

# **Lexical-Semantic Organization in Bilingual Children**

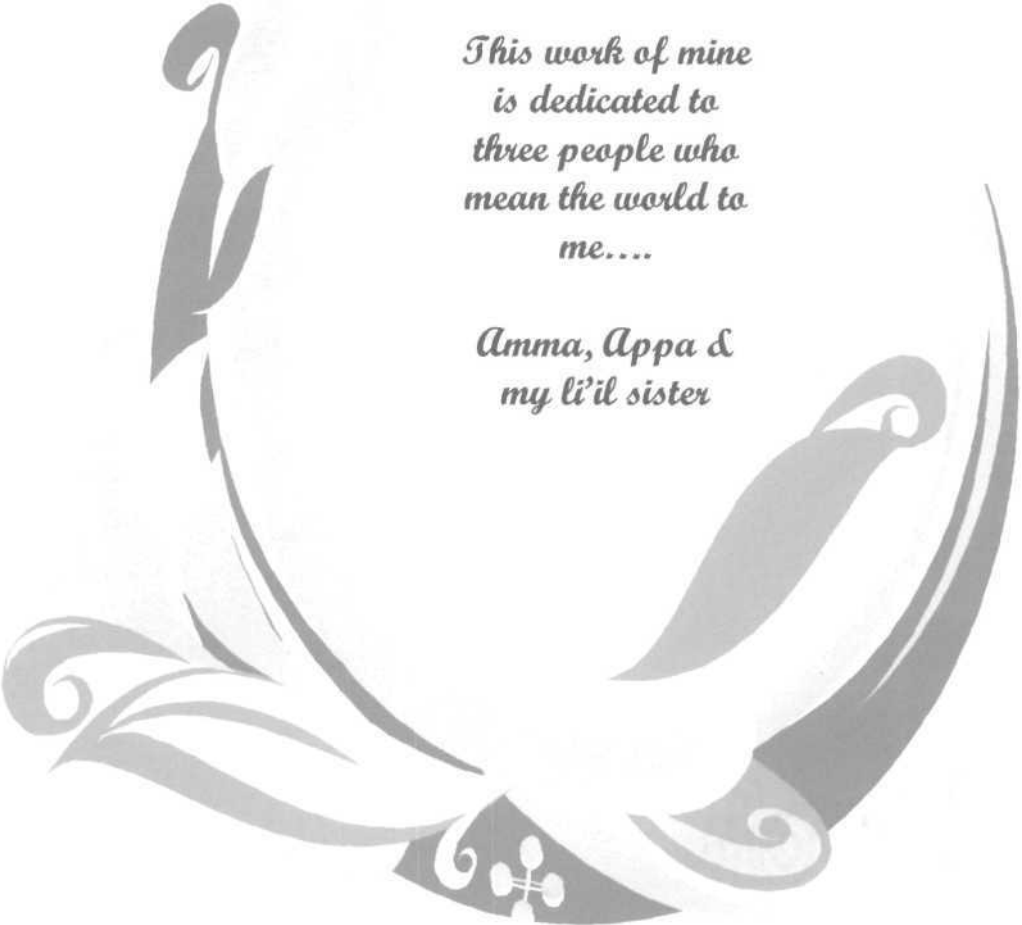
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ALL INDIA INSTITUTE OF SPEECH AND HEARING  
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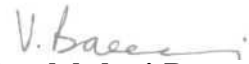


*This work of mine  
is dedicated to  
three people who  
mean the world to  
me....*

*Amma, Appa &  
my li'il sister*

## CERTIFICATE

This is to certify that this dissertation entitled "**Lexical-Semantic Organization in Bilingual Children**" is a bonafide work in part of fulfillment for the degree of Master of Science (Speech Language Pathology) of the student with Registration number 06SLP004. This has been carried under the guidance of a faculty of this institute and has not been submitted earlier to any other university for the award of any diploma or degree.



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## CERTIFICATE

This is to certify that the dissertation entitled "**Lexical-Semantic Organization in Bilingual Children**" has been carried out under my supervision and guidance. It is also certified that this has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Guide

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## **DECLARATION**

I hereby declare that this dissertation entitled "**Lexical-Semantic Organization in Bilingual Children**" is the result of my own study and has not been submitted earlier in any other University for the award of any other Diploma or Degree.

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April, 2008.

**Register No. 06SLP004**

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# **LEXICAL SEMANTIC ORGANIZATION IN BILINGUAL CHILDREN**

## **CHAPTER I**

### **INTRODUCTION**

All living creatures communicate and only human beings exchange information using a code that we call language. Language can be defined as a socially shared code or conventional system for representing concepts through the use of arbitrary symbols and rule-governed combination of the symbols (Owens, 2000). Language is a complex combination of several component rule system comprising of phonology, lexical, semantic and pragmatic aspects. The above are further divided into three major components, based on their functions: form, content and use (Bloom and Lahey, 1978).

The acquisition of language in children, which is a complex phenomenon, has been studied extensively. Since language incorporates phonology, lexical, semantic, syntactic and pragmatic aspects, development of skill in each of these components is crucial. The linguistic component of meaning, that is lexical-semantics, is perhaps the most complex and the least understood.

The lexical aspect of language is defined as the words of the language. When a child learns about the meaning of a word, it is stored at the lexical level. This level is the component of a more general semantic level.

Semantics, takes into account individual meaning of words, also known as lexical meaning. It encompasses the relationships between words and their semantic roles. Significant development in both of these dimensions is clearly evident in children in their pre-school years. Children learn words daily without any efforts.

Similarly, they will begin to combine words in ways that reliably indicate the relationships that they perceive among objects and events around them.

The growth of vocabulary continues throughout a person's lifetime. Through the school years, words are added to the speaker's vocabulary. This acquisition of vocabulary involves more than adding items to one's lexical list. It also involves the sorting of words into categories.

One of the changes seen in children's processing and organization of words is called as the syntagmatic-paradigmatic shift (Ervin, 1961). Over the past decades, researchers have studied this phenomenon through various paradigms. One such paradigm, which has been used extensively, is the word association task. A word association paradigm is an experiment where the children are required to say the first word that comes to their mind with respect to the word presented.

In a word association task, the pre-school child is likely to respond to a word according to its syntactic role. The child processes and organizes the stimulus word according to the word that is likely to follow it in a sentence. As children change their cognitive processing strategies, they respond to words in a paradigmatic manner, based on the semantic features of the word he or she hears. This shift from syntagmatic to paradigmatic occurs slowly, but the most rapid change is observed between five and nine years, and the shift is not complete until adulthood.

During the process of language acquisition, children often learn more than one language. The term bilingual refers to individuals who can function in more than one language. Bilingualism is an integral product of globalization and social mobility.

Bloomfield (1933) defined bilingualism as “native like control of two languages”. In recent years, researchers have been actively involved in studying bilingual acquisition. Language acquisition in a bilingual child is equally complex and intriguing phenomenon. This acquisition of the second language depends on the environment the child is exposed to and can occur, either sequential or simultaneous. A bilingual child differs from a monolingual child, in the sense, that the former has to add words of both the languages into his or her mental lexicon.

The nature of bilingual lexical organization is an enduring question in bilingual research (Snodgrass, 1984). Over the past couple of decades, much of the research conducted in bilingualism, has been concerned with the organization of a bilingual’s two languages. Studies on the organization of semantic lexicon in bilingual children have used methods of priming, translation paradigm and word association tasks. One of the most popular paradigms used is the word association task. Recent studies on bilingual children/adults using word association tasks have also shown a shift from syntagmatic to paradigmatic relation (Söderman 1993; Namei 2004). This indicates that the first and second language mental lexicons are not as different from each other (Meara 1984).

In the Indian context, the acquisition of English as a second language occurs mostly in the school age. Studies of bilingual children’s lexical semantic organization can provide much needed information about the development of the two linguistic systems



### **Need for the study**

Bilingualism in India is different from that prevalent in the countries such as Europe and America. In the light of this situation, generalization of the Western research findings to the Indian context is not appropriate. Investigating word association pattern bilingual children learning Indian English are necessary. Therefore, the present study is designed to investigate lexical-semantic development by adopting word association paradigm.

Hence the objectives of the present are three-fold

1. To compare the development of lexical-semantic organization in the two languages of bilingual children.
2. To compare the lexical-semantic organization in Kannada language of Kannada-English bilingual children with that of monolingual children.
3. To examine the effect of bilingualism on lexical-semantic organization.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

Language is one of the most mysterious products of human mind. It is a means of communication and socialization as well as a vehicle for thought. It is highly complex and is learned incredibly rapidly.

Language can be defined as a socially shared code or conventional system for representing concepts through the use of arbitrary symbols and rule-governed combination of symbols (Owens, 2000).

Language is a complex combination of several component rule system and it can be divided into three major components: form, content and use (Bloom and Lahey, 1978). Here, the form encompasses the area of phonology, morphology and syntax, whereas, language content and use encompasses semantics and pragmatic respectively. The components of language overlap and in some cases the determination of the component is arbitrary. The rules in each of the component are mastered simultaneously and not sequentially.

Since language incorporates phonology, lexical, semantic, syntactic and pragmatic aspects, development of skill in each of the above is crucial. The linguistic component of meaning, that is lexical-semantics, is perhaps the most complex and the least understood.

The lexical aspect of language is defined as the words of the language. When a child learns about the meaning of a word, it is stored at the lexical level. This level is the component of a more general semantic level. Semantics, takes into account

individual meaning of words, also known as lexical meaning. It encompasses the relationships between words and their semantic roles.

Often, during the process of language acquisition, children learn more than one language. Language acquisition in a bilingual child is equally complex and intriguing phenomenon. A bilingual child differs from a monolingual child, in the sense, that the former has to add words of both the languages into his or her mental lexicon.

Bloomfield (1933) defined bilingualism as the native-like control of two languages. However, this is a rather strict view of bilingualism and one that limits the number of individuals or groups that could be classified as bilinguals. On the other hand, Haugen (1953) defined bilinguals as individuals who are fluent in one language but who “can produce complete meaningful utterances in the other language”. Diebold (1965) saw bilingualism as including simply passive knowledge of the written language or any contact with a second language and the ability to use it in the environment of the native language.

According to the cognitive organization, bilinguals can be divided into compound or coordinate bilinguals. Compound bilinguals are thought to be individuals who have learnt both languages in the same context, or learned the second language through translation. Compound bilinguals attribute identical meanings to corresponding words and expression in their two languages. This is achieved generally through learning another language in school situation, or through acquiring two languages at home where both are spoken interchangeably by the same people in the same situations.

Coordinate bilinguals are thought to be those who have acquired two languages in different contexts and are thus better able to keep both languages apart. They derive different or partially different meanings from words in the two languages. The distinction in meaning is thought to arise from learning the two languages in different situations where the languages are rarely interchanged.

Thirumalai and Chengappa (1986) have characterized bilingualism in different ways as given below:

1. How the language of a bilingual context are kept separately or fused together.
2. Sequence of learning the languages in a bilingual context.
3. Whether the languages of a bilingual context are acquired under formal, instructional conditions or informal, non-instructional set up.
4. An appreciation as to which of the language of a bilingual context is dominant in the individual use of languages.

### **Lexical-Semantic development in monolingual children**

Lexical acquisition begins as early as 5-7 months of age (Jusczyk and Austin, 1995; Saffran, Aslin and Newport, 1996). At 8 months, children recognize about 15 words, and at 10-14 months they typically speak their first words (Fenson,., 1994).

Children's early lexicon is characterized by a large proportion of nominals (words for objects and people) (Gentner, 1982; Gentner and Boroditsky, 2001; Nelson, 1973). After this point, the proportion of verbs and others predicates, increases (Bates, Bretheton and Snyder, 1988).

The first mapping between word and referents emerge gradually, but many children show a burst in rate of word learning at 16-19 months, after they have approximated 50 words in their productive lexicon (Benedict, 1979; Goldfield and Reznick, 1990). As pre-schoolers, the process of storing the first associations for words was called as “fast mapping”(Carey, 1978), Pre-schoolers acquire, on an average, 9-10 words a day, or as many as 5000 words by age 6 years (Beck and McKlown, 1991). Although these initial maps of word meaning are made quickly, they are refined with multiple exposures to the word. This refinement is a process called as “extended” or “slow mapping” (Carey, 1978). It involves increased accuracy of extensions, increased elaboration of meaning, and development of a semantic network.

During the school-age period and adult years, the individual increases the size of his or her vocabulary and the specificity of definition. Gradually, the child acquires an abstract knowledge of meaning that is independent of particular contexts or individual interpretations. This growth is not the same as semantic sophistication or depth of understanding the overall development of child’s semantic system (Pease and Berko-Gleason, 1985). As students accumulate experience with new situations and words, they perceive the many ways in which various stimuli, contexts, and words are interrelated. As they recognize these interconnections, they use their existing vocabulary more flexibly and they more efficiently to add new words to it.

In the process, the individual reorganizes the semantic aspects of language. The new organization is reflected in the way the child uses words. This entire process of semantic growth, beginning in the early school years, may be related to an overall cognitive processing.

Groundwork for the impressive semantic development occurs as children accumulate significant words in their school years. Researchers have estimated vocabulary development at various points throughout the school-age years. First graders are capable of understanding approximately 20,000 words. By the time they have reached sixth grade, students reportedly understand about 50,000 words.

One of the most important behaviors in child's maturing semantic domain is their ability to relate words to each other with increasing flexibility. Words become associated through contexts that overlap in a physical or conceptual way.

Several models have been proposed to understand the cognitive processing in children. Two such models which talk about how words gets organized as well as associated with each other are reviewed in the following section.

### **The Hierarchical Semantic network model (Collins and Quillian 1969)**

This model assumes that concepts are stored within a hierarchical structure, with properties stored together with a concept following the principle of cognitive economy. Cognitive economy refers to the fact that properties of concepts are stored at the highest possible level in the hierarchy and not re-represented at lower levels. According to this model, activation would radiate outward through the network from each node until each individual unit's activation would mutually affect one another. When the activation of two nodes overlap, then the two are related. If the nodes have a close semantic relation, they should be in proximity to each other in the network and responses would be faster because spreading activation will have less distance to cover. The authors proposed three levels in a hierarchical nature:

1. Superordinate categories (e.g. the major category of animals). Here the ideas are abstract and form the highest level of the nodes.
2. Ordinate categories(e.g. cats, dogs, birds and properties of these animal species)
3. Subordinate categories (e.g. canary). This the lowest level of the hierarchy of nodes which are concrete, corresponding to exact species of animals.

### **Spreading Activation Model of Semantic Memory (Collins & Loftus, 1975)**

The spreading activation model is an improvement on the hierarchical conceptualization of semantic information. This model assumes that the words are arranged in networks of nodes, but not hierarchically. All information are represented at the node level. Associated concepts, for example, “red” and “rose” are associated by links between the nodes. The closer the relationship between concepts, the shorter is the link. Spreading activation refers to the idea that finding one concept in the network will also activate concepts linked to it. The activation of one node spreads out to related concepts like a sound wave ripples outward from its source in all direction at once. The link between the target word and its association become weaker as the spreading continues to expand.

Models of semantic memory also offer explanations for the nature of organization of vocabulary by way of word associations. Organization of vocabulary has been characterized in several ways. Organizational shifts are reported to occur at different age levels; yet there are no clear-cut age boundaries at which these changes emerge.

The first shift is known as the thematic-taxonomic shift. This is an early change in children's word associations, where there is a shift from thematic to taxonomic organization. Thematic organization is based on associations that relate words to some integrated context in which they are experienced as a whole. For example, when asked to think of words that "go with" wagon, children exhibiting thematic associations might respond with "the sidewalk", "my playhouse". Here the experience associated with playing with the wagon has provided the theme that pulls these words together into a cohesive collection.

In contrast, taxonomic organization is based on associations or classifications in which items share features that define them as a class. For example, taxonomic responses to words "wagon" would probably include such items as 'my truck', "daddy's car", "a bus". Children begin to build hierarchies of taxonomic relations, at age 2 years (Clark, 1995). There are notable increases in taxonomic knowledge between ages 3 and 5 years (Anglin, 1977). The thematic-to taxonomic shift is thought to result from the fast expansion of vocabulary and world knowledge characteristic of middle childhood.

A second and parallel developmental shift that occurs in children is termed as the syntagmatic-paradigmatic shift. At the age of five, most children respond to a word stimulus with a word that follows in a syntactic sequence. By age of nine, most children respond with a word from the same form class or paradigm. A predominance of paradigmatic over syntagmatic responses is indicative of a more developed semantic system, as this pattern is typical of mature language users (Lippman, 1971).



In summary, the lexical-semantic development in monolingual children is a complex phenomenon that encompasses the relationship between words and their semantic role. There is significant development in both of these dimensions, which is evident in children from their pre-school years. As the semantic system of the child develops, words get organized in a hierarchical manner and the shift in their vocabulary becomes more evident.

### **Lexical-semantic development in bilingual children**

During the process of language acquisition, children often learn more than one language. Language acquisition in a bilingual child is equally complex phenomenon. Bloomfield, (1933) defined bilingualism as “native like control of two languages”. In recent years, researchers have been actively involved in studying bilingual acquisition.

Lexical development in monolingual children has received considerable empirical attention in recent years, leading to significant advances in our understanding of language learning in this population. In contrast, very little is known about the lexical-semantic system of preschool age children who learn a single language from birth (L1) and begin to learn a second language (L2) during this very dynamic period of communication development. Learning a second language during childhood is not a simple additive process, but rather one that involves complex interactions between L1, L2, and the developing child (Kohnert, 2004).

In this view bilingualism can be divided into two types as given by Weinrich (1953); Ervin and Osgood (1954). They said that a bilingual child could either be a compound bilingual or a coordinate bilingual. A compound bilingual child has only

one semantic system, but two linguistic codes. Usually this refers to someone whose two languages are learnt at the same time, often in the same context. In contrast to this, a coordinate bilingual has two semantic systems and two linguistic codes. This usually refers to someone whose two languages are learnt in distinctively separate contexts.

A small number of studies have looked at the lexical-semantic development in both languages spoken by bilingual school aged children (e.g., Davidson, Kline, & Snow, 1986; Nakajima, Handscombe, Green, & Tran, 1984). These important studies tapped the metalinguistic production skills in both languages (French-English, Vietnamese-English) of bilingual children and collectively documented significant L1/L2 transfer effects.

Learning a second language during childhood is not a simple additive process, but rather one that involves complex interactions between L1, L2, and the developing child (Kohnert, 2004). Only a handful of studies have directly investigated skills in both the L1 and L2 of preschool children learning two languages sequentially. Despite relatively consistent results across studies with respect to growth in L2, findings diverge sharply for L1. Results from one set of studies clearly indicate that L1 is vulnerable and subject to rapid backsliding when L2 is systematically introduced during the preschool years (Leseman, 2000; Schaerlaekens, Zink, & Verheyden, 1995; Wong-Fillmore, 1991). Wong-Fillmore interviewed 1,100 families in the United States in an attempt to understand the impact of early instruction in the majority language (L2) on young children's development and use of the home language (L1). Results of this survey suggested that negative changes in L1 corresponded to early exposure to L2.

In addition to considering lexical skills separately in L1 as well as L2, a number of studies point to the importance of measuring the collective or composite language system of developing bilinguals. Recent research on the comparison of the two lexical systems in bilingual children, have shown that a significant portion of lexical-semantic information is unique to one of the child's two languages (e.g., Marchman & Martínez-Sussman, 2002; Pearson et al., 1993, Pearson, Fernández, & Oller, 1995). That is, the child has some concepts that are lexicalized only in one of their two languages, and others that are lexicalized only in the other language. Composite vocabulary scores for typically developing bilingual children are comparable to those of their monolingual peers (Pearson et al., 1993).

Studies of bilingual children's lexical-semantic knowledge can provide much-needed information about the simultaneous development of two linguistic systems. Furthermore, such studies may shed light on the driving forces of lexical-semantic development, be they general developmental factors (e.g., age/cognitive maturity, schooling, or reading acquisition), or specific linguistic factors (e.g., proficiency or exposure in a certain language).

Bilingual children are similar to their monolingual peers in terms of lexical-semantic organization of vocabulary they acquire. In fact, bilingual children perform much better than monolingual children on a number of cognitive tasks, including selective attention, forming concepts, and reasoning analytically. Bilingual children score significantly higher than monolinguals on the measures of verbal and nonverbal intelligence, in particular on those tests requiring mental manipulation and reorganization of visual symbols, concept formation, and symbolic flexibility (Peal

and Lambert, 1962). Hence the authors concluded that the bilingual children outperformed their monolingual peers due to their enhanced mental flexibility and strong concept formation skills.

In addition, children who speak two or more languages are more cognitively swift or flexible than children who speak just one language (Bialystok, 1999; Hakuta, Ferdman, and Diaz, 1989). It is also noteworthy, that bilingual children are superior to monolingual children in their metalinguistic skills. Bilingual children are more aware of the arbitrariness of words as symbols than monolinguals. They are more adept at identifying grammatical and semantic errors, and they have greater phonological awareness.

Over the past couple of decades, much of the research conducted in bilingual domain has been concerned with the organization of a bilingual two languages. Models of bilingual lexical organization distinguish between two levels of representation: one lexical with two language specific stores and one conceptual comprising a single store.

