

LEXICAL SEMANTIC ORGANIZATION IN CHILDREN

Ashwini, B. N.

Register No: 15SLP008

A Dissertation Submitted in Part Fulfilment of Final Year

Master of Science (Speech-Language Pathology)

University Of Mysuru

Mysuru



ALL INDIA INSTITUTE OF SPEECH AND HEARING

MANASAGANGOTTHRI, MYSURU-570 006

May, 2017

CERTIFICATE

This is to certify that this dissertation entitled “**Lexical Semantic Organization in Children**” is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 15SLP008. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysuru
May, 2017

Dr. S.R. Savithri
Director
All India Institute of Speech and Hearing
Manasagangothri, Mysuru-570006

CERTIFICATE

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

Mysuru
May 2017

Guide
Dr. Abhishek.B.P

Lecturer in Speech Sciences Department of
Speech Language Sciences All India
Institute Of Speech and Hearing
Manasagangothri , Mysuru

DECLARATION

This is to certify that this dissertation entitled “**Lexical Semantic Organization in Children**” is the result of my own study under the guidance of Dr. Abhishek B. P, Lecturer in Speech Sciences, Department of Speech Language Sciences, All India Institute of Speech and Hearing, Mysuru, and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

**Mysuru,
May, 2017**

Registration No: 15SLP008

ACKNOWLEDGEMENT

At first, My sincere 'PRANAMAS' to all the 'GURUS' who have supported me and helped in moulding myself towards the excellence.

I would like to extend my thankfulness to my guide 'Dr .Abhishek. B.P who himself is a fantastic learner and helped me to learn everything related to research with open heart.

Sir, I thank you from the bottom of my heart for helping me and guiding me for completing my master's dissertation.

I would like to thank my family and friends, especially my brother Manjunath, for being my strength and support throughout my life.

Special thanks to poornima, kavya and niharika for providing me with all valuable suggestions to complete my dissertation

My sincere thanks to all my beloved "GURUS" at AIISH right from my Bachelors for all their support and guidance throughout the course of my study and for helping me become a good human being.

Special thanks to Dr. Santhosha Sir for his guidance in statistical analysis.

I would like to thank all my closest friends for sharing all kinds of experiences with me.

A special thanks to all the school's authorities who welcomed me and let me collect the needed data for my study.

I would also like to thank all those little children for participating in my study.

I also place on record, my sense of gratitude to one and all, who directly or indirectly supported me for completing my study.

Table of Contents

SL. No	Title	Page No.
	List of tables	viii-ix
	List of figures	x
I	Introduction	1-4
II	Review of literature	5-24
III	Method	25-33
IV	Results and Discussion	34-56
V	Summary and conclusions	57-62
	References	63-67
	Appendix	68-72

List of tables

Sl. No	Title	Page. No.
3.1	Details of participants in the age range of 4-7years	27
4.1	Mean, Median and SD values for the age range of 4-7 years across taxonomic, thematic and unrelated response categories.	37
4.2	Mean, Median and SD values of males and females across different response categories in the age range of 4-5 years	41
4.3	Mean, Median and SD values of males and females across different response categories in the age range of >5-6 years	42
4.4	Mean, Median and SD values of males and females across different response categories in the age range of >6-7 years	44
4.5	Mean, Median and SD values for taxonomic, thematic and unrelated response categories across 4-5,>5-6 and >6-7 years.	46
4.6	Details of lexical categories considered for the stimulus presentation	49
4.7	Types of responses for lexical categories in the age range of 4-5years.	50
4.8	Types of responses for lexical categories in the age range of >5-6 years	52
4.9	Types of responses for lexical categories in the age range of >6-7 years.	53
4.10	Percentage of auditory and visual responses in the age range of 4-5	55

years.

4.11 Percentage of auditory and visual responses in the age range of >5-6 55

years

4.12 Percentage of auditory and visual responses in the age range of >6-7 56

years.

