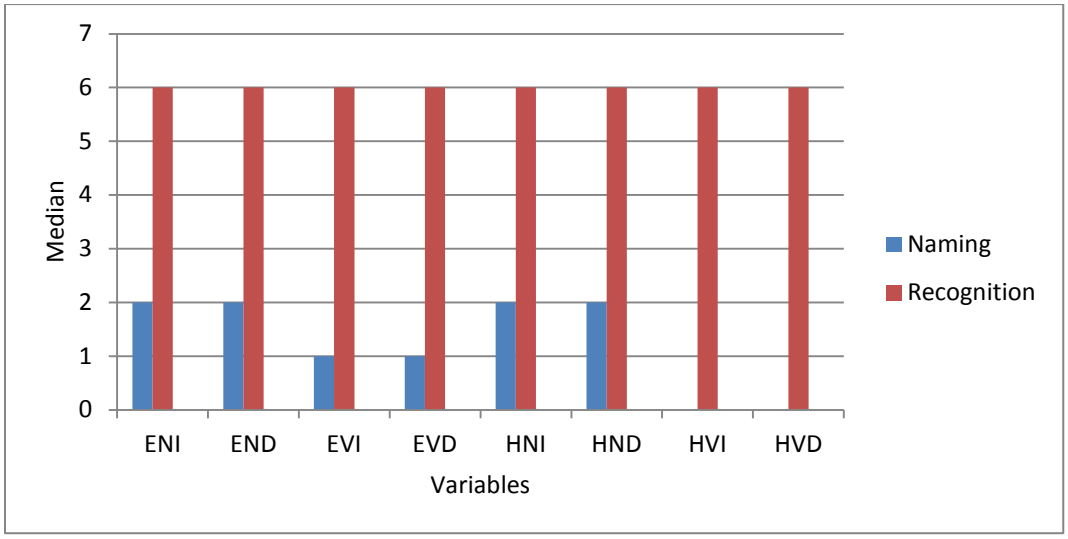

Figure 4: Median of Naming & Recognition in Immediate and delayed recall across 6-8 years**.**

From Table 7 and Figure 4 it was inferred that there was no difference in median values of naming and recognition between immediate vs. delayed recall task. Overall,

recognition scores are superior to naming score for both immediate and delayed recall tasks. Further, Wilcoxson 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 6-8 year old multilingual children. Results of pair wise comparison are tabulated in Table 8.

Table 8:

Comparison of performance in conditions Immediate recall vs. Delayed recall in 6-8 years old Multilingual children in naming and recognition tasks.

Pairs	**Naming**		**Recognition**	
	Z	**p value**	**Z**	**p value**
END - ENI	-1.857	0.063	-3.500	0.000**
EVD - EVI	-1.732	0.083	-3.00	0.003**
HND - HNI	-1.414	0.157	-2.828	0.005**
HVD - HVI	-1.342	0.180	-2.828	0.005**

Note: *p<0.05-significant difference, and **p<0.01-Highly significant difference

From Table 8, results revealed no significant difference in naming tasks across all the variables. On observing the results of recognition task on immediate and delayed recall, revealed highly significant difference in conditions END-ENI (|Z| =3.500, p=0.000), EVD-EVI (|Z|=3.00, p=0.003), HND-HNI (|Z|=2.828,p= 0.005) and HVD-HVI (|Z| = 2.828,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 multilingual children in 6 to 8 years range, was better on immediate recall in comparison with delayed recall. 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 than older memory which 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 found 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 inturn 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 with the studies by Trupthi (2009) and Deepak (2016).

Considering the main objective of the study to compare recognition and naming abilities across all the conditions, a 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 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 non-linguistic 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 L2 compared to L1 in the naming task for verbs on comparing the effect of L1 vs. L2. Particularly, it was found that participants performed better in recognition than naming task in both the languages.

3. Children performed better on nouns compared to verbs in naming task in L1. 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 multilingual children using naming and recognition task. In this study, 32 multilingual children aged from 6-8 years were recruited on random basis, whose L1 was Hindi and L2 was English. Children were trained for set of novel words in both Hindi and English, wherein for each language two set of words, were used. Each set consisted of 12 novel words. Out of the twelve words, six words were nouns and another six words were verbs. 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 explored and studied across three conditions; i) Effect of Hindi (L1) and English (L2), ii) Effect of category (nouns vs. verbs) and iii) Immediate vs. delayed recall abilities in fast mapping. In each condition, scores were separately calculated for each participant and overall data was statistically analysed using SPSS software version IBM 17. The data was subjected to descriptive statistics and based on the normality criteria, non-parametric tests were employed.