#### **Revised hierarchical memory models (Kroll and Stewart, 1990, 1994)**

In this model, bilingual memory is conceived as represented in separate but interconnected lexicons. These two structures represent the bilinguals first (L1) and second language (L2) lexicons. This model's most critical assumptions are that the lexical links differ in strength; the words in each language are linked to a general concept and to each other. The L2 lexicon is connected to the L1 lexicon by strong links and the L1 is connected to the L2 lexicon by weak links that are sensitive to semantic processing. Because bilinguals seldom translate from their L1 to their L2

languages, they develop a weak link from the L1 to their L2 and it does not develop as well as the active L2 to L1 lexical links. In addition to the connections between the two lexicons, bilingual memory is thought to be composed of a conceptual store. The conceptual store is connected to both the L1 and L2 lexicons. However, the connections between the L1 lexicon and the conceptual store are strong and direct; whereas, the connections between the L2 lexicon and the conceptual store are weak. Thus, the subject's L1 is more likely to access the conceptual store directly (conceptually mediate) than the subject's L2. In other words, when exposed to an L1 concept, the bilingual is more likely to access the conceptual store because of his/her L1. Because the lexical link from the bilingual's L2 to L1 lexicon is stronger and faster, the bilingual would most likely utilize these links to access the conceptual; store, in this way, the link from the conceptual; system to the bilingual's L2 lexicon remains weaker. The RHM model assumes that both lexica; and conceptual links are active in bilingual memory but the strength of those links differs as a function of fluency in L2 and the relative dominance of L1 and L2. Thus, an asymmetry was hypothesized-L2 to L1 translation should be faster than L1 to L2 translation and also less sensitive to the effects of semantic factors.

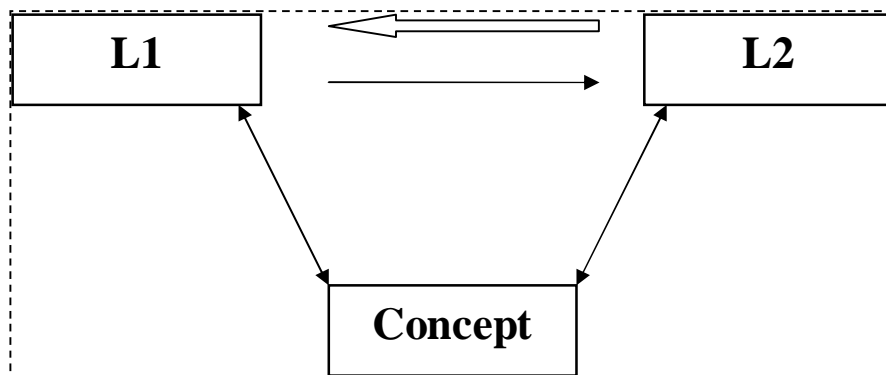


Figure a: Revised Hierarchical Memory Model

### **Word Association Model (Potter, So, Von Eckhardt and Feldman, 1984)**

This model assumes that the second language (L2) gain access to concepts only through first language (L1) mediation. The links between L1 and L2 are the lexical links and links between L1 and the concepts are denoted as the conceptual links. This model predicts that translation from L1 to L2 will be faster than picture naming in L2 because translation relies on the lexical links and can thus by pass conceptual access. Thus according to this model, cross-language processing exploits the links at the lexical level.

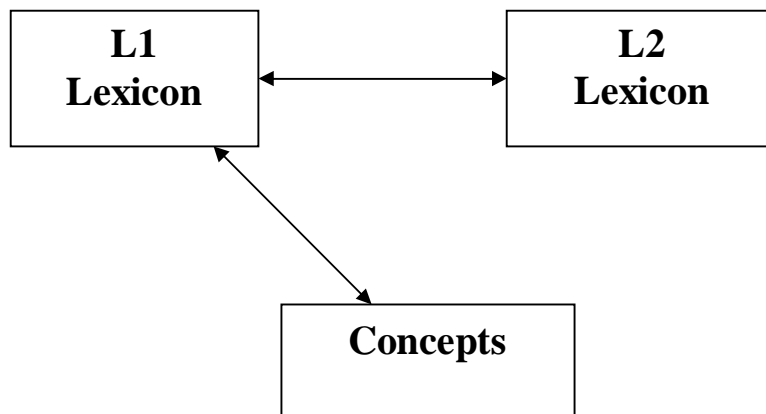


Figure b: Word Association Model

If lexical–semantic organization is shaped by general cognitive factors that transcend the boundaries of language, we may expect to see parallel development in each of a bilingual person’s two languages and in individuals learning one or two languages. If, however, linguistic/experiential factors dictate lexical–semantic organization, we may expect differences in rate or pattern of development between monolinguals and bilinguals and between bilinguals’ two languages.

In the exploration of bilingual mental lexicon, that is the lexical-semantic organization, a number of tasks have been employed. These are tasks of priming (cross-language priming), translation tasks and word association tasks.

In research on bilingual vocabulary, the word association task has been explored as an elicitation tool with the belief that word associations reflect fundamental characteristics of the relations between words in the mental lexicon. The results of these studies have been analyzed and compared to monolingual baseline data in order to describe and explore lexical and cognitive development as well as the structure of the mental lexicon.

Recent studies on bilingual children/adults using word association tasks have also shown a shift from syntagmatic to paradigmatic relation (Söderman 1993; Namei 2004). This indicates that the first and second language mental lexicons are not as different from each other (Meara 1984). Namei (2004) argues that the syntagmatic–paradigmatic shift in the first and second language is not an organizational characteristic of the whole mental lexicon but a developmental feature of every individual word, indicating increased lexical knowledge.

### **The syntagmatic-paradigmatic phenomenon in monolingual and bilingual children**

A developmental phenomenon, parallel to the thematic-taxonomic shift, noted by researchers, is the syntagmatic–paradigmatic shift that occurs around the age of 5-9 years of age. A syntagmatic association is based on a syntactic relationship. For example, the stimulus “girl” might elicit a child response “run”. In contrast, a paradigmatic association is based on semantic class, resulting from semantic attributes. In this case, the word “girl” might elicit “boy” or “woman”. The shift may represent either a refinement or organization of semantic features or change in general cognitive processing strategies.

According to Saussure's theory (1959/1915), language is structured by:

1. Combinatory principles, what can be sequentially combined with what in a given structure.
2. Substitutability principles, indicating which forms are alternatives within a particular slot in the structure to be filled.

The former principle is known as the syntagmatic relation, and the latter as the paradigmatic relation. Paradigmatic relations according to Saussure, are abstraction from experience, whereas syntagmatic relations are evident in spoken utterances. The two types are interdependent in that the combinatory structures are defined in terms of paradigmatic categories.

The evidence comes from various tasks used to describe the syntagmatic-paradigmatic shift. The tasks employed to study the shifts were category production, word associations and list recall.

Different lexical organization principles derive from syntagmatic and paradigmatic relations and are reflected in changes in children's responses on word association tasks from early to middle childhood (Nelson, 1977b). In the word association task the subjects are presented with a list of words one at a time and asked to respond to each one with the first word that comes to their mind. In this task adults respond most of the time with words from the same grammatical class, that is, with paradigmatic responses. Very young children respond primarily with syntagmatic associations, that is, words, which come from different word class. Such responses diminish as children advance in the school years



The shift is of interest both for its relation to general theories regarding word associations and for its implications regarding the cognition and linguistic functioning of children. It is of special interest because it seems to coincide with qualitative shifts in other cognitive and linguistic domains, in particular that from preoperational thought to logical concrete operations (Piaget, 1970).

One of the earliest studies done by Woodrow and Lowell (1916), observed that children tended to make associations on a contiguity basis, and described adult associations in terms of grammatical class similarity, or semantic similarity, or contrasts.

Brown and Berko (1960) described children's associations as primarily heterogeneous by parts of speech, and adult's as primarily homogeneous, reporting a steady change from a low-frequency of homogeneous responses by children in early primary grades to high-frequency by adults. They interpreted the change as indicative of syntactic learning. On the basis of this study, the authors advanced the hypothesis that the shift from heterogeneous (or syntagmatic) to homogeneous (or paradigmatic) associations was a consequence of the child's "gradual organization of his vocabulary into the syntactic classes called parts of speech". This was the first major claim for an explanation of syntagmatic-paradigmatic shift in linguistic terms.

In research on bilingual vocabulary, the word association test has been explored as an elicitation tool in the belief that word associations reflect fundamental characteristics of the relations between words in the mental lexicon. The results of these studies have been analyzed and compared to monolingual baseline data in order to describe and explore lexical and cognitive development as well as the structure of

the mental lexicon of bilingual speakers. One of the points of reference in word association studies is the notion of a syntagmatic–paradigmatic shift.

Cunningham (1990) examined the word association data of two groups of Irish-English bilingual children. One group was based in an English-medium school and was receiving input in Irish only during Irish lessons, and the other of which was based in an Irish-medium school receiving input in Irish throughout the school day. The findings of this study revealed that L2 learners who had received more input produced fewer “clang” associates and more ‘paradigmatic’ associates than did learners with less experience of the target language. These results were similar to those obtained by Soderman, (1989, 1983).

Recent L2 association studies document the fact that a syntagmatic–paradigmatic shift occurs in the associations of non-native speakers as well (Söderman 1993; Namei 2004). This indicates that the L1 and L2 mental lexicons are not as different from each other as previously believed (Meara 1984).

Namei (2004) compared 100 Persian–Swedish bilingual subjects with 100 native speakers of Swedish and Persian on a word association task. The elicitation instrument was the Kent-Rosanoff association list (1910), and the subjects’ task was to give a single-word response to each stimulus word. The results showed that phonologically-based associations occur in both the L1 and the L2 as a function of the degree of word knowledge. Phonologically-based organization is a primary acquisition feature of every individual word, and it is not abandoned even during the advanced stages of language proficiency, whether in the L1 or the L2. It was found that words that are barely known may elicit phonologically-based associations, those

that are partially known may have a strong syntactic organization, and well-known words are connected to other words mainly on a semantic basis. The author argues that the syntagmatic–paradigmatic shift in the L1 and L2 is not an organizational characteristic of the whole mental lexicon but a developmental feature of every individual word, indicating increased lexical knowledge.

The results from the word association studies show that the first language (L1) mental lexicon is organized mainly on a semantic basis, while the organization of the second language (L2) mental lexicon in the early stages of development is phonologically based, indicating a less profound lexical knowledge.

To summarize, according to Namei (2004), development in word knowledge is reflected in the overall organizational features of words in the mental lexicon: barely familiar words are form-based, moderately known words are syntagmatic, fairly well-known words are paradigmatic, and well known words are paradigmatic or late syntagmatic (Entwisle 1966; Wolter, 2001).

To date, studies comparing bilingual and monolingual children’s semantic organization have yielded mixed results. In a 3-year longitudinal investigation, Lambert and Tucker (1972) compared percentages and speed of generating paradigmatic word associations (the more mature type of association responses) between English–French bilingual children and monolingual control groups (English-speaking, French-speaking) at the end of each year of French immersion. The bilingual children produced generally comparable or, in some cases, higher percentages of paradigmatic responses than the control children. Depending on the year and the group of comparison, the bilingual children demonstrated faster,

comparable, or slower response times than the monolingual children. Additionally, Ben-Zeev (1977) found that although Hebrew–English bilingual children generated a similar number of paradigmatic responses as monolingual controls, but, they responded more slowly.

### **Issues in syntagmatic-paradigmatic shift**

#### **Influence of word class on syntagmatic-paradigmatic phenomenon**

Word class is reported to influence response types and associative behavior, which points to the fact that word class, is an influential factor in language acquisition and in the integration of words in the mental lexicon (Clark 1993; Källkvist 1999). This class influence raises important questions as to the effect of word class on the structure of the mental lexicon, the nature of lexical development and how word knowledge is accessed. The influence of word class also questions the notion of a syntagmatic–paradigmatic shift as evidence of lexical and cognitive development.

Ervin (1961) studied children from kindergarten through sixth grade using stimulus words from various form classes. The responses from the kindergarten children were syntagmatic, except those to nouns, and there was a significant increase in paradigmatic responses. She interpreted her results in terms of contextual similarity. That is, words become associated when they can occur in the same context.

The syntagmatic–paradigmatic distinction pertains to all form classes (e.g., adjectives, nouns, verbs). Frequency of syntagmatic and paradigmatic responses is dependent upon form class, word frequency, and the particular features of the stimulus words, for example, whether the stimuli are contrastive, such as big and small, or non-contrastive, such as yellow; (Entwisle, 1966). Entwisle (1966) also

found multiword responses and many “clang” responses (i.e., rhyming or otherwise acoustically related words) in younger children’s protocols. Regardless of this interpretation, it should be noted that for all ages studied, the syntagmatic-paradigmatic shift, when it is found, is found primarily for word classes other than nouns and that in the typical list of highly familiar nouns and adjectives, it is found mainly for adjectives.

A large-scale study done by Entwisle (1966) presents the most complete analysis to this date. The stimulus list consisted of 96 words which were selected to represent nouns, adjectives and verbs at three levels of frequency of use. Over 1200 children, from pre-kindergarten to fifth grade were considered as subjects. The results revealed that there was an increase paradigmatic response for nouns in all the groups, but a reversal was noticed for verbs. In interpreting the results, the author stated that the syntactic responding was at its peak around first- to third-grade level for most words on the list but is still present at the fifth grade level.

Various theoretical explanations have been provided for word associations in children. The most basic theory of the production of word associations is that of associative pairing in language use. This theory proposes that responses are associated with stimulus words in a word association task because they have been frequently experienced together in the past.

One oppositional theory which rejects the view that the syntagmatic-paradigmatic shift is based on syntactic learning was proposed by McNeil (1966). He proposed that the associations of children are based on semantic principles, and children under the age of 7 years show insufficient learning of the semantic feature of words.

In summary, above review also illustrates that the syntagmatic–paradigmatic shift is observed most predominantly in high-frequency adjectives, whereas nouns tend to be paradigmatic even at early stages, and verbs are more strongly syntagmatic (Nelson, 1977). These patterns are replicated in Miller and Fellbaum’s (1991) study, where they conclude that central sense relations differ for different word classes. For example, an understanding of paradigmatic relations (i.e., synonymy, antonymy) is central in the acquisition of adjectives, which may facilitate an earlier and more complete shift from syntagmatic to paradigmatic responding for adjectives versus other word classes.

The issue of word class influence on test results has not been thoroughly explored in the discussion of L2 associative behavior despite critical discussions in recent word association studies of the nature of syntagmatic and paradigmatic responses and of the syntagmatic–paradigmatic shift (Söderman 1993; Wolter 2001).

Wolter (2001) notes that it takes a great deal of lexical knowledge to be able to relate a response sequentially (i.e. syntagmatically) to the prompt word. Söderman (1993) argues that a paradigmatic response may not necessarily represent the highest level of lexical knowledge, and that there may not be such a marked shift from syntagmatic to paradigmatic responses as has been claimed for decades. Both studies point to native-speaker informants who showed an extremely strong preference for syntagmatic responses (Wolter 2001), or who did not show a clear preference for either syntagmatic or paradigmatic responses (Söderman 1993).

Nissen and Henriksen (2006) challenged the concept of syntagmatic-paradigmatic shift. Contrary to previous research which suggests that the L1 adult mental lexicon appears to be predominantly paradigmatically structured (Schmitt

2000), these authors claimed that a surprising majority of syntagmatic responses in the L1 test. The authors have discussed the influence of word class on test results in terms of the acquisition and semantic organization of nouns, verbs and adjectives. This study suggests that the lexical-semantic organization in bilinguals might be different from that of monolinguals in terms of cognitive processing.

### **The Repeated Word Association Test**

Though a word association task has been used to explore the fundamental characteristics of the relations between words in the mental lexicon, a repeated word association task would give a better understanding of the mental lexicon.

In Elbers and van Loon-Vervoorn's (1998) study, Dutch speakers generated associations to nouns four times. A decrease of coordinate responses (e.g., cat–lion) across repeated trials was seen in adults, suggesting that coordinate relation, a subtype of paradigmatic relations, was initially more accessible in the mature system. The repeated nature of this task allows measurement of both storage and accessibility of paradigmatic semantic relations. Although the number of paradigmatic responses may be equivalent between two groups of children, suggesting comparable storage of paradigmatic relationships, the pattern of retrieval may differ across repeated elicitations, suggesting differences in accessibility (Elbers & van Loon-Vervoorn, 1998). For example, in one group of children, paradigmatic responses may be at their peak during the initial elicitation and gradually decrease, whereas in another group, such responses may be initially rare but steadily increase across trials.

In a more recent study, where Mandarin-English bilinguals and Mandarin monolinguals were studied, the results revealed that Both the bilingual and the

monolingual children demonstrated the same decreasing pattern in paradigmatic responding across trials. This pattern was more consistent in the bilingual group. This finding suggests that the children's knowledge of hierarchical relational terms was similarly shallow so that generating paradigmatic associations became more demanding with each new elicitation.

India is a multilingual country right from its earliest days. Children in India, majorly learn English as their second language at school. Since their development process is different from those children of Western population, it is not possible to make a generalized statement about the results obtained in Western countries. Till date, there is no literature on the lexical-semantic organization in Indian context. Therefore, on the basis of this the present study is designed to understand lexical-semantic development in Indian bilingual children.

### **Need for the study**

Bilingualism is an area with a lot of promise for the future to all those involved in this field, considering that majority of the individuals around the world are bilinguals. Studies addressing bilingual issues related to mental lexicon, lexical-semantic organization etc., have been emerging in large in the American and European countries. Keeping in mind the nature of bilingualism in India, generalization from the studies done in the West is questionable.

Also, extremely few studies have been done in the field of lexical-semantics in children in an Indian context.



Further, the languages that have been investigated so far are languages from entirely different language families compared to those in India (English, Spanish, Chinese, Greek). The language considered in the present study, Kannada, is the member of the Dravidian family of languages and is spoken in South India. It follows the Brahmi script and is syllabic in nature. English, on the other hand, is from the Latin language family and is alphabetic. There is a need to investigate such structurally distant languages for a clearer understanding of language processing in bilinguals.

It is also important to establish data on the lexical-semantic organization in normal children, without which the organization in clinical population is difficult to understand. Thus, from a clinical standpoint too such a study is warranted.

### **Objectives of the study**

The objectives of the present are three-fold

4. To compare the development of lexical-semantic organization in the two languages of bilingual children.
5. To compare the lexical-semantic organization in Kannada language of Kannada-English bilingual children with that of monolingual children.
6. To examine the effect of bilingualism on lexical-semantic organization.

## CHAPTER III

### METHOD

The present study is aimed at investigating the lexical-semantic organization in Kannada-English bilingual children using a repeated word association paradigm task.

#### Subjects

30 Kannada-English bilingual and 30 predominantly monolingual Kannada speaking children in the age range of 6-8 years participated in the study.

Age	Kannada-English bilingual children	Kannada monolingual children
6 years	10	10
7 years	10	10
8 years	10	10

**Table 1: Subjects**

#### Subject selection criteria

The subjects were selected based on the following criteria:

#### Inclusionary criteria

- ✓ Age (6-8 years)
- ✓ Proficiency in the target language(s).

#### Exclusionary criteria

- ✓ Speech, language, hearing, social, or emotional disorders
- ✓ Proficiency in a language other than the one(s) under study.

### **Proficiency in the target languages**

Information about the bilingual children's language use and proficiency level was collected through rating forms. A questionnaire adapted from "Languages of school-going children" (Jayashree and Prema, 2007) was filled out by the children's parents. One questionnaire was given to the teachers while the other was given to the parents of the children. Each questionnaire included questions regarding the usage of the languages by the child in different environments. Specific questions were asked about the people with whom the child interacts in different settings (school vs weekend), on different days of the week (weekdays vs weekends), and language of communication (Kannada, English or both) between the child and the person. Parents and teachers of bilingual children were asked to rate their children's proficiency along a five point rating scale from 0 to 4 (0= no proficiency and 4= native like proficiency).

### **Language level**

The semantics portion of the Linguistic Profile Test was used as a measure of children's receptive and expressive vocabulary.

### **Test Material**

Words from "A little bit of help-Early language Training Kit" (Karanth, Manjula, Geetha, Prema, 1999) were selected for the stimuli.

The final word list consisted of sixty pairs of words with equal number of nouns, verbs and adjectives. The sixty pairs of words were divided into two matched lists (List I and List II) each consisting of thirty words.

For List I, only syntagmatic examples were provided by the experimenter. Example: “when I hear the word *cat* I recall words such as *milk*, *tail*, and *meow*. Now when you hear the word *bus* what do you recall?”

Examples for List II with paradigmatic relations.

Example: “when I hear the word *chair* I recall *table*, *bed*. Now when you hear the word *eat* what do you recall?”

For both the lists the examiner provided pictorial demonstration explaining the word association.

### **Procedure**

Two groups of five children each in the each group of six to eight years was considered for the study. For example, five year group was divided into Group A<sub>1</sub> and Group B<sub>1</sub> with five children in each group. Similarly, the other two groups were divided as Group A<sub>2</sub>, Group B<sub>2</sub> for six year group and Group A<sub>3</sub>, Group B<sub>3</sub> for seven year group.

The procedure was carried out in two experimental conditions. The presentation of List I and List II was counterbalanced across the children, as shown in Table 2. The two experimental sessions were carried out with a gap of at least two weeks. The entire list was presented three times to elicit word association from the children.

The children were seated comfortably in a quiet environment and the words were presented through headphones. The words were recorded maintaining the same intensity throughout the list.

**Table 2: Order of stimulus presentation**

AGE	GROUP DIVISION	Bilingual children				Monolingual children	
		Session I (Kannada)		Session II (English)			
6 years	Group A <sub>1</sub> (no. 5)	List I	List II	List I	List I	List I	List I
	Group B <sub>1</sub> (no. 5)	List II	List I	List II	List I	List II	List I
7 years	Group A <sub>2</sub> (no. 5)	List I	List II	List I	List II	List I	List II
	Group B <sub>2</sub> (no. 5)	List II	List I	List II	List I	List II	List I
8 years	Group A <sub>3</sub> (no. 5)	List I	List II	List I	List II	List I	List II
	Group B <sub>3</sub> (no. 5)	List II	List I	List II	List I	List II	List I

The procedure for the present study was divided into two experimental stages.

### **Experiment I**

Bilingual children

Session I

During this session, the Kannada word list was used. The words from List I consisting of syntagmatic examples were presented to children belonging to Group A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> of all the age groups, on a given day.