List of figures

Sl. No.	Title	Pg. No.
3.1	Schematic representation of stimulus presentation	30
3.2	A sample of line diagram	31
3.3	Schematic representation of stimulus presentation and response categorization	32
4.1	Median scores of 4-7 years of age across different response categories	38
4.2	Median scores of males and females across different response categories in the age range of 4-5 years.	41
4.3	Median scores of males and females across different response categories in the age range of >5-6 years.	43
4.4	Median scores of males and females across different response categories in the age range of >6-7 years.	44
4.5	Median scores of different response categories across 4-7 years of age.	46

CHAPTER I

INTRODUCTION

Language is the principal signalling-system or instrument of communication used by humans for the transmission of information, ideas, etc. Communication by means of language is carried out in a number of medium. i.e. via speech, writing and traditionally less centrally through singing. Human language may be distinguished from the signalling systems of other species chiefly by its grammatical and semantic complexity and its flexibility.(Encyclopedia of Language and Linguistics,2006). Semantics being one of the crucial component of language which deals with the learning of the words. The minimal distinctive unit in the semantics of the language is called lexemes. The study of meanings, forms, and application of these lexeme and its relation with other linguistic structure is called lexical semantics. There are different ways in which meaning of a word which can be described in various lexical relations which are in the form of synonyms, antonyms, hypo and hypernyms. Synonyms refers to words which that sound different but have the same or identical meaning as another word (small-little, big-large), antonyms refers to a set of words that have the sense relation which involves the opposite meaning(fast-slow, young-old) , Hypo and hypernyms refers to a relationship between a general item and the more significant item, that fall under the category of general items e.g.: where red, blue green are hyponyms and they fall under the category of colour which is hypernyms.

These relationships between general item and specific item is described using two hierarchical forms of thematic and taxonomic relations. Basic organizational principles of lexical-semantics consists of thematic relations which includes words representing similar theme.(e.g.: cow-grass) and taxonomic relations are those which includes hierarchical

category membership (e.g.: plate-glass, kitchen item). Various methods like priming task, semantic fluency task, and word association tasks, which can be used to tap on lexical semantic organization of an individual. In the semantic fluency task, the experimenter asks the participant to say as many names of items belonging to a certain category such as animals or fruits usually in a one minute trial. This task gives the information on vocabulary size with respect to the given category but fails to predict how words are organised in children as the responses provided can be classified only under taxonomic relations. Priming is yet another task which can be used in studying lexical semantic organisation in children. Spreading activation theory of semantic processing seems to be an effective explanatory construct to explain priming. According to the automatic spreading activation model, a prime activates the representations related to the target within a semantic network thus establishing a connection between prime and target words .This neural network model of semantic priming assumes that the presentation of a prime stimulus facilitates a change in the connections and representation of lexical knowledge. Priming is a non-conscious (implicit) form of human memory in which exposure to previously presented stimulus influences the response to the following stimulus. Priming operates at the level of mental lexicon and information provide through priming tasks taps only on comprehension skills of an individual whereas word association task can provide information on both comprehension and expressive ability of the child.

Studies related to lexical-semantic organisation in children are usually carried in the western context (Sheng et al 2006) compared to Indian context. This study was carried out in typically developing bilingual children in the age range of 5-8. The task used to tap on lexical semantic organization was repeated word association task and responses were grouped into paradigmatic and syntagmatic responses. Limited Indian studies (Chithra,2008; Janani. 2009) have been carried out in normal young population of age range 6-8 with repeated word association task. However the task was bounded as the response categories were confined to

syntagmatic and paradigmatic responses. In this study the participants were supposed to produce responses which were grouped into paradigmatic and syntagmatic responses.

As we see in these studies, task used to tap on lexical semantic organization was repeated word association task which gives the information on expressive skills of an individual and not on the organization of vocabulary whereas the present study used free word association task which would provide an insight for both categorical organization and production. The responses in these studies were grouped into paradigmatic and syntagmatic responses whereas these responses produced by children can also fit in to other categories like taxonomic and thematic relationships which would likely be tapped on an open free word association task. Age considered for these study was 5-8 years whereas the present study considered the children across the age group of 4-7 year .This would help in looking at the child's lexical semantic organization and its development as age increases.

The mode of presentation in the children was auditory, the present study also would use auditory mode for presentation and in addition cues will be presented visual mode (only when no responses for auditory mode) to curb down the no responses (which is a possibility in children as young as 4 to 7 years).

Aim

The aim of the study was to measure the lexical-semantic organization in children in the range of 4-7 years.