On examining effect of language (Hindi vs. English) across recognition and naming tasks, results indicated novel word learning was better in L2 (English) than L1 (Hindi) for verbs during the naming task. This was attributed to magnitude of language exposure, the environment the child is exposed to and proficiency of language. In the present study, children were more proficient in English than Hindi. On examining effect of nouns vs verbs, results revealed that novel nouns had superior scores compared to novel verbs and this could be because noun referrants are more imageable, concrete,

stable and tangible compared to verbs, which are less imageable, abstract, momentary and fleeting. Also, verbs take arguments and thus, they are essentially described by relations among nouns and are learned after some basic requisite nouns have been acquired. Thus, mapping a novel verb to its referrant is more difficult than mapping a novel noun to its referrant. Results on 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 multilingual children are better off in fast mapping skills in their proficient language compared to their native language. The factors that play crucial role in the process of fast mapping in 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

- This study can be utilized as reference for further studies to see how learning of novel word takes place in L1 and L2 in multilingual language disordered population as compared to typically developing multilingual children.
- The process of fast mapping can be employed as a strategy in order to further enhance the vocabulary of children.
- The effect of practice trial in the clinical population can be provided in future by understanding the lexical connections for novel word learning through both visual and auditory modes.
- The results of the study can be used to design intervention procedure in language disordered multilingual population. The deficiency in their vocabulary can be enhanced by using the strategies of fast mapping as used in this study.
- This study gives an insight about how novel word learning takes place in multilingual 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 studied across different lexical categories like noun v/s verbs across different age groups.
- 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 compared between various types of multilingualism.
- Fast mapping can also be studied in L3 and L4 of typically developing multilingual children.
- Fast mapping abilties can be studied with contextual effect using stories.
- Fast mapping abilities can be studied in terms of lexical or semantic features.
- Effect of word length on fast mapping skills can be studied.
- Reaction time taken for learning novel words can be incorporated in future studies.

Limitations of the study

- Better conclusions could have been obtained about fast mapping abilities in multilingual children if large number of subjects were recruited.
- 1-4 syllable words were selectedas 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.
- Multilingual issues were not probed in the present study, since L1 & L2 were only focused. Three or more languages within the environment may be considered in the future studies.

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Appendix (A)

HINDI NOVEL WORDS

SRNO.	NOUNS		VERBS	
	Set 1		Set 2	
1	/Upgrah/	उपग्रह	/tartaranɑ/	टरटराना
2	/ʤwɑlɑmukhi/	ज्वालामुखी	/risnɑ/	रिसना
3	/langar/	लंगर	/ektak/	एकटक
4	/ʧʰaʧʰundar/	छछूँदर	/kutarnɑ/	कुतरना
5	/aʃtakon/	अष्टकोना	/ʧingɑːdnɑ/	चिंघाड़ना
6	/upkaran/	उपकरण	/ʧugnɑ/	चुगना

ENGLISH NOVEL WORDS

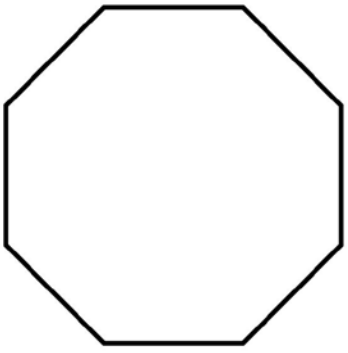
SR NO.	NOUNS		VERBS	
	Set 1		Set 2	
1	Bagpipe	/bœgpɑip/	Broadcasting	/brɔdkɑsting/
2	Algae	/œlge/	Castling	/kœsling/
3	Saxophone	/sœxafon/	Hibernating	/hɑibarneting/
4	Oasis	/oesis/	Wobbling	/vɔbling/
5	Constellation	/kɔnstileʃan/	Harvesting	/hɑrvœsting/
6	Microscope	/maikroskop/	Mining	/mɑining/

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

Appendix (B)

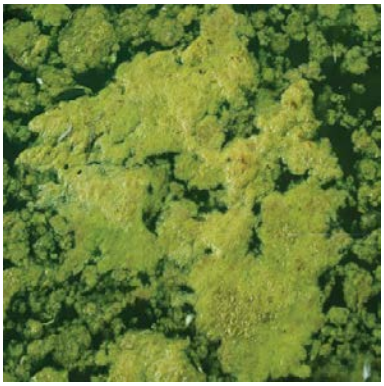
Pictures used to teach novel words

Set1-Hindi (Nouns)

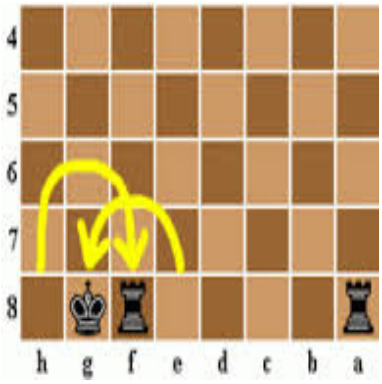


Set 2- Hindi (Verbs)

Set 1- English (Nouns)



Set 2- English (Verbs)



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.

Date:

Name of child: Age/Sex:

School: Grade:

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 Hindi):

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?