The following day, children belonging to Group B<sub>1</sub>, B<sub>2</sub> and B<sub>3</sub> received the words from List II, which consisted of paradigmatic examples.

After a gap of two days, children belonging to Group A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> received List II and Groups B<sub>1</sub>, B<sub>2</sub> and B<sub>3</sub> received List I.

Session 2

After a gap of two weeks, the English word association test was administered, which followed the same procedure given above.

## **Experiment II**

Monolingual children:

Similar to the bilingual children, for the monolingual children, two groups of five children each in the age group of six to eight years was considered. Children in Group A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> received List I on a given day.

The following day, children belonging to Group B<sub>1</sub>, B<sub>2</sub> and B<sub>3</sub> received the words from List II, which consisted of paradigmatic examples.

After a gap of two days, children belonging to Group A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> received List II and Groups B<sub>1</sub>, B<sub>2</sub> and B<sub>3</sub> receive List I.

### **Scoring/classification of responses**

The responses of the children were scored on-line. The word association responses were categorized under five types as listed below to assess the lexical-semantic organization with age (Cronin, 2002).

1. A synonym (large-big); an antonym (good-bad); a coordinate (cat-dog); a superordinate (rose-flower); a subordinate (shoe-slippers); or in case of adjectives, a direct negation (pretty-not pretty) of the stimulus are treated as paradigmatic responses.
2. Responses were coded as syntagmatic in terms of the prompts in the syntactic stream (stand-up, read-book) or words that bear thematic relationships with the prompts (sick-medicine, catch-ball).
3. Responses were categorized as clang responses if they were sound-based, or rhyming and alliterative words (‘cold’ - ‘old’, ‘river’ - ‘giver’).

4. Responses are classified as non-associated category will be used when there was no visible association between the stimulus and response words ('cold' - 'jump', 'river' - 'nighttime').
5. The no response or stimulus word repeated category will be assigned when the child can not come up with a response, or simply repeat the stimulus word.

The data thus compiled was subjected to statistical analysis with the following purpose:

1. Within group comparison for monolingual children.
2. Within group comparison for bilingual children.
3. Between group comparison of monolingual and bilingual children.
4. Between language comparison in the bilingual children.

A qualitative analysis of the nature of the lexical-semantic organization in children was also done.

## CHAPTER IV

### RESULTS AND DISCUSSION

The present study aimed at investigating the lexical-semantic organization in Kannada-English bilingual children using a repeated word association paradigm task. Hence the objectives of the present are three-fold

1. To compare the lexical-semantic organization in Kannada language of Kannada-English bilingual children with that of monolingual children.
2. To compare the development of lexical-semantic organization in the two languages of bilingual children.
3. To examine the effect of bilingualism on lexical-semantic organization.

#### Quantitative analysis:

#### I. Comparison of the lexical-semantic organization in Kannada language of Kannada-English bilingual children with that of monolingual children

Mean scores and standard deviations- comparison of monolingual and bilingual responses across age and language:

Table 3: Mean scores and Standard deviation - comparison of monolingual and bilingual responses across age and language

List	Trial	Res pon ses	Language												
			1.00						2.00						
			Age						Age						
			6 years		7 years		8 years		6 years		7 years		8 years		
Mean	SD	Mea n	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD				
List 1	Trial I	SG	26.6	3.71	19.5	6.88	22.50	5.40	25.70	2.26	22.40	6.75	21.1	6.20	
		PG	<b>2.3</b>	<b>3.16</b>	9.60	7.08	7.40	5.39	4.20	2.20	7.40	6.56	8.70	6.48	
		CG	.00	.000	.00	.00	1.00	.31	.00	.00	.00	.00	.00	.00	.00
		NA	<b>.20</b>	<b>.632</b>	19.5	.67	.00	.00	.00	.00	.00	1.00	.31	<b>1.00</b>	<b>6.20</b>
		NR	<b>.90</b>	<b>1.59</b>	<b>.50</b>	<b>.84</b>	.00	.00	.10	.31	1.0	.31	<b>.10</b>	<b>.31</b>	
	Trial II	SG	26.90	3.81	28.0	1.4	26.10	5.62	28.70	1.15	25.00	4.24	27.2	2.52	
		PG	<b>.60</b>	<b>.843</b>	1.80	1.2	<b>2.50</b>	<b>2.54</b>	1.10	1.19	4.70	4.34	2.30	1.94	
		CG	.00	.00	.00	.00	1.00	.31	.00	.00	1.00	.31	.00	.00	
		NA	.00	.00	.00	.00	1.00	.31	.00	.00	1.00	.31	<b>.40</b>	<b>1.26</b>	
		NR	2.50	3.80	<b>.20</b>	<b>.63</b>	<b>1.20</b>	<b>3.1</b>	<b>.20</b>	<b>.63</b>	1.00	.3	1.00	.31	



List 2	Trial III	SG	26.10	2.80	28.9	2.33	28.60	1.34	29.00	1.33	28.20	1.31	28.7	2.05	
		PG	<b>.30</b>	<b>.94</b>	<b>.80</b>	<b>1.75</b>	1.00	1.05	<b>.40</b>	<b>.84</b>	1.30	1.41	1.20	2.09	
		CG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
		NA	.00	.00	<b>.30</b>	<b>.94</b>	.00	.00	.00	.00	<b>.30</b>	<b>.48</b>	.00	.00	
		NR	3.60	3.06	.00	.00	<b>.40</b>	<b>.69</b>	<b>.60</b>	<b>1.26</b>	<b>.20</b>	<b>.42</b>	1.00	.31	
	Trial I	SG	16.50	8.39	13.7	2.45	<b>5.90</b>	<b>7.70</b>	17.90	2.88	12.40	5.50	4.40	3.37	
		PG	13.10	8.25	15.5	2.22	22.80	7.33	11.90	2.92	16.80	5.92	25.2	3.42	
		CG	.00	.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
		NA	<b>.20</b>	<b>.63</b>	<b>.20</b>	<b>.63</b>	.30	.67	.00	.00	<b>.80</b>	<b>1.47</b>	<b>.40</b>	<b>.96</b>	
		NR	<b>.20</b>	<b>.632</b>	<b>.60</b>	<b>1.07</b>	.00	.00	<b>.20</b>	<b>.42</b>	.00	.00	.00	.00	
	Trial II	SG	23.40	3.92	24.6	5.12	25.70	2.21	26.40	1.26	22.80	7.52	21.0	5.16	
		PG	4.9	4.43	<b>4.90</b>	<b>5.44</b>	3.40	1.83	2.80	1.47	<b>6.90</b>	<b>7.24</b>	8.90	5.32	
		CG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
		NA	.00	.00	<b>.20</b>	<b>.63</b>	.00	.00	.00	.00	1.00	.31	.00	.00	
		NR	<b>1.70</b>	<b>2.11</b>	<b>.30</b>	<b>.94</b>	.90	.73	<b>.80</b>	<b>1.13</b>	.20	.6	<b>.10</b>	<b>.31</b>	
	Trial III	SG	24.50	2.12	28.7	2.11	27.60	1.91	26.00	1.94	39.10	31.25	26.6	2.91	
		PG	<b>.80</b>	<b>1.47</b>	<b>.60</b>	<b>1.07</b>	1.40	1.89	2.60	2.22	<b>.90</b>	<b>1.10</b>	3.30	2.90	
		CG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
		NA	.0000	.000	<b>.400</b>	<b>.843</b>	.0000	.000	.00	.00	.00	.00	.00	.00	
		NR	4.70	3.0	<b>.300</b>	<b>.674</b>	<b>1.000</b>	<b>1.49</b>	<b>1.400</b>	<b>2.221</b>	.00	.00	<b>.10</b>	<b>.316</b>	

The Table 3 below gives the mean and standard deviation values for the comparison of monolingual and bilingual children's response across age and language. In the Table, the monolingual group is depicted by Language 1, and the bilingual group is depicted by Language 2. Instances where the S.D is greater than the mean are highlighted, indicating a wide variation in the scores of individual subjects. As seen from the Table 1, the number of times the standard deviation values are greater than the mean values is more in the monolingual group. This is more so for paradigmatic (PG) responses during the first trial and non-associated (NA) and no responses (NR) in the second and third trials. With respect to the bilingual group, this trend is more scattered and generally the standard deviation values are lesser than the mean values. It is seen from the Table 3, that the mean values for younger children is more for syntagmatic responses and less for paradigmatic responses. Whereas, for older children the mean scores for paradigmatic responses is more compared to syntagmatic responses. Hence, it is seen that a developmental trend is seen in the

organization of the lexical-semantic knowledge across age groups in both the languages.

### I.1. Comparison of monolingual and bilingual responses across age and language

Table 4: Comparison of monolingual and bilingual children across age and language

		Source							
Dependent Variable		AGE			LANGAUGE			AGE * LANGAUGE	
			F	Sig	F	Sig	F	Sig	
LIST I	Trial 1	<b>Syntag</b>	<b>5.197</b>	<b>.009**</b>	.020	.888	.923	.403	
		<b>Paradig</b>	<b>5.662</b>	<b>.006**</b>	.056	.814	.820	.446	
		Clang	1.000	.375	1.000	.322	1.000	.375	
		NA	.663	.519	.853	.360	.853	.432	
		NR	1.710	.190	3.393	.071	1.710	.190	
	Trial 2	Syntag	.821	.445	.001	.971	2.728	.074	
		<b>Paradig</b>	<b>5.410</b>	<b>.007**</b>	3.118	.083	2.414	.099	
		Clang	.500	.609	.000	1.000	1.500	.232	
		NA	1.167	.319	.889	.350	.389	.680	
		NR	1.728	.187	<b>4.855</b>	<b>.032*</b>	1.443	.245	
	Trail 3	Syntag	1.941	.153	2.312	.134	<b>4.686</b>	<b>.013**</b>	
		Paradig	1.730	.187	.525	.472	.107	.899	
		Clang	.	.	.	.	.	.	
		NA	<b>3.176</b>	<b>.050*</b>	.000	1.000	.000	1.000	
		<b>NR</b>	<b>12.678</b>	<b>.000**</b>	<b>8.183</b>	<b>.006**</b>	<b>7.570</b>	<b>.001**</b>	
LIST 2	Trial 1	<b>Syntag</b>	<b>24.187</b>	<b>.000**</b>	.105	.747	.423	.657	
		<b>Paradig</b>	<b>22.753</b>	<b>.000**</b>	.343	.560	.561	.574	
		Clang	.	.	.	.	.	.	
		NA	1.122	.333	.573	.453	1.122	.333	
		NR	1.615	.208	2.077	.155	2.077	.135	
	Trail 2	Syntag	.603	.551	.932	.339	<b>3.452</b>	<b>.039</b>	
		Paradig	1.408	.253	2.148	.149	<b>3.198</b>	<b>.049*</b>	
		Clang	.	.	.	.	.	.	
		NA	1.800	.175	.200	.657	.200	.819	
		<b>NR</b>	<b>4.227</b>	<b>.020*</b>	<b>4.214</b>	<b>.045*</b>	.741	.481	

Trail 3	Syntag	2.485	.093	1.186	.281	1.075	.348
	<b>Paradig</b>	<b>3.608</b>	<b>.034*</b>	7.430	.009	1.119	.334
	Clang	.	.	.	.	.	.
	NA	2.250	.115	2.250	.139	2.250	.115
	<b>NR</b>	<b>17.608</b>	<b>.000**</b>	<b>12.030</b>	<b>.001**</b>	<b>4.491</b>	<b>.016*</b>

Note: \*  $p \leq 0.05$

\*\*  $p < 0.01$

To address the first objective, a statistical comparison between monolingual and bilingual children's response was made across age and language. This was carried out using two-way MANOVA. With respect age, only a few parameters such as, syntagmatic, paradigmatic, no responses and non-associated were significantly different ( $p < 0.05$ ), though all were not significant in all the trials. When the languages between monolingual and bilingual children were compared, a significant difference was not observed.

Since a significant difference was obtained on certain parameters across age group across the trials, a post-Hoc analysis of the responses across age in monolingual and bilingual children was carried out.

### **List 1 (Words for Syntagmatic relations)**

On the first trial, there was a significant difference on syntagmatic,  $F(1, 54) = 5.197$ ,  $p < 0.01$  and paradigmatic,  $F(1, 54) = 5.662$ ,  $p < 0.01$  responses with respect to age was found. This significant difference was found between the age groups 6 year old and 7/8 year old children. The children belonging to 6 year old generated more number of syntagmatic responses when compared to the other two age groups. On the second trial, the only parameter that differed significantly was the paradigmatic responses  $F(2, 54) = 5.410$ ,  $p < 0.01$  across the age. Here, again the 6 year old children differed from the other two groups, by generating the least number of paradigmatic

responses. On the third trial, non-associated responses,  $F(2, 54) = 3.176$ ,  $p = 0.01$  and no responses,  $F(2, 54) = 12.67$ ,  $p < 0.01$  differed significantly across age group. On non-associated responses, the 7 year old children were significantly different from the other two groups, whereas, the 6 year old children differed significantly from the other two groups for no responses.

### **List 2 (Words for Paradigmatic relations)**

The same trend was seen on the first trial, where, all the three groups differed significantly from each other. For the syntagmatic responses,  $F(2, 54) = 24.187$ ,  $p < 0.01$ , where, 6 year old children had higher scores, whereas on paradigmatic responses,  $F(2, 54) = 22.753$ ,  $p < 0.01$ , where, the 8 year old children had higher scores. On the second trial, there was significant differences on no responses,  $F(2, 54) = 4.227$ ,  $p < 0.05$ , where, again the 6 year old children generated more number of no responses compared to the other two age groups. On the third trial, a significant difference for paradigmatic responses  $F(2, 54) = 3.608$ ,  $p < 0.05$ , and no responses  $F(2, 54) = 17.608$ ,  $p < 0.01$  was found. Here, the number of paradigmatic responses generated by 8 year old children was more and the numbers of no responses were generated more by the 6 year old children.

Similarly the interaction effect of age X language revealed that only few parameters were significantly different across trials. For **List 1**, significance was found during the third trial, for syntagmatic responses and no responses. While, for **List 2**, significant difference for the second trial, for syntagmatic and paradigmatic responses was found.

## I. 2. Within group comparison-Monolingual children

For the within group comparison of monolingual children, a one-way ANOVA was carried out and the results of which are presented in Table 5

Table 5: Within monolingual group comparison

Dependent Variable		F	Sig	
LIST 1	Trial 1	<b>Syntagmatic</b>	<b>4.217</b>	<b>.025*</b>
		<b>Paradigmatic</b>	<b>4.704</b>	<b>.018*</b>
		Clang	1.000	.381
		Non-associated	.818	.452
		No response	1.867	.174
	Trial 2	Syntagmatic	.566	.574
		<b>Paradigmatic</b>	<b>3.176</b>	<b>.058*</b>
		Clang	1.000	.381
		Non-associated	1.000	.381
		No response	1.620	.217
	Trial 3	<b>Syntagmatic</b>	<b>4.685</b>	<b>.018*</b>
		Paradigmatic	.768	.474
		Clang	.	.
		Non-associated	1.000	.381
		<b>No response</b>	<b>11.838</b>	<b>.000**</b>
LIST 2	Trial 1	<b>Syntagmatic</b>	<b>6.659</b>	<b>.004**</b>
		<b>Paradigmatic</b>	<b>6.040</b>	<b>.007**</b>
		Clang	.	.
		Non-associated	.080	.924
		No response	1.800	.185
	Trial 2	Syntagmatic	.853	.437
		Paradigmatic	.427	.657
		Clang	.	.
		Non-associated	1.000	.381
		No response	2.508	.100
	Trial 3	<b>Syntagmatic</b>	<b>11.137</b>	<b>.000**</b>
		Paradigmatic	.750	.482
		Clang	.	.
		Non-associated	2.250	.125
<b>No response</b>		<b>14.212</b>	<b>.000**</b>	

Note: \* p< 0.05

\*\* P< 0.01

A within group comparison was made to see if there was difference across age group in monolingual children across the trials. The results revealed that only on few parameters there was a significant difference seen at (p< 0.05). Hence, a post-hoc analysis was carried out to see which of the age group differed significantly from each other.

### **List 1 (Words for Syntagmatic relations)**

On the first trial, a significant difference was obtained on syntagmatic,  $F(2, 27)=4.217$ ,  $p<0.05$  and paradigmatic,  $F(2, 27)= 4.704$ ,  $p<0.05$  responses across the age groups. Here there was significant difference in the responses generated by the 6 year old children and 7 year old children. The 8 year old children were almost similar to the 6 year old children, that is, they generated more number of syntagmatic responses. Only the paradigmatic responses,  $F(2, 27)= 3.176$ ,  $p<0.05$  showed a significant difference on the second trial, where the 8 year old children had higher scores compared to the other two age groups. In the third trial, the syntagmatic responses  $F(2, 27)=4.685$ ,  $p<0.05$  and no responses  $F(2, 27)= 11.838$ ,  $p<0.01$  showed a significant difference, where again the 6 year old children scored differently from the other two groups.

### **List 2 (Words for Paradigmatic relations)**

A similar trend was noticed in the trial 1, across age group, where a significant difference was obtained for syntagmatic,  $F(2,27)= 6.659$ ,  $p<0.01$  and paradigmatic responses,  $F(2, 27)= 6.040$ ,  $p<0.01$ . The 8 year old children showed a different trend in comparison with the other two age groups. They generated less number of syntagmatic responses and more number of paradigmatic responses than the other two groups of children. There was no significant difference was found across responses in the three age groups on trial 2. In trial 3, there was a significant difference in syntagmatic responses,  $F(2,27)= 11.137$ ,  $p<0.01$  and no responses,  $F(2,27)= 14.212$ ,  $p<0.01$  across the age group was found. Here, the number of syntagmatic responses and no responses was greater in the 6 year old group. Hence, a trend across age is clearly seen on post-hoc analysis, where the syntagmatic response decreases across age group but, increases with the trials. Whereas, paradigmatic responses increases with age and decreases with responses. Also these results reveal that the number of

non-associated and no responses is more in the 6 year old group when compared to the 7 and 8 year olds.

### I. 3. Within group comparison-Bilingual Kannada speaking children

For the within group comparison of bilingual children, a one-way ANOVA was carried out, the results of which are tabulated below.

Table 6: Within Bilingual group comparison

Dependent Variable		F (2, 27)	Sig	
List 1	Trial 1	Syntagmatic	1.890	.171
		Paradigmatic	1.788	.187
		Clang	.	.
		Non-associated	.500	.612
		No response	.000	1.000
	Trial 2	<b>Syntagmatic</b>	<b>4.036</b>	<b>.029*</b>
		<b>Paradigmatic</b>	<b>4.179</b>	<b>.026*</b>
		Clang	1.000	.381
		Non-associated	.765	.475
		No response	.167	.847
	Trial 3	Syntagmatic	.633	.539
		Paradigmatic	1.025	.372
		Clang	.	.
		<b>Non-associated</b>	<b>3.857</b>	<b>.034*</b>
		No response	1.118	.341
List 2	Trial 1	<b>Syntagmatic</b>	<b>27.668</b>	<b>.000**</b>
		<b>Paradigmatic</b>	<b>24.525</b>	<b>.000**</b>
		Clang	.	.
		Non-associated	1.543	.232
		No response	2.250	.125
	Trial 2	Syntagmatic	2.672	.087
		<b>Paradigmatic</b>	<b>3.493</b>	<b>.045*</b>
		Clang	.	.
		Non-associated	1.000	.381
		No response	2.404	.109
	Trial 3	Syntagmatic	1.659	.209
		Paradigmatic	3.130	.060
		Clang	.	.
		Non-associated	.	.
		<b>No response</b>	<b>3.636</b>	<b>.040*</b>

Note: \*  $p \leq 0.05$

\*\*  $P < 0.01$

A within group comparison was done to see if there was difference across age group in bilingual children across the trials. The results revealed that on a few

parameters there was a significant difference seen, at ( $p < 0.05$ ). Hence, a post-hoc analysis was carried out to see which of the age group differed significantly from each other.

### **List 1 (Words for Syntagmatic relations)**

On trial 1, no significant difference was obtained on any of the responses across the age group. On the second trial, however, a significant difference was obtained on syntagmatic  $F(2,27)=4.036$ ,  $p < 0.05$  and paradigmatic  $F(2, 27)= 4.179$ ,  $p < 0.05$  responses. The age groups that differed from each other were the 6 year old children and 8 year old children, where, the former group generated more syntagmatic responses. On the third trial, the age groups differed on non-associated condition  $F(2,27)= 3.857$ ,  $p < 0.05$ . Here, the age group that showed a significant difference was the 7 year old group, which generated more number of no responses compared to the other two groups.

### **List 2 (Words for Paradigmatic relations)**

On trial 1, the children of each age group differed significantly from each other on syntagmatic responses  $F(2, 27)= 27.668$ ,  $p < 0.01$  and paradigmatic responses  $F(2,27)= 24.525$ ,  $p < 0.01$ . The 6 year old group had higher mean scores for syntagmatic responses, whereas the 8 year old children had higher mean scores for paradigmatic responses. On the second trial, the children differed significantly on the paradigmatic responses  $F(2,2 27)= 3.493$ ,  $p < 0.05$ . The 8 year old children had higher mean scores when compared to the other two groups. On the third trial, the children differed on no response  $F(2,27)= 3.636$ ,  $p < 0.05$ , where again the 6 year old children had higher mean score values.