Objectives

The primary objective of the study was

- ✓ To determine lexical semantic organisation of children in the age range of >4-5 years, >5-6 years and >6-7 years through free word association

The secondary objectives of the study

- ✓ Additional qualitative analysis was carried to understand the responses in relevance to the different lexical categories considered .

CHAPTER II

REVIEW OF LITERATURE

2.1. Language

Language is the ability to acquire and use complex and dynamic system of communicational symbols. 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 (Owens2000). Components of language are phonology, syntax semantics, morphology and pragmatics. Development of each skill is very much important in the acquisition of language. Being the most crucial skill, semantics can be defined as the study of the meaning of given linguistic expression .Semantic development of a child starts by 18 months. An average child acquires about fifty to sixty words by this age, these words include more of nouns eg: milk, glass, cat, cake, at six years of age children acquire the vocabulary which includes around 10 to 15 thousand words. Frequent word forms which are used by the child include more of adjectives which generally follows negation such as 'no'. vocabulary also includes functional vocabulary and social words, such as "please" and "bye".

Learning the meaning of new words includes three stages, first stage is, complete object learning in which new word refers to a complete object. For example, when an eighteen-months old child sees a cow and care taker teaches it as the word 'cow', the child infers that the word 'cow' describes the whole animal and not parts of it (such as colour, shape, etc.).second type is learning new word which refers to a type of thing, not just to a particular thing. For example, when the child hears the word 'cow' he/she understands that it is

used for the animal type and not only for that particular cow that they saw. Basic third level learning can be explained as new words refers to objects that are similar in basic ways (appearance, behaviour, etc.).In other words, when the child hears the word "cow" he/she generalizes it to other animals that look like cow by the external appearance, such as colour, and four-legged animal..

Major factor in the child's vocabulary development is contextual clues, which can be considered as the expressive part of semantics whereas the words represented in the brain as mental lexicon. As a synchronic component of language, the lexicon is understood broadly as a finite list of stored word forms. It defines the vocabulary of a person in a language. Items in the lexicon are called as lexemes or word forms, these lexemes are grouped as lemmas. Each lemma is a group of lexemes generated by inflected morphology. Lexicon is organised according to open and closed categories such as, determiners or pronouns which rarely produces new lexemes; this function is primarily static. Open categories, such as nouns, verbs, have highly active generation mechanisms and their lexemes are made more semantic in nature. Lexemes are words; so lexical semantics is the study of word meaning.

2.2. Lexical semantics

Lexical semantics is concerned with the identification and representation of the semantics of lexical items, It looks how the meaning of the lexical units are correlates with the language structure of syntax, this is referred as syntax-semantic interference which is an observation of how systematic association of sound patterns related with meaning. There are different ways that a meaning can attach to a word which can be described in various lexical relations which are in the form of synonyms, antonyms, hypo and hypernyms. Synonyms refers to words which that sound different but have the same or identical meaning as another word (small-

little, big-large), antonyms refers to a set of words that have the sense relation which involves the opposite meaning(fast-slow, young-old) , Hypo and hypernyms refers to a relationship between a general item and the more significant item, that fall under the category of general items e.g.: where red, blue green are hyponyms and they fall under the category of colour which is hypernyms ,these lexical-relations are organised based on different organizational principles.

2.3. Lexical semantic organization

Lexical semantic organizational principles in children helps in learning of a lexicon. This determinesthe cognitive distinctions that are marked in their language .This level of organizing the word that mediates between cognitive organization and language is called semantic organization, Acquiring a language includes learning its semantics –that is learning how meanings are linguistically realized. Learning how the semantic meanings are connected to its lexicon is called as lexical semantic organization.

lexical-semantics organization consists of basic principles of thematic relations which includes words sharing similar theme (e.g:ship-water) and taxonomic relations in which hierarchical category is present (e.g.: Brinjal - onion, vegetable) these organization principle can be well explained with the model of spreading activation(Collins& Loftus,1975)Main idea of this model is that words are represented by different conceptual nodes Every node is connected through links to every other nodes that share similar associated relations, whenever a single node gets stimulated or activated, this stimulation spreads out throughout the path of the network which connects other different nodes. There are many links connecting the nodes such that the activation of one node primes (or co activates) many related nodes in a very rich semantic network. This can be explained with an example, the word ‘house’ may readily activate words such as building, wall, roof, gate, , all

these words belong to the same semantic category as house. It may also triggers thoughts of another cluster of words such as mother, television, sofa, chair, games all of which share thematic relations with house. Similarly semantic networks comprises of many lexicon which gets activated on presenting a target stimulus. The strength of lexical semantic organization depends on number of lexical items being activated and the rate at which those items are being accessed from the lexical storage.