**LIST 1 (Items with syntagmatic examples)**

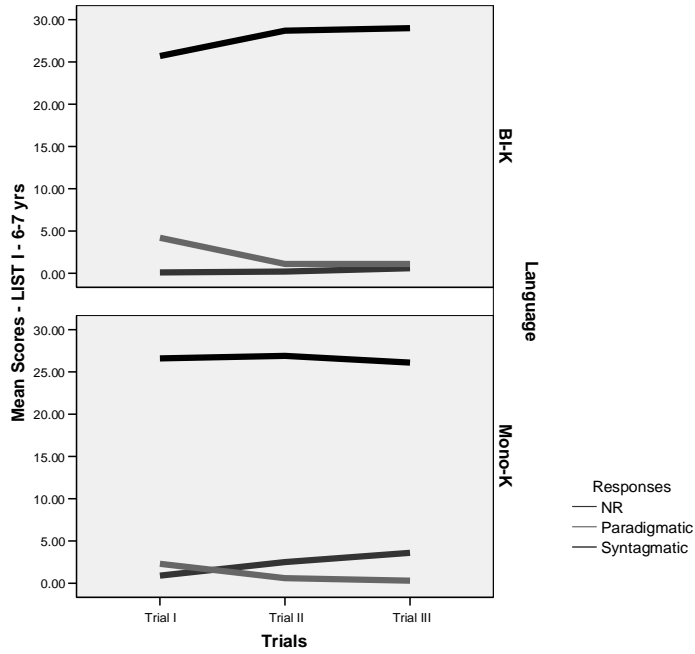


Figure 1(a) Comparison between 6-7 year old Bilingual and Monolingual children for List 1 across trials, across age groups.

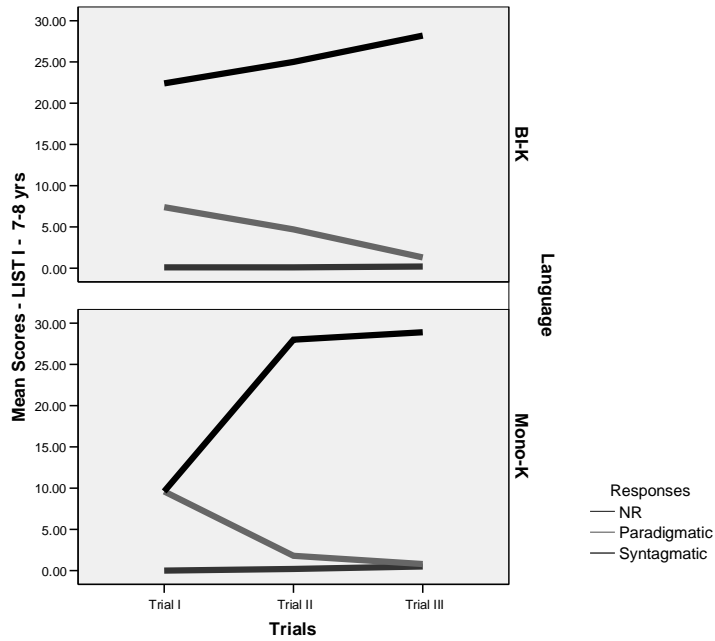


Figure 1(b) Comparison between 7-8 year old Bilingual and Monolingual children for List 1 across trials, across age groups.

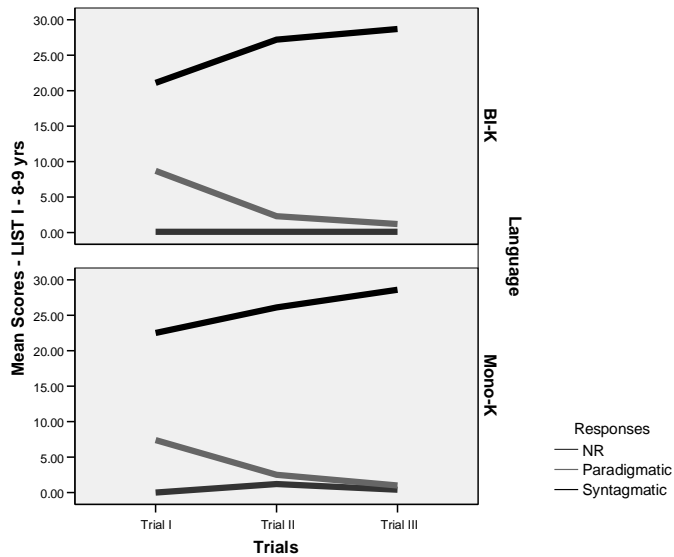


Figure 1(c) Comparison between 8-9 year old Bilingual and Monolingual children for List 1 across trials, across age groups.

Figures 1(a), 1(b) & 1(c) - Responses of Monolingual and Bilingual children across age group, across trials

The above figures show the comparison between Bilingual and Monolingual children for List 1 across trials, across age groups. From the figures the following can be inferred:

***Figure 1 (a):***

1. *Paradigmatic responses across trials:* A clear trend in responses is seen where, that there is a decrease in the number of paradigmatic responses across trials. This fall in the responses is seen especially from the second trial onwards. Though the trend is seen as same in both the language groups, the fall is steep in bilingual group. This says that the number of paradigmatic responses generated by these children is comparatively more than the monolingual group.

2. *Syntagmatic responses across trials:* As observed from figure 1 (a) above, the mean scores for syntagmatic responses are more in comparison with the paradigmatic and no responses. The mean scores for syntagmatic responses increased with trials in the bilingual group. The monolingual group was consistent in generating syntagmatic responses across the trials, but a slight fall in response is noticed towards the third trials.
3. *No responses across trials:* The one response that clearly differentiates between the bilingual and monolingual group in this age is the number of no responses given by the children. The figure 1 (a) clearly shows that the number no responses increases with trials in the monolingual group than in the bilingual group. The response given by the bilingual group is almost consistent across the three trials, though a small change is noticeable.

**Figure 1(b):**

1. *Paradigmatic responses across trials:* From the above figure 1 (b), a clear difference in the paradigmatic responses is seen across the two groups. The number of paradigmatic responses is same in both the groups for the first trial. But, from the second trial onwards the decrease in the response is greater in the monolingual group. The bilingual group shows a very gradual fall in response, and this fall is greatest towards the third trial. This means to say that the paradigmatic responses are maintained across trials in bilingual children in this age group.
2. *Syntagmatic responses across trials:* This response gives a clearer picture of the difference between the two groups. As seen from the figure 1 (b), in the monolingual group, the increase in the number of syntagmatic response is

greater when compared to the bilingual group. This increase is happening gradually across the trials in monolingual children till the second trial. From the second trial the response reaches a plateau in both the groups.

3. *No responses across trials*: “No response” does not differentiate between the two groups. The responses are consistent across trials in both the groups.

**Figure 1 (c):**

1. *Paradigmatic responses across trials*: The trend across trials is the same in both the groups, except the number of paradigmatic responses generated by the bilingual group is greater than the monolingual group. This can be seen in the differences in the mean scores of the two groups.
2. *Syntagmatic responses across trials*: The number of syntagmatic responses increases as the trials increase. In the bilingual group, the increase is seen more clearly than in the monolingual group from the first trial onwards only.
3. *No responses across trials*: In the bilingual group, it is seen that the responses across the trials is consistent, but, whereas, in the monolingual group, there is a sudden increase in the no responses in the second trial, after which, a slight decrease in no response is seen.

The above figures illustrate the responses given by the monolingual and bilingual children for List 1 (words with syntagmatic relations). It is evident from the figures that there is clear shift in the lexical-semantic knowledge from syntagmatic to paradigmatic responses. Nevertheless, the trend across age group is found to be similar across trials in all the age groups, where the paradigmatic responses decrease across trials and syntagmatic responses increase across trials. Though children both the groups organize their lexical-semantic knowledge in a similar pattern, a subtle

difference with respect to age is seen. The shift in the organization is seen at an earlier in the bilingual when compared to the monolingual group of children.

**LIST 2 (Items with Paradigmatic relations)**

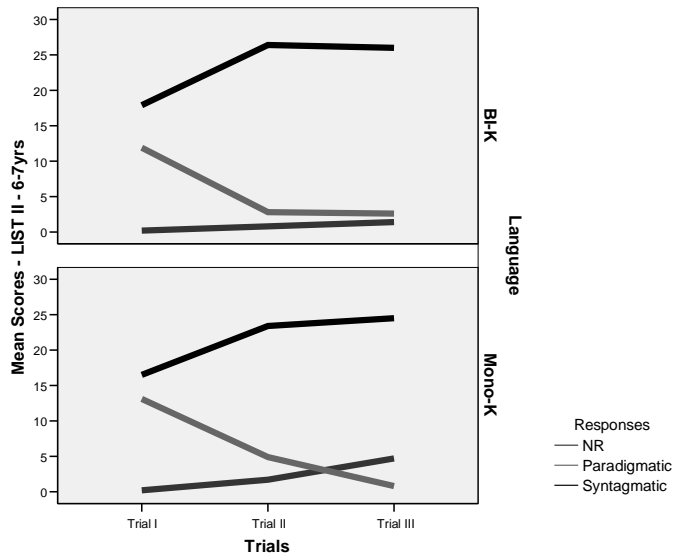


Figure 2(a) Comparison between 6-7 year old Bilingual and Monolingual children for List 2 across trials, across age groups.

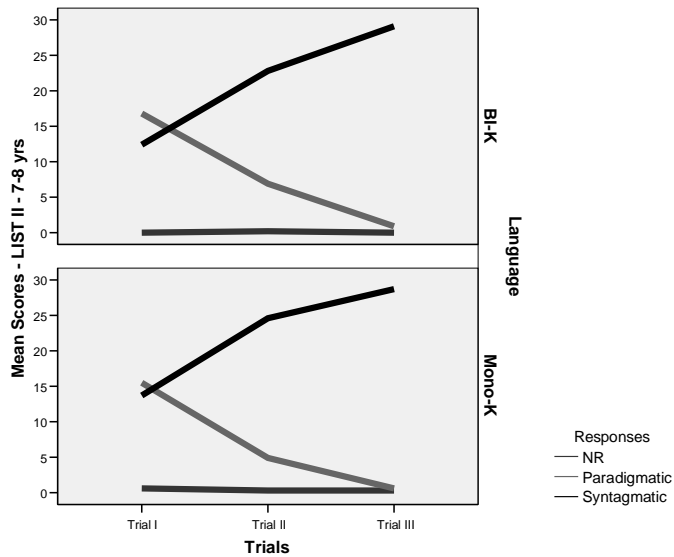


Figure 2(b) Comparison between 7-8 year old Bilingual and Monolingual children for List 2 across trials, across age groups.

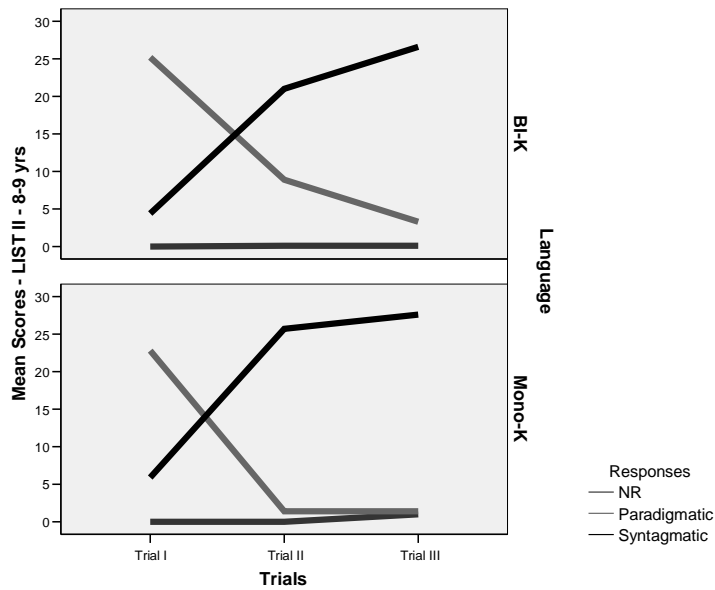


Figure 2(c) Comparison between 8-9 year old Bilingual and Monolingual children for List 2 across trials, across age groups.

Figures 2(a), 2(b) & 2(c) - Responses of Monolingual and Bilingual children across age group, across trials

**Figure 2(a):**

1. *Paradigmatic responses across trials:* The trend between both the groups is the same, but the difference here lies in the way the slope falls. The number of paradigmatic responses generated by both the groups is more in the first trial and then it decreases. This decrease is more prominent in bilingual, whereas the monolingual children are able to make paradigmatic responses even through the second trial. At the third trial there is a sharp fall in responses given by monolingual children, while in the bilingual children the decrease is gradual from the second trial.
2. *Syntagmatic responses across trials:* The scores for syntagmatic responses across trials is seen to be same for both the groups. As the trials increases the number of

syntagmatic responses increases in both the groups. The increase is gradual from the first trial and there is a sudden change in the second trial after which the line reaches a plateau.

3. *No responses across trials:* The two groups can be clearly distinguished on the basis of the no responses across the three trials. It can be seen from the figure 2(a) that, in the bilingual group, there is slight and gradual increase in no responses. Whereas, in the monolingual group, this increase is seen more clearly towards the third trial. Where a sharp raise is noticed.

**Figure 2(b):**

Figure 2(b) shows the comparison between 7-8 years Bilingual and Monolingual children for List 2 across trials. From the figure it can be seen that the trend in the responses across the trials in both the groups is similar where, number of paradigmatic responses given by the children in both the group decrease with trials and the number of syntagmatic responses increase across the trials. It is interesting to observe that the responses for syntagmatic and paradigmatic responses start to overlap after the first trial. But, there is a difference in this overlap between the bilingual and monolingual group. In the bilingual group, this overlap starts at a later stage after the first trial when compared to the monolingual group.

**Figure 2 (c):**

1. *Paradigmatic responses across trials:* There is a clear difference between the bilingual and monolingual group on the basis of paradigmatic responses noticed. In the bilingual group, it can be seen that the paradigmatic responses are maintained even after the second trial and the mean scores does not reduce to the



least even on the third trial. Whereas, in the monolingual group, there is a sudden fall in paradigmatic responses from the first trial to the second trial. Unlike the bilingual group, in the monolingual group, the paradigmatic response merges with no responses. This is to say that the number of paradigmatic responses generated across trials decreases at a greater rate in the monolingual group when compared to the bilingual group.

2. *Syntagmatic responses across trials:* The difference in the two groups on syntagmatic responses lies in the slope of the line. In the monolingual group, the line is steeper when compared to the bilingual group. If observed carefully, it can be seen that the number of syntagmatic responses generated by the monolingual group, across trials is more in comparison to the bilingual group. This can be seen by a slight upward shift in the line of monolingual group. Also the gap between the paradigmatic response and the syntagmatic response is greater in monolingual children. This indicates that the number of syntagmatic responses across trials increases at a greater rate in the monolingual group.
3. *No responses across trials:* There is an increase in the line for no response in the monolingual group when compared to that of the bilingual group. In the bilingual group, the response is consistent across trials with no increase or decrease in the response.
4. *The overlap between syntagmatic and paradigmatic responses:* As seen from the figure 2(c), there is an overlap between the syntagmatic and paradigmatic responses, which is seen after the first trial. This overlap occurs at a later stage, which is more towards the second trial in the bilingual group. Whereas, in the monolingual group the overlap between the lines occurs at an earlier stage.

The above figures exemplify the responses given by monolingual and bilingual children for the List 2 (items for paradigmatic relations). There is an unmistakable shift from paradigmatic to syntagmatic responses in the group of children. One could consider that the words in List 2 could be a better predictor for this shift. The children in both the groups have generated more number of paradigmatic responses when List 2 was given as stimulus when compared to List 1. Yet, across the three trials, the trend across age group is found to be similar, where the paradigmatic responses decrease across trials and syntagmatic responses increase across trials.

## II. To compare the development of lexical-semantic organization in the two languages of bilingual children

Table 7 shows the mean and standard deviation values for the two languages of bilingual children. The highlighted values in the table show that the standard deviation values are greater than the mean values, which is especially true in the younger groups of 6 years. This trend is noticed for “clang”, “no responses” and “non-associated” responses in the younger group. This trend gets scattered in the 7 year old group and seen least in the 8 year old group.

The same trend is seen across the two languages, showing there is not much difference between the languages spoken by bilingual children.

Table 7: Mean and Standard deviation- Comparison across age in Bilingual children

Language	Lists	Trials	Responses	6 years		7 years		8 years	
				Mean	S.D	Mean	S.D	Mean	S.D
English	LIST 1	Trail I	Syntagmatic	23.50	5.54	24.4	6.07	20.10	4.72
			Paradigmatic	5.90	5.02	<b>6.00</b>	<b>8.55</b>	9.80	4.68
			Clang	<b>.10</b>	<b>.31</b>	.00	.00	.00	.00
			Non Associated	<b>.50</b>	<b>.70</b>	<b>.40</b>	<b>.69</b>	<b>.10</b>	<b>.31</b>
			No response	.00	.00	.00	.00	.00	.00
		Trial II	Syntagmatic	25.50	3.89	26.60	5.18	28.10	1.85
			Paradigmatic	4.10	3.24	<b>2.90</b>	<b>4.14</b>	1.90	1.85
			Clang	<b>.10</b>	<b>.31</b>	<b>.20</b>	<b>.42</b>	.00	.00
			Non Associated	<b>.20</b>	<b>.41</b>	<b>.30</b>	<b>.67</b>	.00	.00
		Trial III	No response	<b>.10</b>	<b>.31</b>	.00	.00	.00	.00
			Syntagmatic	29.10	1.28	29.30	1.15	28.60	2.11
			Paradigmatic	<b>.6</b>	<b>1.07</b>	.50	.97	1.40	2.11
			Clang	.00	.00	.00	.00	.00	.00
			Non Associated	.00	.00	<b>.10</b>	<b>.31</b>	.00	.00
		English	LIST 2	Trial I	No response	<b>.30</b>	<b>.4</b>	<b>.10</b>	<b>.31</b>
Syntagmatic	15.00				5.24	14.60	7.36	5.10	2.68
Paradigmatic	14.50				5.35	14.80	7.06	24.80	2.69
Clang	.00				.00	<b>.20</b>	<b>.63</b>	.00	.00
Non Associated	<b>.30</b>				<b>.48</b>	<b>.30</b>	<b>.67</b>	<b>.10</b>	<b>.31</b>
Trial II	No response			<b>.20</b>	<b>.42</b>	.00	.00	.00	.00
	Syntagmatic			21.4	6.34	23.00	5.63	20.00	6.76
	Paradigmatic			8.10	6.06	6.30	5.10	10.00	6.76
	Clang			<b>.20</b>	<b>.63</b>	<b>.10</b>	<b>.31</b>	.00	.00
	Non Associated			.00	.0	<b>.60</b>	<b>.84</b>	.00	.00
	No response			<b>.20</b>	<b>.42</b>	3.00	9.48	.00	.00
	Syntagmatic			28.00	2.44	24.60	9.13	25.70	3.36

		Trial III	Paradigmatic	<b>1.20</b>	<b>2.57</b>	<b>1.60</b>	<b>3.06</b>	4.20	3.39
			Clang	.00	.00	.00	.00	.00	.00
			Non Associated	.00	.00	<b>.30</b>	<b>.67</b>	.00	.00
			No response	<b>.80</b>	<b>.91</b>	<b>.50</b>	<b>.84</b>	.10	.31
Kannada	LIST 1	Trial I	Syntagmatic	25.70	2.26	22.40	6.75	21.10	6.20
			Paradigmatic	4.2	2.20	7.40	6.56	8.70	6.48
			Clang	.00	.00	.00	.00	.00	.00
			Non Associated	.00	.00	<b>.10</b>	<b>.31</b>	<b>.10</b>	<b>.31</b>
		No response	<b>.10</b>	<b>.31</b>	<b>.10</b>	<b>.31</b>	<b>.10</b>	<b>.31</b>	
		Trail II	Syntagmatic	28.70	1.15	25.00	4.24	27.20	2.52
			Paradigmatic	<b>1.10</b>	<b>1.19</b>	4.70	4.3	2.30	1.94
			Clang	.00	.00	<b>.10</b>	<b>.31</b>	.00	.00
	Non Associated		.00	.00	<b>.10</b>	<b>.31</b>	<b>.40</b>	<b>1.26</b>	
	No response	<b>.20</b>	<b>.63</b>	<b>.10</b>	<b>.31</b>	<b>.10</b>	<b>.31</b>		
	Trial III	Syntagmatic	29.00	1.33	28.20	1.31	28.70	2.05	
		Paradigmatic	.40	.84	<b>1.30</b>	<b>1.41</b>	1.20	2.09	
		Clang	.00	.00	.00	.00	.00	.00	
		Non Associated	.00	.00	<b>.30</b>	<b>.48</b>	.00	.00	
	No response	<b>.60</b>	<b>1.26</b>	<b>.20</b>	<b>.42</b>	<b>.10</b>	<b>.31</b>		
	Kannada	LIST 2	Trial I	Syntagmatic	17.90	2.88	12.40	5.50	4.40
Paradigmatic				11.90	2.92	16.80	5.92	25.20	3.42
Clang				.00	.00	.00	.00	.00	.00
Non Associated				.00	.00	<b>.80</b>	<b>1.47</b>	<b>.40</b>	<b>.96</b>
No response			<b>.20</b>	<b>.42</b>	.00	.00	.00	.00	
Trial II			Syntagmatic	26.40	1.26	22.80	7.52	21.00	5.16
			Paradigmatic	2.80	1.47	6.90	7.24	8.90	5.32
			Clang	.00	.00	.00	.00	.00	.00
		Non Associated	.00	.00	<b>.10</b>	<b>.31</b>	.00	.00	
No response		<b>.80</b>	<b>1.13</b>	<b>.20</b>	<b>.63</b>	<b>.10</b>	<b>.31</b>		
Trial III		Syntagmatic	26.00	1.94	39.10	31.25	26.60	2.91	
		Paradigmatic	2.6000	2.22	<b>.90</b>	<b>1.10</b>	3.30	2.90	
		Clang	.0000	.00	.00	.00	.00	.00	
		Non Associated	.0000	.00	.00	.00	.00	.00	
No response		<b>1.40</b>	<b>2.22</b>	.00	.00	<b>.10</b>	<b>.31</b>		

## II. 1. One-way ANOVA- Comparison across age groups in English-Kannada Bilingual children

Table 8: One-way ANOVA- Comparison across age groups in English-Kannada Bilingual children

Language	List	Trials	Responses	F(2,27)	Sig.
English	LIST 1	Trail I	Syntagmatic	1.715	.199
			Paradigmatic	1.233	.307
			Clang	1.000	.381
			NA	1.194	.319
			NR	.	.
		Trial II	Syntagmatic	1.139	.335
			Paradigmatic	1.167	.326
			Clang	1.080	.354
			NA	1.105	.346
			NR	1.000	.381
		Trial III	Syntagmatic	.521	.600
			Paradigmatic	1.108	.345
			Clang	.	.
			NA	1.000	.381
			NR	2.100	.142
English	LIST 2	Trial I	<b>Syntagmatic</b>	<b>10.581</b>	<b>.000**</b>
			<b>Paradigmatic</b>	<b>11.992</b>	<b>.000**</b>
			Clang	1.000	.381
			NA	.507	.608
			NR	2.250	.125
		Trial II	Syntagmatic	.574	.570
			Paradigmatic	.946	.401
			Clang	.600	.556
			<b>NA</b>	<b>5.063</b>	<b>.014*</b>
			NR	.936	.405
		Trial III	Syntagmatic	.897	.420
			Paradigmatic	2.893	.073
			Clang	.	.
			NA	1.976	.158
			NR	2.220	.128
Kannada	LIST 1	Trial I	Syntagmatic	1.890	.171
			Paradigmatic	1.788	.187
			Clang	.	.
			NA	.500	.612
			NR	.000	1.000
		Trail II	Syntagmatic	4.036	.171
			<b>Paradigmatic</b>	<b>4.179</b>	<b>.026*</b>
			Clang	1.000	.381
			NA	.765	.475
			NR	.167	.847
		Trial III	Syntagmatic	.633	.539
			Paradigmatic	1.025	.372
			Clang	.	.
			<b>NA</b>	<b>3.857</b>	<b>.034*</b>
			NR	1.118	.341

Kannada	LIST 2	Trial I	<b>Syntagmatic</b>	<b>27.668</b>	<b>.000**</b>
			<b>Paradigmatic</b>	<b>24.525</b>	<b>.000**</b>
			Clang	.	.
			NA	1.543	.232
			NR	2.250	.125
		Trial II	Syntagmatic	2.672	.087
			<b>Paradigmatic</b>	<b>3.493</b>	<b>.045*</b>
			Clang	.	.
			NA	1.000	.381
			NR	2.404	.109
		Trial III	Syntagmatic	1.659	.209
			Paradigmatic	3.130	.060
			Clang	.	.
			NA	.	.
			<b>NR</b>	<b>3.636s</b>	<b>.040*</b>

Note: \*  $p \leq 0.05$

\*\*  $P < 0.01$

To address the second objective, a comparison across age groups in English-Kannada Bilingual children was made. This was carried out using One-way ANOVA. With respect age within the bilingual children, only a few parameters were significantly different ( $p < 0.05$ ).

Since a significant difference was obtained on certain parameters across age group across the trials, a post-Hoc analysis of the responses across age within the bilingual children was carried out.

#### **List 1 (Words for Syntagmatic relations)**

In English language, a significant difference was not obtained for any of the responses across the age group across the trials.

#### **List 2 (Words for Paradigmatic relations)**

On the first trial, there was a significant difference on syntagmatic,  $F(2,27)=10.581$ ,  $p < 0.01$  and paradigmatic,  $F(2,27)=11.992$ ,  $p < 0.01$  responses with respect to age. Here, for the syntagmatic responses, the 8 years differed significantly from the 6

and 7 year old children, whose mean scores were higher than 6 year old children., The 8 year old children, again differed from the 6 and 7 year old children in terms of paradigmatic responses, where the scores was higher for the 8 year old children. On the second trial, the only parameter that differed significantly was no response,  $F(2,27)= 5.063$ ,  $p<0.05$  across the age. Here, the 7 year old children differed significantly from the other two age groups, where the scores were higher for 7 year old children. Again, on the third trial, there was no significant result obtained.

### **List 1 (Words for Syntagmatic relations)**

In Kannada language, no significant result was obtained for the first trial. But on the second trial, a highly significant difference was obtained for the paradigmatic responses  $F(2, 27)= 4.179$ ,  $p<0.05$  across the age groups. Here, a difference was seen between the age group, 7 and 8 year old children. In addition, on the third trial, the children significantly differed in terms of no response  $F(2, 27)= 3.857$ ,  $p<0.05$ . Here, the 7 year old differed significantly than the other two age groups, showing an increase in no responses at 7 years.

### **List 2 (Words for Paradigmatic relations)**

In Kannada language, a significant difference was obtained on the syntagmatic  $F(2,27)= 27.668$ ,  $p<0.01$  and paradigmatic responses  $F(2,27)= 24.525$ ,  $p< 0.01$  on the first trial. All the three age groups differed from one another with respect to their responses. For syntagmatic responses, 8 year old children generated the least number of responses, while the 6 year old children had the maximum mean score. For paradigmatic responses, the exact opposite trend was observed, where the 8 year old children made the maximum responses and the 6 year old children giving the least number of responses. On the second trial, the children differed significantly from each

other only on paradigmatic responses  $F(2,27)= 3.493$ ,  $p<0.05$ . The most significant difference here again was between the 6 year old and the 8 year old children. Here, the 8 year old children had higher scores compared to that of 6 year old children. Finally, on the third trial, the children differed significantly only on no responses  $F(2,27)= 3.636$ ,  $p<0.05$ . This difference was particularly clear between 6 year old and 8 year old children.



**LIST 1 (Items with syntagmatic examples)**

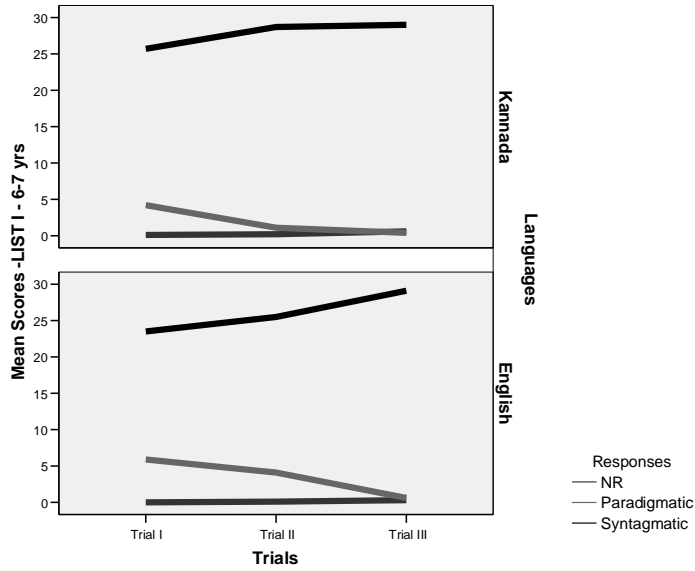


Figure 3(a) Comparison of languages of 6-7 year old English-Kannada Bilingual for List 1 across trials

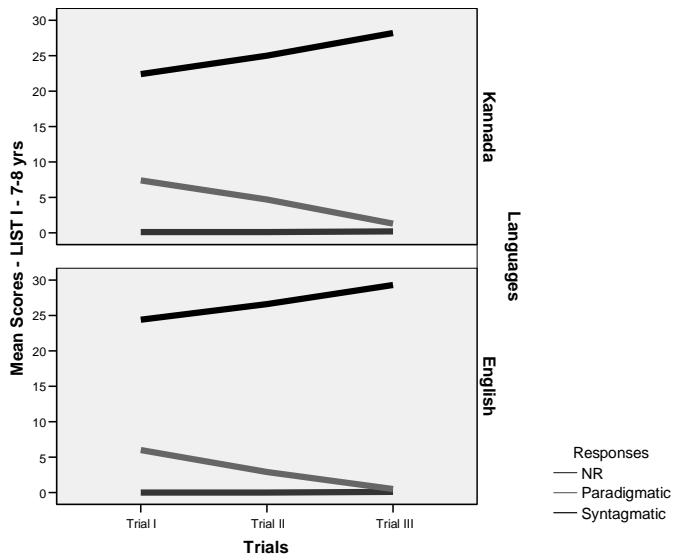


Figure 3(b) Comparison of languages of 7-8 year old English-Kannada Bilingual for List 1 across trials

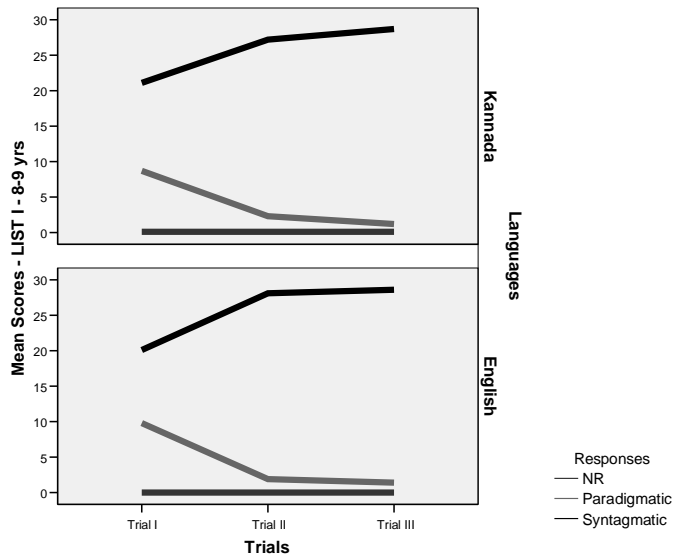


Figure 3(c) Comparison of languages of 8-9 year old English-Kannada Bilingual for List 1 across trials

Figures 3(a), 3(b) & 3(c) - Responses of Bilingual children across age group, across trials

**Figure 3(a):**

1. *Paradigmatic responses across trials:* Figure 3(a) shows the responses of the two languages of bilingual children, between Kannada and English. The number of paradigmatic responses given in English is comparatively more than in Kannada. In both the groups the number responses decreases as the trial increases. A sharp dip in the response is seen at the second trial in Kannada after which the decrease is seen as a steady rate. In English, the response reduces upto the point of no response line only at the third trial.
2. *Syntagmatic responses across trials:* Figure 3(a) shows that the number of syntagmatic responses generated in English language is more when compared to the ones generated in Kannada language. Again, the number of syntagmatic responses increases with trials. Unlike the trend seen in English, the responses

given in Kannada reaches a plateau after the second trial, but this trend is not seen in English. In English, the responses keep increasing, showing an upward growth in the number of syntagmatic responses.

3. *No responses across trials:* In both the languages of the bilingual children, the trend for no response is similar. A steady plateau is maintained across the trials in both the languages.

**Figure 3(b):**

Figure 3(b) shows the comparison of languages of 7-8 year old English-Kannada Bilingual for List 1 across trials. When the figures are compared, a similar trend is observed in both the languages. Here, the number of paradigmatic responses decreases as the trials increased and the number of syntagmatic responses increases as the trials increased. In both the responses, that is, paradigmatic as well as syntagmatic responses, an asymptote is not reached even after the third trial. When “no responses” are compared in both the languages, no change is evidently seen across trial.

**Figure 3 (c):**

Figure 3 (c) shows the comparison of languages of 8-9 year old English-Kannada Bilingual for List 1 across trials. The pattern of responses seen in both languages is comparable. The number of paradigmatic responses decreases with trials and the syntagmatic responses increases with trials. No difference in the pattern of no responses is observed. The number of “no responses” given by the children of this age group is almost negligible.

To summarize, when the mean scores are compared the tendency of responses is similar across age groups. But, as seen in the Figure 3 (a), 6 year old children have generated more number of paradigmatic responses in English than in Kannada, whereas, this difference in responses between the two languages is not seen in the other two age groups.

**LIST 2 (Items with Paradigmatic relations)**

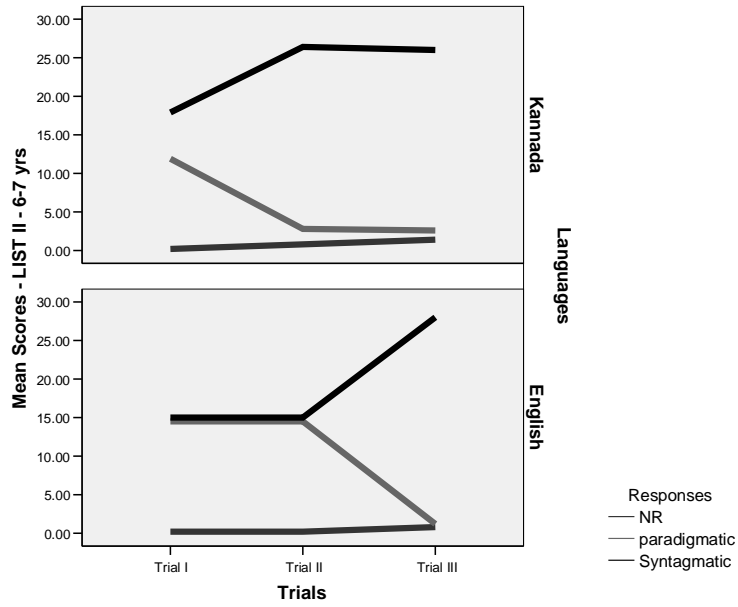


Figure 4(a) Comparison of languages of 6-7 year old English-Kannada Bilingual for List 2 across trials

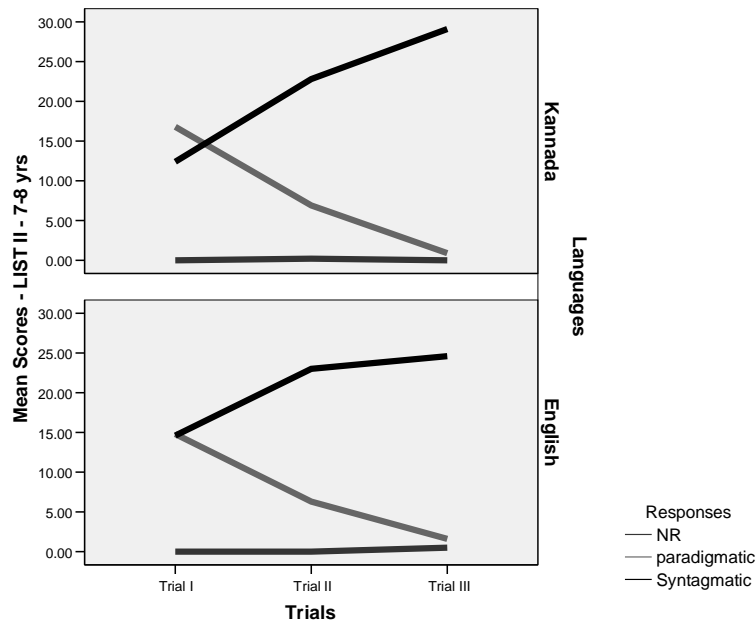


Figure 4(b) Comparison of languages of 7-8 year old English-Kannada Bilingual for List 2 across trials

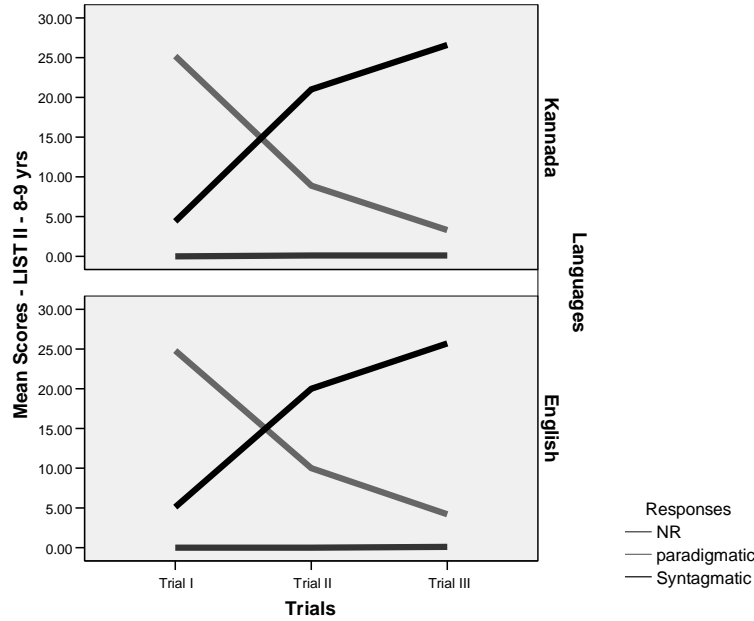


Figure 4(c) Comparison of languages of 8-9 year old English-Kannada Bilingual for List 2 across trials

Figure 4 (a), 4 (b) & 4 (c): Responses of Bilingual children across age group, across trials

**Figure 4 (a):**

1. *Paradigmatic responses across trials:* The pattern of responses differs in both the languages with respect to paradigmatic and syntagmatic responses. As seen in the graph, the paradigmatic responses given in English follows a steady plateau at first and the responses start to decrease gradually towards the third trial. In Kannada the exact opposite pattern can be observed. Here the responses decrease steadily till the second trial, after which a plateau is reached.
2. *Syntagmatic responses across trials:* The pattern of responses differs in both the languages as seen from figure 4(a). In English, similar to the paradigmatic responses, a plateau is seen till the second trial. But unlike the paradigmatic responses, there is a steady increase in the syntagmatic response till the third trial.

An exact opposite pattern can be observed in Kannada, where the number of syntagmatic responses increases from the first trial onwards to the third trial after which an asymptote is obtained in their responses.

3. *No responses across trials:* In English, the increase in no response after the second trial is barely noticeable, whereas in Kannada a good increase in the number of no response is seen after the second trial.
4. The most striking pattern that is observed here is the merge that occurs with the syntagmatic and paradigmatic responses in the beginning of the first trial. These two responses amalgamate with each other and then a split is seen from the second trial onwards, where the paradigmatic responses decreases and the syntagmatic responses increase.

**Figure 4 (b):**

Figure 4(b) shows the comparison of languages of 7-8 year old English-Kannada Bilingual for List 2 across trials. From the figure it can be seen that in both the languages an identical trend is followed. The number of paradigmatic responses decreases across trials and the number of syntagmatic responses increases across trials. In both these responses, a plateau is not reached even at the third trial. An evident change in the pattern is the overlap that occurs around the first trial between the paradigmatic and syntagmatic responses. The difference in the languages in this term is that, this overlap is just noticeable in English, whereas, in Kannada a clear overlap is after the first trial, almost towards the second trial. Interestingly, the number of no responses is seen to be more in English when compared to Kannada, but this change is seen only towards the third trial.

**Figure 4 (c):**

Figure 4 (c) shows the comparison of languages of 7-8 year old English-Kannada Bilingual for List 2 across trials. As seen in the figure, it is clear that the pattern followed in both the languages is similar. The paradigmatic responses decrease across trials and it maintains such a pattern even at the third trial, without reaching a plateau. The syntagmatic responses, increases across trials and again it maintain the same pattern without reaching a plateau. The overlap occurs at the exact same point for both the languages. The mean scores for the paradigmatic responses seems to be more in English when compared to Kannada. The gap between the paradigmatic and syntagmatic responses is reduced in English in comparison with Kannada. No responses does not show any change in its pattern, being constant across all the three trials.

To summarize, it is seen from the figures given above that in English, the Bilingual children are able to generate more number of paradigmatic responses in comparison to in Kannada. Though this difference is subtle, the mean scores in English paradigmatic responses is greater than in Kannada.