Lexical items are organized for an easier accessibility in the mental lexicon which can be referred to lexical storage. lexical items exists in two forms , one in which words carry a meaning like nouns, verbs, adjective and adverbs and another in which grammar is attached even though grammatical item do not provide a meaning to a word, it contribute to morphological structure like ,in the form of conjunctions. Meanings related to all the words are stored in our lexicon with all the possible associations. For example, when we search for the word apple we also get the associative words like fruits, grapes, this is because of the connected networks in the lexicon.

2.4. Lexical access

Lexical access is defined as the way which individual access words in the mental lexicon. It is the processed by which the basic sound-meaning connections of language, i.e. lexical entries, are activated. Studies have showed several factors which can affect lexical access, such as: the frequency effect, word imageability effect and many more. Low-frequency lexical items produce elongated decision times and therefore are accessed more slowly in comparison to high-frequency lexical items, such frequency effect phenomenon is very important in determining which lexical item is chosen in models of lexical access which involve competition between two items. Moreover, the frequency effect has been well correlate and used in studies of lexical access. Balota & Chumbly (1984) in their study

revealed that high frequency words were named in more faster way in comparison with low-frequency words.

Words such as television and chair are easy to visually imagine in our mind, whereas words such as happiness and pain are more difficult to picture. This is due to the concrete and abstract nature of the words, which relates to the difficulty and ease of picturing some words in comparison to others. This concreteness can be otherwise referred as as imageability and as implied by its name, is the ability to visualize lexical items. Those words which describes tangible noun are called as concrete words, abstract words describe nouns which may be intangible (i.e. apple and freedom) respectively. Several studies supports the fact that concrete lexical items such as apple is easy to imagine, while abstract word such as pain, is difficult to imagine(Gleason, & Bernstein (1998). Many studies, on the word concreteness effect have revealed consistent results that quick processing happens with respect to concrete words than for abstract concepts.

Much studies has been carried out to investigate the lexical access concept by understanding how lexical items are accessed and it is explained based on existing models of lexical access.

a) Logogen Model

Logogen model is a type of interactive model proposed by Morten 1969. This model explains how sources of information combine in word recognition, originally this model was designed for visual recognition. But it has been treated as a general model for word recognition by many researchers". Logogens are a vast number of specialized recognition units, each logogen represents a single word. i.e. Memory includes specialized aspects which intern comprises of semantic and phonemic information about every item that is stored in

memory. Logogens store only the information that is specifically necessary for word and not the words themselves but logogens help in retrieval of the words. Each logogen has a threshold level at which it outputs a recognition response. When a particular word stimulus hits the logogen's activation level it rises and the output system receives the word expression.

b) Cohort model

The cohort model was originally put forward by Marslen – Wilson and Tyler in 1980. It is based on the concept that auditory or visual input to the brain which stimulates neurons as it enters the brain, rather than at the end of hearing the word. The word cohort defines a group of words that share a common set during lexical selection. Auditory lexical access retrieval starts with the initial one or two phonemes that reach the listener's ear. The mental lexicon activates every possible word that begins with that speech segment. E.g.: Bald is the target word heard by the listener, Bald, black, ball, bad, bill can be activated which are called as competitors for the target word. As the speech segment enters the ear and stimulates more neurons, giving rise to more competitors, competitors which do not match the input will be rejected in order to decrease in activation. The processes by which words are activated and competitors rejected in the cohort model are frequently called 'activation and selection' or 'recognition and competition'. These processes continue until it matches with the target stimulus which can be called as recognition point, at which only one word remains activated and all competitors have been rejected. There are three levels of word recognition according to this model, first is access level, second is selection level and the last is integration level. The initial portion of a spoken word activates all the words beginning in that way. That goes on until only one word remains. Thus, the model capitalizes and suits for the temporal nature of speech, i.e. the initial position of words affects the recognition process first. Also words in the sentences can be

identified either from word-initial formation or by word final formation. E.g.: captain and capital.

c) Semantic Feature Model

The model was proposed by Smith, Shoben, and Rips (1974) according to this model each concept has 2 levels of feature: Defining features (essential components) which is the most salient feature necessary to define a concept. It distinguishes a concept from others and Characteristic features (accidental, not always present) which characterizes a concept and not define a concept. Defining features are those that a bird, for example, must have in order for it to be classified in that category. Characteristic features, on the other hand, are those that are usually associated with typical members of the category. That most birds fly is an example. Thus, canaries are more quickly recognized as birds than are penguins because they are more typical than penguins, which swim instead of fly. In a similar way, it takes longer to say that a bat is not a bird, because bats share features characteristic of birds even while the match on defining characteristics is poor. Feature comparison models can seem very attractive. But they are not particularly economical, i.e., large collections of features would be required for learning, and the models make no claims about how such collections would be organized. Finally, semantic feature comparison models have been criticized for their failure to account for semantic flexibility. That is, context can cause certain aspects of a concept's meaning to be more or less prominent.

2.5. Methods for studying lexical semantic organization and lexical access

There are various methods to study the lexical semantic organization in an individual. Few of them and widely used are Priming, semantic fluency and word association tasks.

2.5.1 Priming

Priming refers to the change in the ability of an individual to identify or produce an item as a result of a prior encounter with a specific item (Tulving & Schacter, 1990). It is a non-conscious (implicit) form of human memory in which exposure to previously presented stimulus influences the response to the following stimulus. The most common interpretation of priming is that the representation of the prime and target in the cortex are interconnected such that activation of the representation of the prime would automatically activate the representation of the target word. In a typical priming experiment, two words are presented successively. The first word refers to prime and the second word is the target to which response has to be made. The time duration between the prime and initiation of the target is called as Stimulus Onset Asynchrony (SOA). Priming effect is said to occur when prime facilitates the response to targets.

Types of Priming

Various types of priming which have been widely used to understand the linguistic organization and processing are:

- a) *Semantic priming*: In semantic priming, the prime and the target would belong to the same semantic category For and similar features are shared example, the word hoarse is a semantic prime for donkey, because the both are from same category and present with nearly similar visual features. Semantic priming is theorized to work because of

spreading neural networks. When an individual thinks of one item in a category, similar items are primed (stimulated, activated) by the brain.

- b) *Translation Priming*: In this type of priming, the prime word is presented in one language (L1 or L2) of a bilingual individual, followed by its translation in other language (L2 or L1). E.g. /bekkU/ (prime in Kannada language, L1) followed by target / cat/ in L2 (English language). In translation priming the presentation of a prime word automatically causes its lexical entry (Foster & Davis, 1984) to be activated which signifies short SOA's.
- c) *Phonological Priming*: In Phonological priming, the prime and target are phonologically related to each other. For example, the word /kʌp/ (prime) is phonologically related to the word 'kæt' (target) since they share a common initial phoneme. This commonality would result in the prior activation of the target in the brain.
- d) *Syntactic priming*: Here, the prime and the target are syntactically related to each other. E.g. – a 'cat' (prime) followed by target 'a cat that's on a table'.
- e) *Orthographic Priming*: This type of priming specifically influences visual word recognition as it involves use of orthography. Here, a visual prime is 4 spelled similar to target word. Usually the prime and target words share all the same letters except for one. E.g. – 'farm' (prime) followed by target 'barn'.
- f) *Repetition Priming*: Here, the prime presented will be the same as the target stimuli. The influence of the initial presentation of the stimulus on responding to the same stimulus presented few milliseconds later is considered.

Priming looks into organization of words in the mental lexicon and not on the expressive skills of an individual .

2.5.2 Semantic fluency task

In a semantic fluency task, participants are asked to provide as many words as they can think of in a semantic category (e.g., animal, food, and supermarket). This task has been widely used to explore children's lexical semantic knowledge, lexical organization, and word retrieval ability (Koren, Kofman, & Berger 2005; Hurks et al., 2010). The more words in the category that exist in their mental lexicon, the larger their total number of responses. Additionally, responses often reveal how the lexicon is organized. This task taps only on the vocabulary size of particular lexical category and not on the lexical semantic organization of the child's vocabulary.