### III. Issues in syntagmatic-paradigmatic shift: Word Class Analysis

#### LIST 1 (Items with syntagmatic examples)

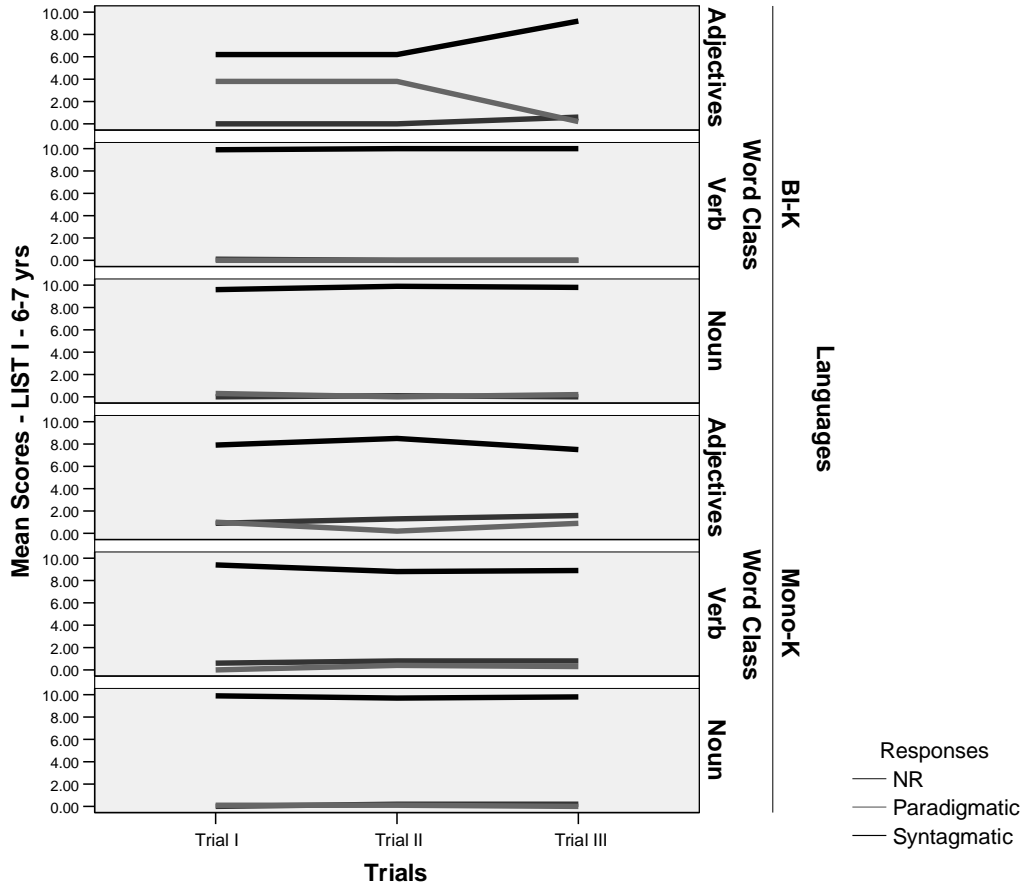


Figure 5(a): Word class analysis: Comparison between 6-7 year old Monolingual and Bilingual children across trials in List 1

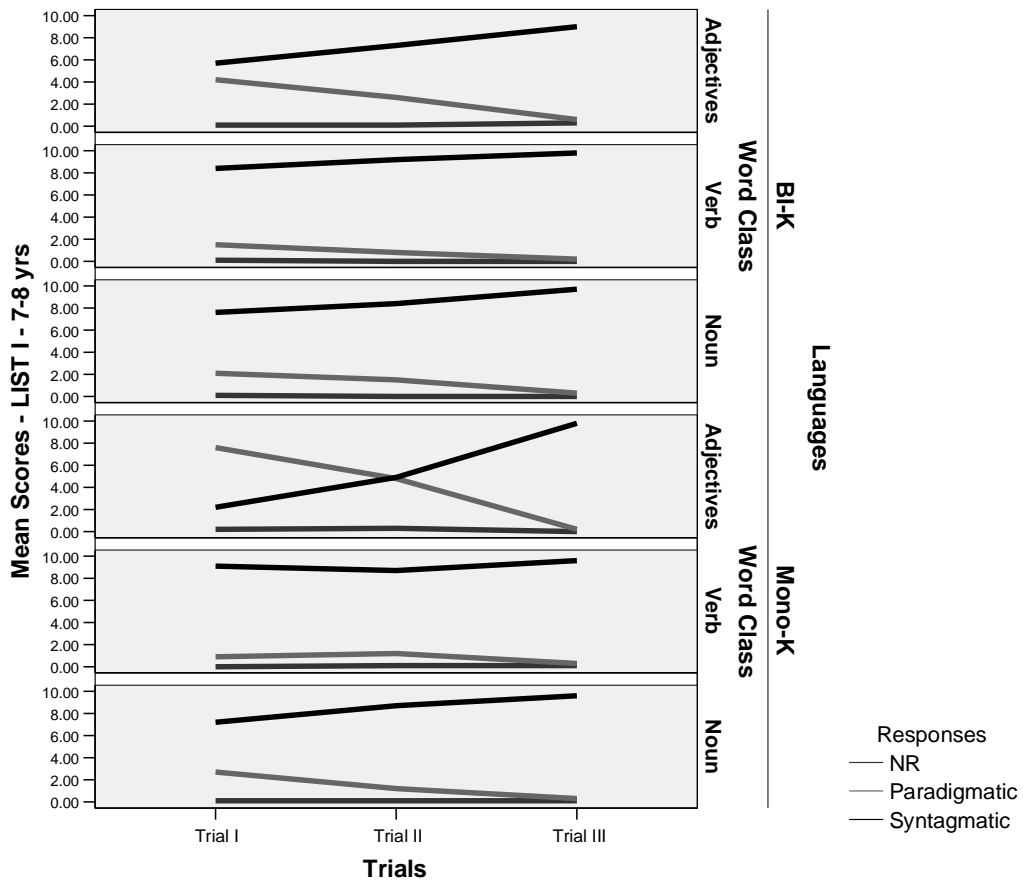


Figure 5(b): Word class analysis: Comparison between 7-8 year old Monolingual and Bilingual children across trials in List 1

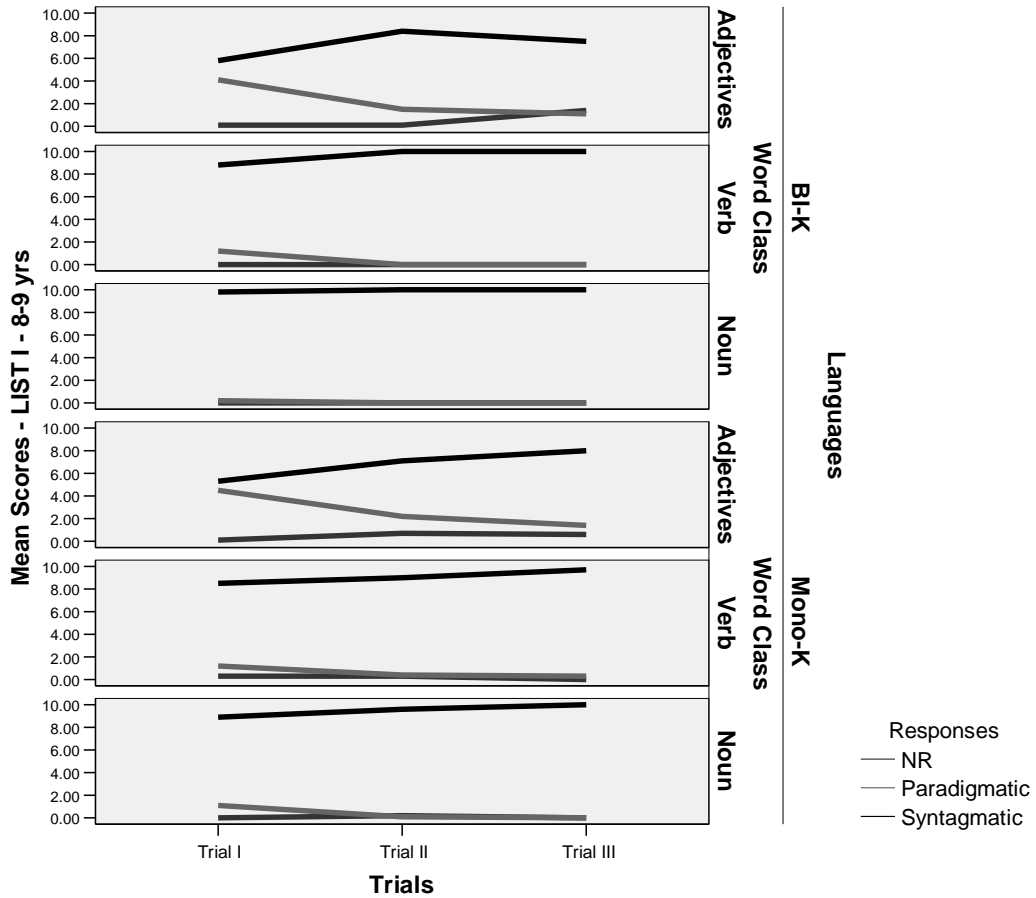


Figure 5(c): Word class analysis: Comparison between 8-9 year old Monolingual and Bilingual children across trials in List 1

**Figure 5(a):**

1. *Nouns*: From figure 5(a), it can be seen that the mean scores for paradigmatic responses and no responses are almost negligible. The scores of these two responses follow the same trend in both the monolingual and bilingual group, where an overlap between the responses is seen. With respect to syntagmatic responses for nouns, it is clearly seen that the mean scores are higher, and it follows the same trend in both the groups.
2. *Verbs*: Here, in the bilingual Kannada group, there is no differentiation between the paradigmatic and no responses. Whereas, in the monolingual group, the mean

scores for the no responses is slightly greater than the paradigmatic responses. With regards to the syntagmatic responses, both the groups have higher mean scores and also follow the same trend.

3. *Adjectives*: The greatest difference between the word class and between the two groups across the trials is seen in the responses given by the children for adjectives. In the bilingual group, the paradigmatic responses decrease after the second trial, whereas the syntagmatic responses increase with trials. In the monolingual group, the number of no responses is seen to be more than the paradigmatic responses. In the paradigmatic response of this group, a dip is seen in the mean scores at the second trial and then the responses are seen to increase slightly. With respect to Syntagmatic responses, after the second trial, the responses start to decrease towards the third trial.

**Figure 5(b):**

1. *Nouns*: A clear raise in the number of paradigmatic responses is seen in this age group, both in bilingual and monolingual children. Across the trials, these responses are seen to decrease. Syntagmatic responses are seen to increase across trials in both the bilingual and monolingual group of children. In contrast, there is no difference in the no responses, where a similar pattern is seen both the groups.
2. *Verbs*: In the bilingual group, there is an initial increase in the paradigmatic responses given by the children, but these responses decrease across trials. Whereas, in the monolingual group, the mean scores for paradigmatic responses are held constant and the decrease is seen only towards the third trial. The mean scores for no responses are almost negligible in both the groups.

3. *Adjectives:* A clear increase in the number of both syntagmatic and paradigmatic responses are seen in the monolingual and bilingual group. In the bilingual group the lines for these responses does not overlap, whereas in the monolingual group, an overlap between the responses at the second trial. In both the groups, the trend of increase in syntagmatic responses and decrease in paradigmatic responses across trial is maintained. Again, the mean scores for no responses are almost insignificant.

**Figure 5 (c):**

1. *Nouns:* Here, in the bilingual group, the difference between the paradigmatic and no responses is not seen as a clear demarcation, whereas in the monolingual group, a slight increase in the paradigmatic responses is seen in the first trial, but towards the second trial the difference disappears. Syntagmatic responses in both the monolingual and bilingual group are seen showing the same trend, with an increase in the response towards the second and third trials.
2. *Verbs:* Paradigmatic responses and no responses follow the same trend in both the monolingual and bilingual group. In the first trial, a slight increase is seen in the paradigmatic responses, and towards the third trial this line overlaps with no responses, becoming negligible. Syntagmatic responses increase across the trials in both the groups, but in the bilingual group, a plateau is achieved from the second trial onwards.
3. *Adjectives:* In both the groups, the paradigmatic responses decreases across trials and the syntagmatic responses increases across trials, but, gap seen between these two responses is more pronounced in the bilingual group compared to the

monolingual group. Surprisingly, the number of no responses is found to be more in the bilingual towards the third trial.

**LIST 2 (Items with Paradigmatic relations)**

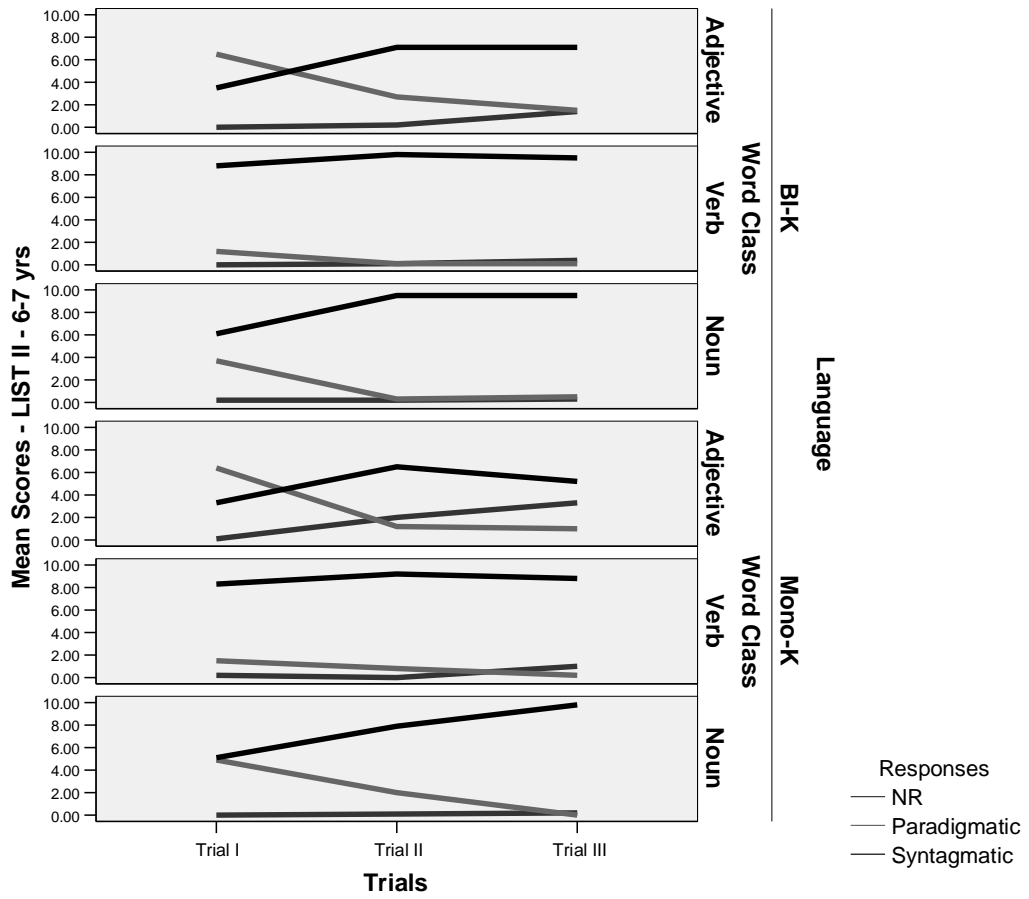


Figure 6(a): Word class analysis: Comparison between 6-7 year old Monolingual and Bilingual children across trials in List 2

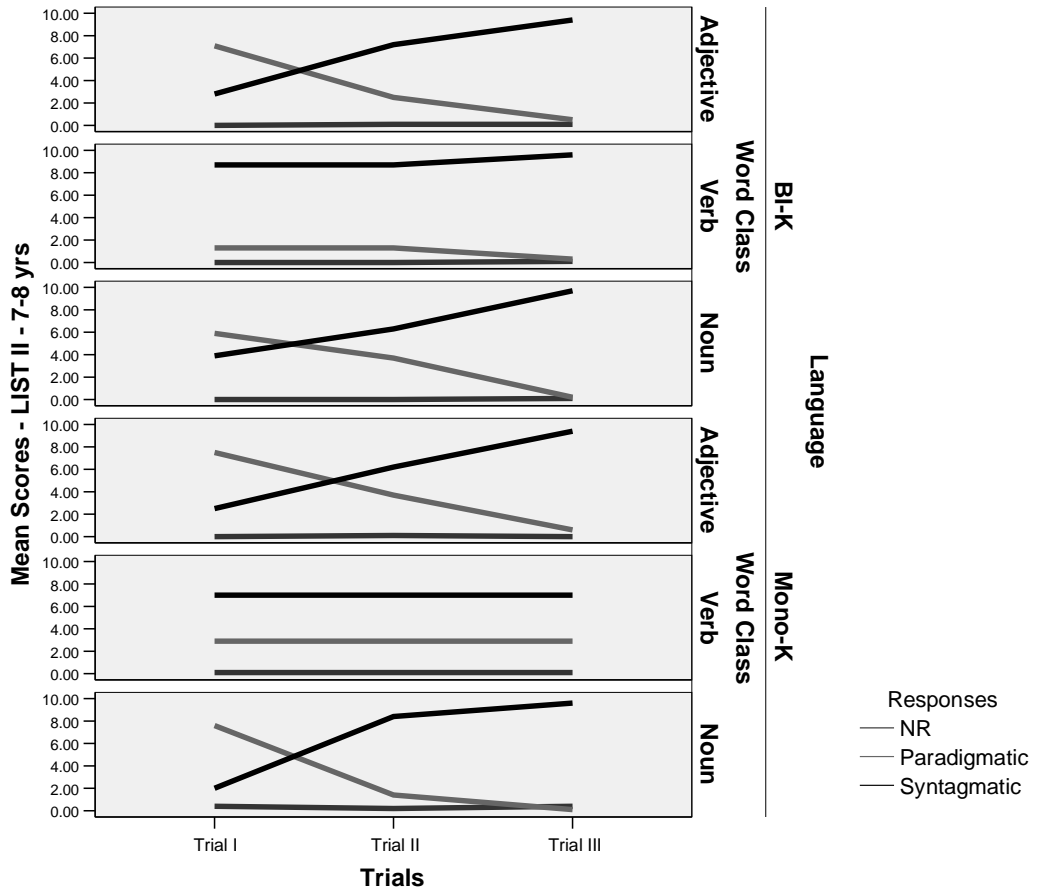


Figure 6(b): Word class analysis: Comparison between 7-8 year old Monolingual and Bilingual children across trials in List 2



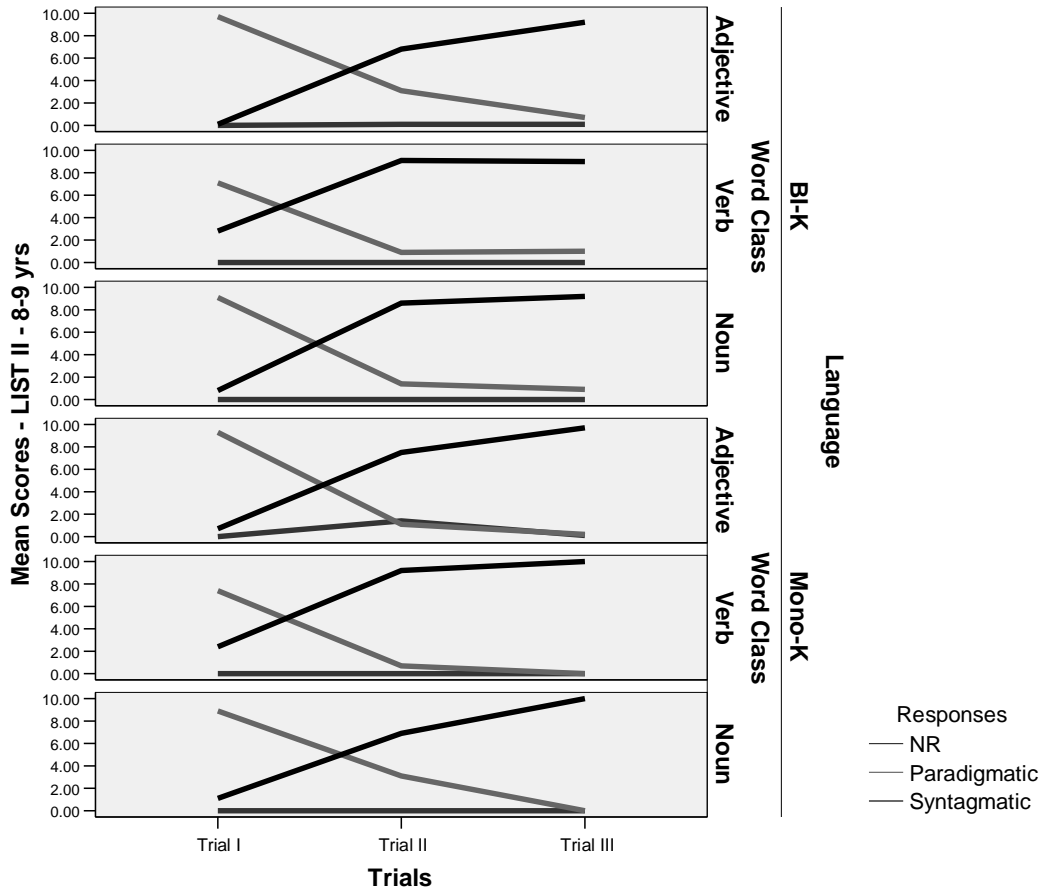


Figure 6(c): Word class analysis: Comparison between 8-9 year old Monolingual and Bilingual children across trials in List 2

**Figure 6 (a):**

1. *Nouns*: In the bilingual group, the paradigmatic responses for nouns decreases with trial and this decrease is seen especially from the first to second trial. From the second trial onwards and to the third trial the paradigmatic responses become almost negligible and intercepts with the no response line. In the monolingual group, the fall in paradigmatic responses is more significantly seen. No response and paradigmatic responses intercept only at the third trial. This is a significant difference between the monolingual and bilingual group. In the monolingual

group, there is a steady increase in the syntagmatic responses, while, in the bilingual group, a plateau is attained after the second trial.

2. *Verbs*: The pattern of responses in both the groups is seen to be similar. Here the paradigmatic responses decrease with trials and the syntagmatic responses increase across trials. The difference between the groups lies in no responses, where in the monolingual group these responses increase towards the third trial.
3. *Adjectives*: Monolingual and the bilingual group are seen to differ from each other on the basis of this response. In the monolingual group, there is a clear raise in the no responses from the second trial to the third trial. Whereas in the bilingual group, this increase is seen only towards the third trial. The other difference is seen in the syntagmatic responses and paradigmatic responses in both the groups. The number of paradigmatic responses generated by the bilingual children is greater when compared to the monolingual children.

**Figure 6 (b):**

1. *Nouns*: In bilingual group, the decrease in paradigmatic responses is seen across trials, but, only after the third trial does the line reach the no response line. Syntagmatic responses increase across trial and a plateau is not reached even after the third trial. In contrast, the children in the monolingual group, though generated paradigmatic responses, their responses decreased across the trials significantly. The similar trend is noticed for the syntagmatic responses in both the monolingual and bilingual groups.
2. *Verbs*: The prominent pattern seen with regards to verbs is in the monolingual group, where across the three trials no decrease or increase in any of the responses is seen. In contrast, in the bilingual group, the paradigmatic

responses decrease across trials and syntagmatic responses increase across trials.

3. *Adjectives*: A steady decrease in paradigmatic responses and an increase in syntagmatic responses is seen in the monolingual group, whereas in the bilingual group, this decrease and increase is seen steadily till the second trial, after which there is a sudden fall and raise in these responses.

**Figure 6 (c):**

It is clearly seen from the graphs above that the pattern of responses of both the monolingual and bilingual group for all the word class across trials is similar. The only prominent change in the pattern is seen in the monolingual group, where the mean scores for the no responses shows a sudden increase at the second trial after which it decreases towards the third trial.

**List 1 (Items for Syntagmatic relations)**

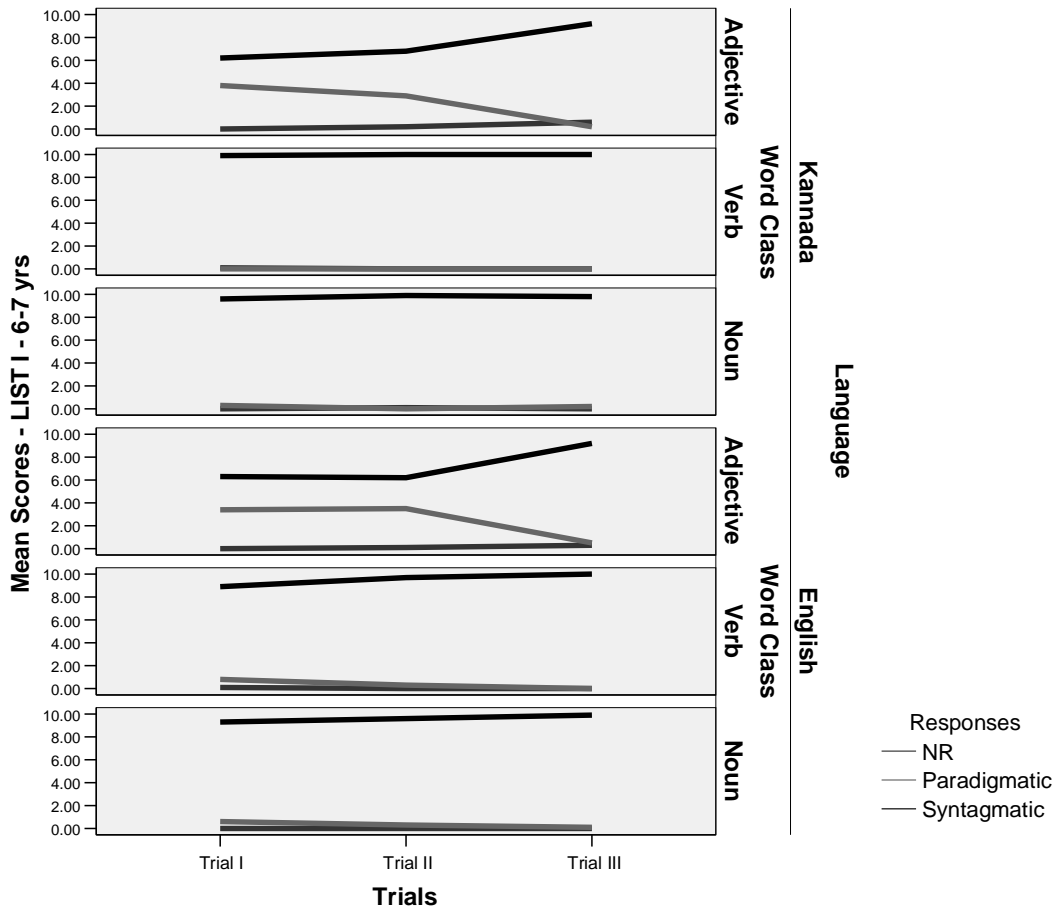


Figure 7 (a): Word Class analysis: Comparison of languages in 6-7 years old English-Kannada Bilingual children for List 1 across trials

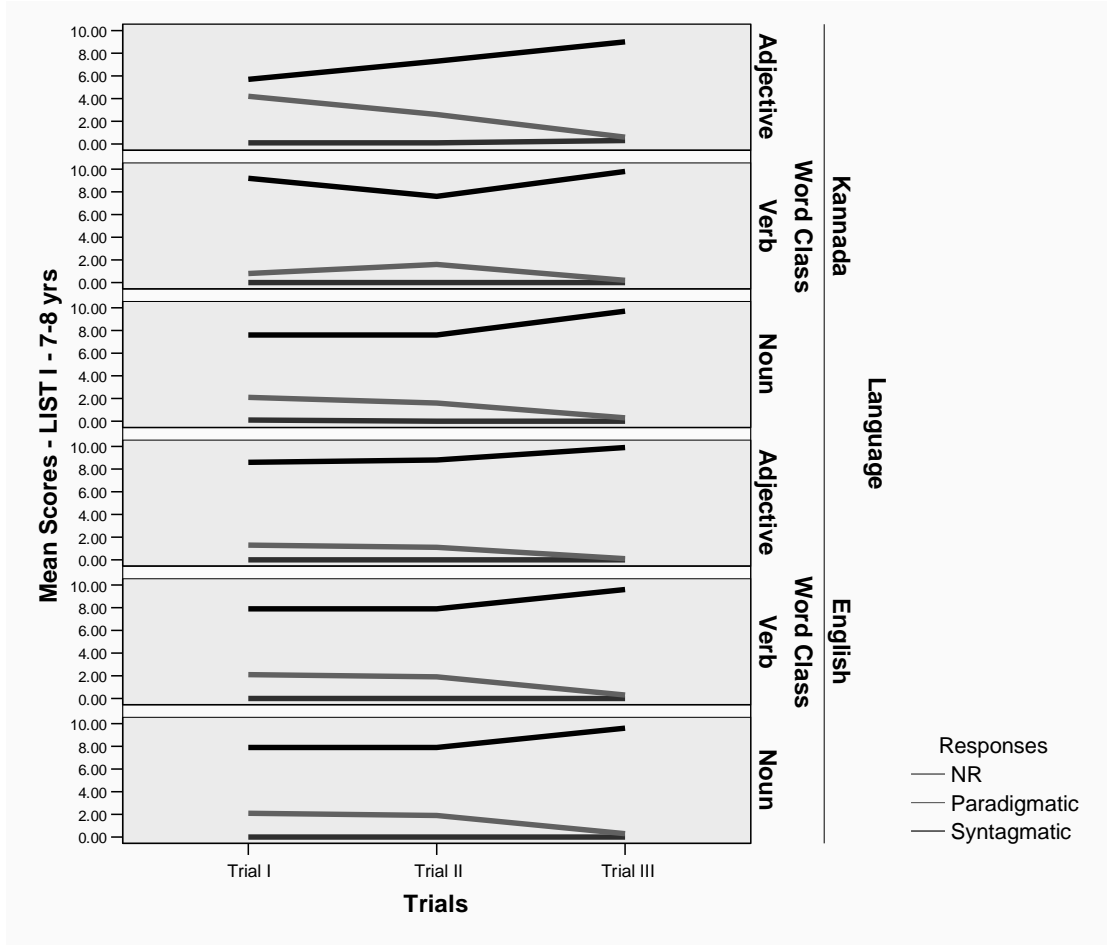


Figure 7 (b): Word Class analysis: Comparison of languages in 7-8 years old English-Kannada Bilingual children for List 1 across trials

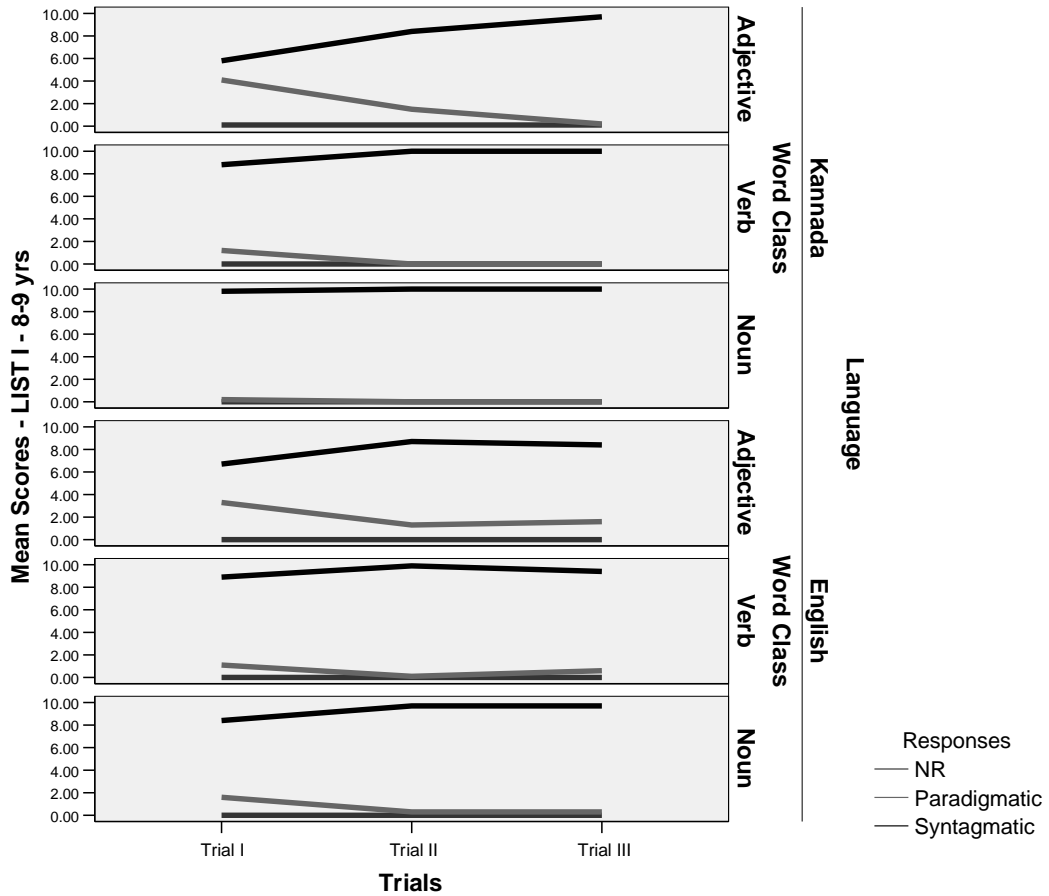


Figure 7 (c): Word Class analysis: Comparison of languages in 8-9 years old English-Kannada Bilingual children for List 1 across trials

**Figure 7 (a):**

1. *Nouns*: There is very subtle difference that can be noted in the paradigmatic responses for nouns in English and Kannada. Children generate more number of paradigmatic responses for nouns in English, when compared to Kannada. There is slight increase in the number of syntagmatic responses in English, whereas in Kannada the response remains constant throughout the trials, showing no increase or decrease in responses. The number of no responses is negligible in both the groups across trials.
2. *Verbs*: The trend for verbs is similar to the one that was noticed for nouns.

3. *Adjectives:* The pattern of response in both the language is similar. Children in both the language generate paradigmatic responses for adjectives, though the number of paradigmatic responses is more in English. Across the trials, in both the languages, syntagmatic responses increase and paradigmatic responses decrease.

**Figure 7 (b):**

1. *Nouns:* Here, the pattern of responses observed in both the languages is similar as seen from the graph. Paradigmatic responses decrease with trials and syntagmatic responses increase with trials.
2. *Verbs:* Unlike the 6 year old group, this group generates paradigmatic responses for verbs, but it decreases with trials. This is held true for both the languages. Syntagmatic responses exhibit the same pattern in both the languages, which increases with trials.
3. *Adjectives:* Surprisingly, in this group, the number of paradigmatic responses for adjectives is lesser in English when compared to Kannada. It decreases across trials in both the languages, whereas syntagmatic responses increase with trials.

**Figure 7 (c):**

As seen from the above graph, the pattern of response across trials in both the language is similar. Here it is seen that paradigmatic responses decrease with trials and syntagmatic response increase with trials. The only prominent difference in the response type is seen in the word class noun of Kannada, where the responses across the trials are maintained at a steady constant, showing no increase or decrease in response.

List 2 (Items for Paradigmatic relations)

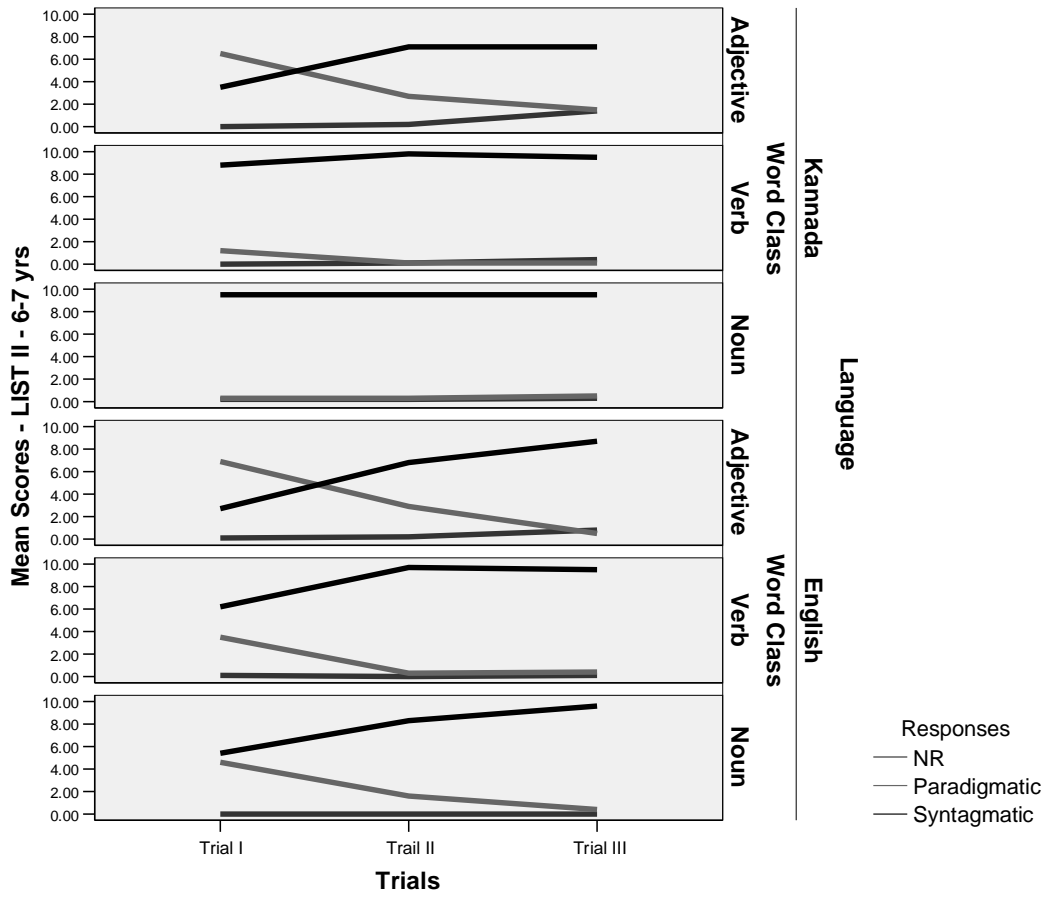


Figure 8 (a): Word Class analysis: Comparison of languages in 6-7 year old English-Kannada Bilingual children for List 2 across trials



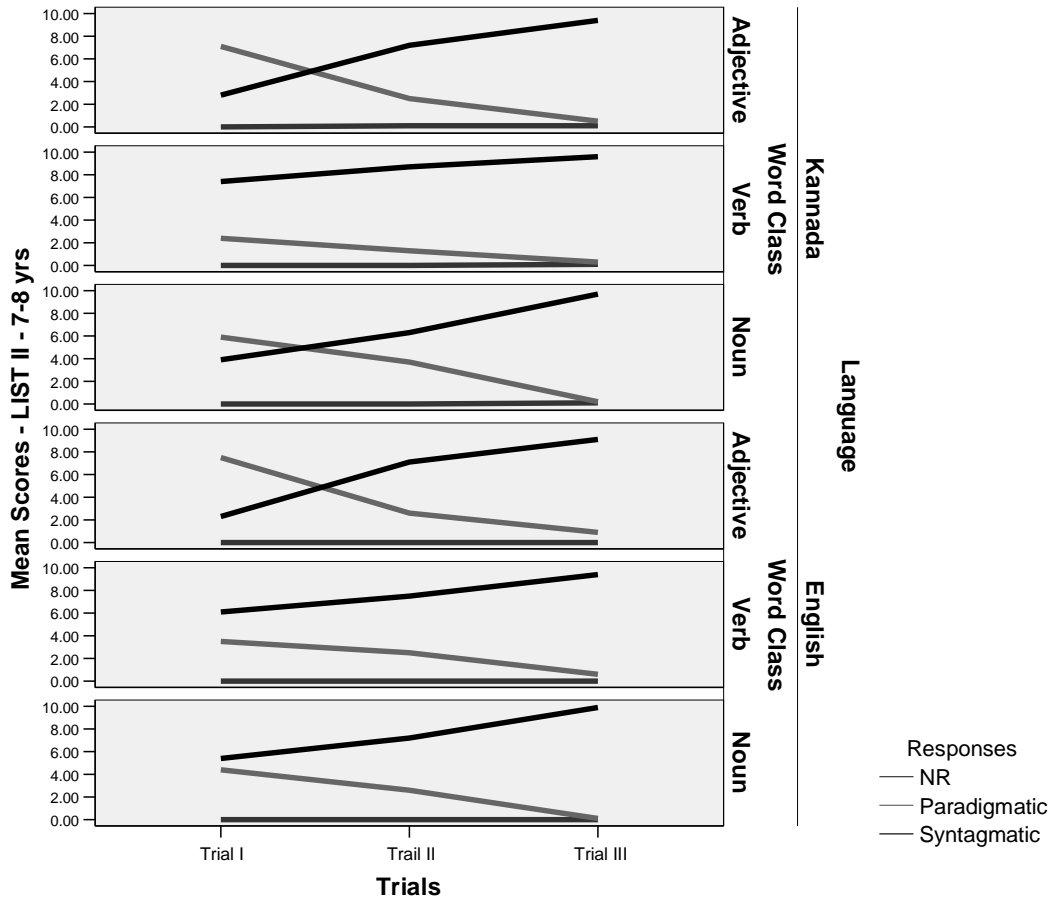


Figure 8 (b): Word Class analysis: Comparison of languages in 7-8 year old English-Kannada Bilingual children for List 2 across trials

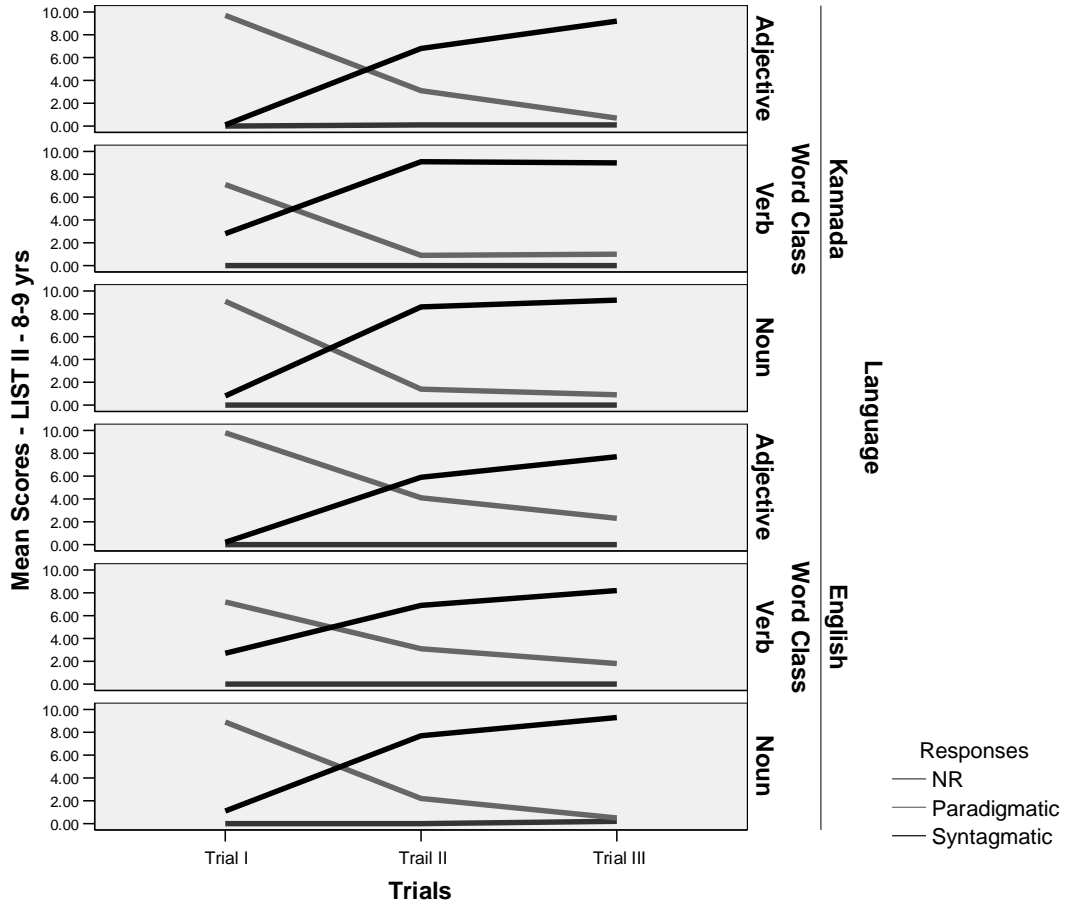


Figure 8 (c): Word Class analysis: Comparison of languages in 8-9 year old English-Kannada Bilingual children for List 2 across trials

**Figure 8 (a):**

1. *Nouns*: The number of paradigmatic responses is greater in English when compared to Kannada. Also, the decrease in the paradigmatic responses is seen more clearly in English. The same trend is noticed for syntagmatic responses, except that it increases across trials and this is more prominent in English than in Kannada.

2. *Verbs*: The number of paradigmatic responses generated in English is more when compared to Kannada. The pattern of decrease in response is seen more clearly in English. Syntagmatic response follows the same trend in both the languages.
3. *Adjectives*: Paradigmatic responses decrease with trials and syntagmatic responses increases with trials. Another noticeable change in adjectives is that the number of no responses increases with trials in both languages.

**Figure 8 (b):**

The pattern of responses is similar in both the languages, with an increase in syntagmatic responses and decrease in paradigmatic response across trials. But, as it can be noted from the graph, it's seen that the number of paradigmatic responses for all the word classes is more in English when compared to Kannada.

**Figure 8 (c):**

It can be seen from the above graph that the pattern of responses is same across trials in both the languages. The difference lies in the overlap seen in adjectives, where it occurs at a later stage of the trial. This is to say that in both the groups, the number of paradigmatic responses is more and more stable up until the second trial.

The present study, the organization of lexical–semantic knowledge in bilingual and monolingual 6- to 8-year-olds was examined using a repeated word association task. The main objective of the study was to see the developmental and organizational trend in monolingual and bilingual children.

### **1. Developmental and organizational trend of lexical-semantic knowledge in children**

The main aim of this study was to see how the mental lexicon of children is organized. A systematic organization of the mental lexicon is seen in children, even at an young age. Young children at the age of 6 years organize their lexical-semantic knowledge syntagmatically, while older children of 8 year old organize it paradigmatically. This is supported by studies done by various authors, where they suggest that the shift from syntagmatic to paradigmatic occurs between the ages of 5-9 years of age (Saussure, 1959, Brown and Berko, 1960, Nelson, 1977b). This shift can be associated with the cognitive organization of the children. Children undergoing this shift between the ages of 6-8 years belong to the pre-operational and concrete operational period of Piaget cognitive theory. In the pre-operational period, from 2 to 7 years of age, children become better able to represent the environment’s reality through symbolic behavior. Children exhibit problem-solving skills and begin the process of categorization and sorting the words. In the concrete operational period, from 7 to 11 years of age, children classify their experiences becomes more organized and hierarchical.

Hence, during the school years, there appears to be a change in cognitive processing, storage and retrieval that reflects a shift from a nonlinguistic visual-perception mode to linguistic categorization. This shift is clearly seen in the results

obtained and hence it supports the fact that children, during their school age undergo a shift in their cognitive processing, which is reflected in their word association task

## **2. Comparison of Bilingual and Monolingual Language across age**

A comparison between the monolingual Kannada and Bilingual Kannada speaking children was carried out through the repeated word association task to see the organizational abilities in Monolingual and Bilingual children. Though the results do not indicate a significant difference in the pattern of development in the two groups, on a closer look across trials, certain subtle dissimilarities are revealed on their organizational abilities. Bilingual children, learning two languages, show a greater number of paradigmatic responses even at the age of 6 years and this become more pronounced at the age of 8 years. Whereas, in monolingual children, the shift from syntagmatic to paradigmatic responses occurs at a later stage and is stabilized at the age of 8 year old. This result is supported by Cunningham (1990), where he examined the word association data of two groups of Irish-English bilingual children. The findings of this study reveal that L2 learners produced more paradigmatic associates. These results are similar to those obtained by Soderman (1983, 1989). Also, Sheng, McGregor & Marian (2006), in their study comparing Mandarin–English bilingual and English monolingual children, found similar patterns of development, though subtle group differences was observed.

Hence, although the pattern of organization is similar, in both monolingual and bilingual, the shift from syntagmatic responses to paradigmatic responses, occurs at an early stage in the bilingual children. The second trial could be considered, the most crucial of the three. It is during this trial that the shift becomes evident and this is true for both the groups across the age.

When the two lists were compared with each other, there are differences seen between the two lists. List 2 has elicited more number of paradigmatic responses, when compared to List 1. The obvious reason would be that in List 2, the children were provided with paradigmatic examples. This might have primed the children into giving paradigmatic responses throughout. When examples were given it would have probably facilitated faster and easier access to the words in the mental lexicon.

When the responses across trials were taken into consideration, both the groups revealed similar patterns of response. Both the bilingual and the monolingual children demonstrated a decreasing pattern in paradigmatic responding across trials. This pattern was more consistent in the bilingual group. This finding suggests that the children's knowledge of hierarchical relational terms was similarly shallow so that generating paradigmatic associations became more demanding with each new elicitation. It is noteworthy that both groups of children generated a large number of syntagmatic responses. Syntagmatic responses were comparable in number to paradigmatic responses during the first trial and became the more dominant response type by the third trial. At Trial 1 bilingual children had an easier time than monolingual children generating paradigmatic associations. For both the groups of children there was a decrease in paradigmatic responding was seen, which become evident on, suggesting that the tendency to provide words from the same category was the strongest for the initial trial. Therefore, although the overall storage of paradigmatic information was similar in size between bilingual and monolingual children, this information was indeed more salient and accessible in bilinguals. This is clear evidence that the semantic system is organized according to both paradigmatic and syntagmatic relations and, together, they construct a balanced pool of word associations. In the early school years, children's store of paradigmatic responses is

still small, and with repeated probing the balance quickly tips over to favor syntagmatic responses. These results are in keeping with the results obtained by Sheng, McGregor & Marian (2006).

### **3. Comparison of the two languages in English-Kannada Bilingual children**

With regards to the second goal, a comparison between the languages of English-Kannada Bilingual children was carried out. The difference between the two languages was seen with respect to the word list. Here, the List 1 provided the children with syntagmatic examples, whereas List 2 carried paradigmatic responses. There was no significant difference found between the languages on List 1, that is to that the children performed equally in both the languages on List 1. On List 2, a significant difference was seen when both the languages were compared. Children generated slightly more number of paradigmatic responses in English when compared to Kannada. This difference in the lists can also be attributed to fact that with examples, the children were provided with a model and this could probably have facilitated a faster and easier access in the mental lexicon. But the trend across the trials was similar in both the languages on both the lists. The paradigmatic responses decreased across trials and the syntagmatic responses increased across trials. The number of no responses was also similar in both the languages, that is, it increased slightly across the trials. These results are consistent with previous studies of Spanish-English bilinguals of a similar age range using different semantic tasks (Pena et al., 2003; Pena et al., 2002). It is also in consonance with that of Ordonez et al.'s (2002) research, in which paradigmatic definitions produced by Spanish-English fourth- and fifth-graders correlated between languages.

Also a noticeable aspect in the present study is that none of children generated any clang responses and hence, these responses were considered negligible throughout the study. This is in contradiction with the study done by Namei (2004), where she compared 100 Persian-Swedish bilingual subjects on a word association task. She concluded that phonologically-based, that is, clang responses; occur in both L1 and L2 as a function of the degree of word knowledge. Some children did generate clang based responses in English, but this was not significant. But in Kannada none of the children generated clang responses. This could be probably interpreted in terms of the familiarity of the words. Bilingual children probably organize the English words in phonologically and hence their access is phonologically based, whereas the words in Kannada are associated mainly on semantic basis. Since the number of children considered in this study was less, this aspect of the results warrants further investigation.

#### **4. Effect of bilingualism on lexical-semantic organization**

With the results obtained in this study, it cannot be concluded for certain that there is an effect of bilingualism on the lexical-semantic organization. On a broader observation of the data obtained, it shows that both monolingual and bilingual children perform almost similar on the word association task. Though bilingual children are seen to generate more paradigmatic responses, at an earlier stage, this is not shown in the significance and is only noticed as a general trend when compared to monolingual children. Also, with regards to the responses obtained across trials, it is shown that bilingual children exhibit subtly more number of paradigmatic responses. So to conclude that bilingualism has an effect on the lexical-semantic organization is premature and warrants further investigation.



## **5. Repeated word association test**

In the present study a repeated word association task was employed to examine the lexical-semantic organization of children in the age range of 6-8 years. The repeated nature of this task allows measurement of both storage and accessibility of paradigmatic semantic relations. Although the number of paradigmatic responses was almost equivalent between two groups of children, which might suggest comparable storage of paradigmatic relationships, the pattern of retrieval may differ across repeated elicitations, suggesting differences in accessibility (Elbers & van Loon-Vervoorn, 1998). For example, in one group of children, paradigmatic responses were at their peak during the initial elicitation and gradually decrease, whereas in another group, such responses may be initially rare but steadily increase across trials.

## **6. Issues in syntagmatic-paradigmatic shift: Influence of word class**

The results of the present study indicate that word class influences response types and associative behavior. This points to the fact that word class is an influential factor in language acquisition and in the integration of words into the mental lexicon. In the present study, it is shown that in both bilingual and monolingual children, adjectives are organized paradigmatically at an earlier stage, followed by nouns. Verbs are the last of the word class to be organized paradigmatically, and this occurs around 8 years of age. These results are in keeping with previous studies (Entwisle, 1966; Soderman, 1993; Wolter, 2001; Cronin, 2002; Sheng, McGregor & Marian, 2006).

Table 9: Examples in English with respect to word class

Word Class	Stimulus	Examples	
		Syntagmatic	Paradigmatic
Nouns	Spoon	Eat	Fork
	Cat	Meow	Dog
Verbs	Eat	Food	Drink
	Throw	Paper	Catch
Adjectives	Hot	Water	Cold
	New	Dress	Old

Table 10: Examples in Kannada with respect to word class

Word Class	Stimulus	Examples	
		Syntagmatic	Paradigmatic
Nouns	tʃamtʃa	ᵊtinnu	Fork
	bəkku	Meow	na:ji
Verbs	ᵊtinnu	u:ʃa:	ku:di
	ɛsi	paper	ᵊtago
Adjectives	bisi	ni:ru	ᵊtelige
	hosa:	bate	ha ejaᵊdu

But, when the languages of English and Kannada were compared in bilingual children, a clear difference in response class was observed between the languages. This was clearly evident of List 2, though subtle difference was observed on List 1 as

well. The results revealed that children organized adjectives, followed by nouns paradigmatically in English, though this was the case in Kannada. Verbs were one word class that was least organized paradigmatically. These results are in contradiction with previous study done by Nissen and Henriksen, (2006) who suggested that the lexical-semantic organization in bilinguals might be different from that of monolinguals in terms of cognitive processing.

The reason why verbs generated the least number of paradigmatic responses and more of syntagmatic responses is probably due to the fact that verbs provide a more cognitive challenge to a child than nouns. Categories of actions thus appear to be less coherent than categories of objects (Clark 1993). Also, in the present study, adjectives elicited paradigmatic responses when compared to nouns. This is in contradiction with the study done by Nissen and Henriksen, (2006), where they said that adjectives were also syntagmatically organize.

To summarize the results, it has been seen from this study that the lexical-semantic organization in Monolingual and Bilingual children show subtle differences. Though this was not significantly difference, the pattern of response, on a close observation, revealed dissimilarities in their organization. The Bilingual children seemed to generate comparably more number of paradigmatic responses than the Monolingual group, even at the age of 6 years. This could suggest a possible positive effect of bilingualism on their lexical-semantic organization, though it warrants further research.

When the responses were seen across trials, it was seen that the paradigmatic responses decrease across trials and syntagmatic responses increased across trials. This could be attributed to two reasons. Firstly, though paradigmatic responses are

considered as a mature lexical-semantic organization, on repeated trials, these responses tip towards syntagmatic responses, suggesting that the organization is shallow. Secondly, when the children are provided with three trials, the access to the mental lexicon becomes difficult and hence a decrease in response is noted.

Considering the two lists, it was seen that the responses generated with List 2 was more paradigmatic in nature and maintained across trials. List 2 provided children with paradigmatic responses, and this could be a possible reason for the greater number of paradigmatic responses provided by children for List 2. This could have facilitated faster and easier access to the mental lexicon, thereby providing more number of paradigmatic responses.

With regards to the influence of word class on the lexical-semantic organization, the results of the present study did reveal some effects. Here, adjectives were organized paradigmatically even at an early age, followed by nouns and finally verbs. The paradigmatic organization of verbs was found only at around 8 years of age.

Hence, the results of this study are in keeping with the previous literature, where the lexical-semantic knowledge of the children is organized in a systematic manner. Young children organize their lexicon syntagmatically, whereas older children organize the words in their lexicon paradigmatically.

## **CHAPTER V**

### **SUMMARY AND CONCLUSIONS**

The present study aimed at investigating the lexical-semantic organization in bilingual children. Hence the objectives of the present are three-fold

7. To compare the development of lexical-semantic organization in the two languages of bilingual children.
8. To compare the lexical-semantic organization in Kannada language of Kannada-English bilingual children with that of monolingual children.
9. To examine the effect of bilingualism on lexical-semantic organization.

30 Kannada-English bilingual and 30 predominantly monolingual Kannada speaking children in the age range of 6-8 years participated in the study. A repeated word association task was administered on these children. The word list was divided into List 1 consisting of syntagmatic examples and List 2 consisting of paradigmatic responses. These lists were counter-balanced across the children. The responses of the children were coded as follows:

1. Syntagmatic
2. Paradigmatic
3. Clang
4. Non-associated
5. No response

These data obtained was subjected to statistical analysis. The following inferences can be drawn from the results thus obtained:

1. It is seen in this study that paradigmatic organization of the semantic lexicon is a robust developmental phenomenon not necessarily affected by the presence of a second language in the ambient environment.
2. There is a parallel developmental and organizational phenomenon of the lexical-semantic knowledge in monolingual children as well as bilingual children.
3. There were subtle differences in responses observed in the two languages of the bilingual children.
4. With regards to age, young children of 6 years of age, generated syntagmatic responses and older children of 8 years of age responded paradigmatically.
5. There was a significant difference obtained between the two lists. This could be attributed to the fact that the children were given examples for each of the list and they could have possibly been influenced by the list. But, irrespective of this, the organizational shift from syntagmatic to paradigmatic response is observed across the age group.
6. When seen across trials, paradigmatic responses reduced with increase in trials, whereas, the syntagmatic responses increased with increase in trial.
7. Contrary to the literature reviewed for the present study, which quoted that the clang responses were present in the word association tasks, this was not found in the present study. Though a few scattered responses of clang was observed, it was not significantly true.
8. No responses increased with increase in trials, and this was more prominent in monolingual group of children.

9. The present study also supports the fact that word class has an influence on the organizational behavior of children. A clear trend is noticed, wherein, adjectives were paradigmatically organized, followed by nouns. Verbs elicited the maximum number of syntagmatic responses.
10. This difference in word class was also noticed across age groups. Children as young as 6 years generated paradigmatic responses for adjectives. Paradigmatic responses for nouns began at 7 years of age, whereas, for verbs, it appeared only at 8 years.

Thus this study maintains the theory that in young children as young as 6 years, associated words syntagmatically and children of 8 years associated words paradigmatically. The spurt in growth of the organization occurs maximally at the age of 7 years, where the children are transiting from the pre-operational stage to concrete stage in Piaget's cognitive theory. It is during this age that the organization of mental lexicon develops at a fast rate and the network begins to get strengthened by environmental exposure and the child's experience with words.

Implications for the present study could be as follows:

1. Since response types and associative behavior seems to be affected by word class, this study can provide an insight about the influence of word class as a factor in language acquisition and in the integration of words in the mental lexicon.
2. Comparison between monolingual and bilingual children lexical-semantic organization, with the help of such word association tasks can contribute to the development of clinical tools for the identification of typical and atypical second-language learners.

The present is only an initial attempt at investigating the lexical-semantic organization in bilingual children. Further studies could be carried out by increasing the complexity of the task by including low-frequency words into the list. Also, a larger group of children can be taken for the task with different levels of language proficiency.



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**APPENDIX A**  
**List 1 (English) - words for Syntagmatic relation**

<b>S.No</b>	<b>Word Class</b>	<b>Stimulus</b>
<b>1</b>	Nouns	Spoon
<b>2</b>		Milk
<b>3</b>		Leg
<b>4</b>		Bus
<b>5</b>		Cat
<b>6</b>		Window
<b>7</b>		Tomato
<b>8</b>		Cap
<b>9</b>		Doctor
<b>10</b>		Bell
<b>11</b>	Verbs	Write
<b>12</b>		Pull
<b>13</b>		Speak
<b>14</b>		Throw
<b>15</b>		Clap
<b>16</b>		Eat
<b>17</b>		Climb
<b>18</b>		Break
<b>19</b>		Fly
<b>20</b>		Fall
<b>21</b>	Adjectives	Small
<b>22</b>		Thin
<b>23</b>		First
<b>24</b>		Little
<b>25</b>		Hot
<b>26</b>		Hungry
<b>27</b>		Heavy
<b>28</b>		Angry
<b>29</b>		Empty
<b>30</b>		New

**List 2 (English) - words for Paradigmatic relation**

<b>S.No</b>	<b>Word Class</b>	<b>Stimulus</b>
<b>1</b>	<b>Nouns</b>	Door
<b>2</b>		Dog
<b>3</b>		Pants
<b>4</b>		Eye
<b>5</b>		Chair
<b>6</b>		Moon
<b>7</b>		Teacher
<b>8</b>		Cycle
<b>9</b>		Train
<b>10</b>		Bag
<b>11</b>	<b>Verbs</b>	Wash
<b>12</b>		Sit
<b>13</b>		Stand
<b>14</b>		Open
<b>15</b>		Read
<b>16</b>		Give
<b>17</b>		Draw
<b>18</b>		Take
<b>19</b>		Sing
<b>20</b>		Kick
<b>21</b>	<b>Adjectives</b>	Good
<b>22</b>		Fat
<b>23</b>		Dirty
<b>24</b>		Happy
<b>25</b>		Old
<b>26</b>		Easy
<b>27</b>		Long
<b>28</b>		Big
<b>29</b>		Many
<b>30</b>		fast

**List 1 (Kannada) - words for Syntagmatic relation**

S.no	Word Class	Stimulus
1	Nouns	tʃamtʃa
2		ha:lu
3		ka:lu
4		bæsu
5		bækku
6		kittaki
7		tɔmæto
8		topi
9		vajdja
10		ga ŋte
11	Verbs	bari
12		ɛ  i
13		maʃa:du
14		ɛsi
15		tʃapa e_tatu
16		_tinnu
17		muri
18		ha:ru
19		bi u
20		ha_tu
21	Adjectives	tʃikka_du
22		_tɛ age
23		mo_dalu
24		swalpa
25		bisi
26		hasivu
27		ba:ra
28		ko:pa
29		ka:li
30		hosa:



**List 2 (Kannada) - words for Paradigmatic relation**

S.no	Word Class	Stimulus
1	Nouns	ba:gilu
2		na:ji
3		pæntu
4		kannu
5		kurtʃi
6		tʃandra
7		s <sup>h</sup> ikʃaka:
8		sajk[ə]
9		raɪlu
10		tʃi:la
11	Verbs	ogi
12		nillu
13		ha:ru
14		tegi
15		o:du
16		kodu
17		bidisu
18		tago
19		ha:du
20		oɖi
21	Adjectives	ho[ɛdu
22		ɖapa
23		be:ga
24		ko[ku
25		santofa:
26		ha[ɛjadu
27		sulab <sup>h</sup> a:
28		uɖa:
29		ɖoda:
30		tumba:

## APPENDIX B

### **Guidelines for scoring word association data:**

#### **Basic information:**

#### **Syntagmatic responses:**

A response was classified as syntagmatic when it belonged to a different word class than the prompt word and was sequentially (i.e. syntactically) related to it (i.e. this does not distinguish between early and late syntagmatic responses). A response from the same word class as the prompt word was classified as syntagmatic in the following cases:

Examples: *spoon- eat; cat- meow; bell- rings; eat-food; throw- paper; fall- down; hot-water; small- bag; new- dress.*

#### **Paradigmatic responses:**

A response was classified as paradigmatic when it belonged to the same word class as the prompt word, showed a clear semantic connection to the prompt word, and met at least one of the following conditions:

Examples: *door- window; dog- cat; pants- shirt; wash- dry; give- take; stand- sit; dirty-clean; happy- sad; fast- slow.*

#### **Clang responses:**

A response was classified as clang/phonological if it was not semantically related to the prompt word but only resembled it phonologically.

Examples: *bell- tell; cat- mat; sit- bit; fat- pat; old- told.*

#### **Non-Associated:**

A response was classified as non-associated if it did have any association related to the prompt word.

### Examples in English and Kannada

Response	Stimulus	English	Kannada
Syntagmatic	Spoon/ tʃamtʃa	Eat	tinnu
	Cat/ bækku	Meow	meow
	Write/ bari	Pen	penu
	Eat/ tinnu	Food	u: ʃa:
	New/ hosa:	Dress	ba ʃe
	Hot/ bisi	Water	ni:ru
Paradigmatic	Door/ ba:gilu	Window	kittaki
	Pants/ pæntu	Shirt	ʃær ʃu
	Stand/ nillu	Sit	ku:ru
	Draw/ bidisu	Write	bari
	Dirty/ koʃku	Clean	hoʃeɖu
	Fast/ be:ga	Slow	metige
Clang	Bell/ ga nte	Tell	-
	Cap/ topi	Tap	-
	Fall/ biʃu	Tall	-
	Sit/ ku:ru	Bit	-
	Fat/ dapa	Bat	-
	Hot/ bisi	Pot	-

Non-Associated	Milk/ ha:lu	Cloud	kurtʃi
	Leg/ ka:lu	Computer	bɔ̌ ʃl ə
	Wash/ o:gi	Sit	ku:ru
	Read/ o:ɖu	Go	ho:gu
	Long/ uɖa:		
	Angry/ ko:pa		

## **5. Repeated word association test**

In the present study a repeated word association task was employed to examine the lexical-semantic organization of children in the age range of 6-8 years. The repeated nature of this task allows measurement of both storage and accessibility of paradigmatic semantic relations. Although the number of paradigmatic responses was almost equivalent between two groups of children, which might suggest comparable storage of paradigmatic relationships, the pattern of retrieval may differ across repeated elicitations, suggesting differences in accessibility (Elbers & van Loon-Vervoorn, 1998). For example, in one group of children, paradigmatic responses were at their peak during the initial elicitation and gradually decrease, whereas in another group, such responses may be initially rare but steadily increase across trials.

## **6. Issues in syntagmatic-paradigmatic shift: Influence of word class**

The results of the present study indicate that word class influences response types and associative behavior. This points to the fact that word class is an influential factor in language acquisition and in the integration of words into the mental lexicon. In the present study, it is shown that in both bilingual and monolingual children, adjectives are organized paradigmatically at an earlier stage, followed by nouns. Verbs are the last of the word class to be organized paradigmatically, and this occurs around 8 years of age. These results are in keeping with previous studies (Entwisle, 1966; Soderman, 1993; Wolter, 2001; Cronin, 2002; Sheng, McGregor & Marian, 2006).