2.5.3 Word Association task

Word association tasks also taps on word frequency as studied by De Groot, (1989). The aim of the study was to study the word image ability and word frequency. Study was carried out in 3 -step experimental phase where Experiments 1 and 2 provided with the discrete word association task, and Experiments 3 used the continued word association task. Data from Experiments 1-3 showed that word imageability strongly determines responding in word association, whereas word frequency hardly affects the word imageability. Experiments 4 (lexical decision) and 5 (word naming) explored the possibility that word frequency effects on the word-recognition stage in word association might have any relation with any effect of word frequency on the association-retrieval stage. Experiments 6-8 examined whether the absence of frequency effects on WA in Experiments 1-3 might have been due to the fact that

the WF classes had a restricted range. A new set of stimulus materials was constructed, with frequency classes further apart. The results have showed that high-imageability words contain more information than those of low-imageability words and that relatively strong links depart from the former type of nodes. Authors have concluded that, responses are dependent on the type of word association used

2.5.4. Types of word associations

The word association task is used to measure semantic knowledge (De Deyne& Storms, 2008). There are different types of word association tasks,

- a) *Discrete word association task*: In which participant provides a single response to a word provided.
- b) *Free word association task*: It is a utilitarian production task that has been directed to a variety of different types of information, such as categories, words, rhymes, word stems, and word fragments (Battig& Montague, 1969; Nelson & Brooks, 1974) In this task , the participant gives as many responses as possible to a provided stimuli within a given amount of time.
- c) *Repeated word association task*: In this task (Sheng, McGregor, 2006), a stimulus is repeated for 2-3 times, and every time the participant will be instructed to provide a similar response.

2.6. Lexical semantic organization in typically developing children

A small number of studies have been carried out in the area of lexical semantic organization in typically developing children. Naomi Hashimoto, Karla McGregor and Anne

Graham (2007) has studied the conceptual lexical organization in typically developing children in the age range of 6-8 using semantic priming of object decisions tasks. The primary objective of the study was to examine the knowledge of semantic relations. Procedure was carried out in 2 phases, In phase 1, the 6-year-olds, 8-year-olds, adults participated in an object decision task. Participants in the primed group made object decisions in response to primes that were related taxonomically, thematically, or perceptually in relation with provided target objects. Those in the unprimed group made decisions about the same stimuli without the benefit of prime words. In phase 2, the children in the primed group explained the taxonomic and thematic relations between the prime–target pairs used in phase 1.

Results showed that In phase 1, the strength of semantic relations did not vary on comparison with type or age, taxonomic priming was as strong as thematic priming and the degree of priming did not reliably differentiate the 3 age groups. The younger age group 6-year had comparatively more difficulty in describing taxonomic than thematic relations, whereas the 8-year-olds described both with ease in phase 2. Authors have concluded the study with contrary to the shift hypothesis, taxonomic and thematic relations-structure concepts in children as young as 6 and into adulthood., 6-year-olds' representations of taxonomic relations which are fragile and vulnerable to high task demands, which was in accordance with the performance hypothesis.

Another important study by Janani& Prema (2008) has studied the development of lexical categorization in pre-schoolers, considering 30 children with the age range of 2.6-5.5years.This study was focused mainly on understanding the nature and process of lexical organization in pre-schoolers and the influence of labelling in lexical organization. Participants were tested with free word association task and lexical categorization task to look into the development of lexical categorization. Responses were categorized into 4 major categories -thematic relations, taxonomic relations, attributive relations, evaluative relations

and others. Results of the study showed that percentage of thematic related responses were higher than all other types across all the age groups and increase in the thematic related responses with the subsequent reduction in taxonomic related response was seen after the 4.5 years indicating the crucial age for conceptual organization shift. Overall this study concludes that pre-schoolers gives more preference to thematic relations in organizing their mental lexicon compared to any other type.

(Nelson, 1991) suggested that children uses both linguistic and perceptual types of information when acquiring the meaning of a lexical item. This is based on the idea that knowledge of word meaning is understood as it is the main interconnection range of a learner's different associations with that particular word, including linguistic and perceptual associations. The way in which lexical-semantic organization can be modelled and understand is by means of a network of nodes, links, and spreading activation present in mental lexicon (Collins & Loftus, 1975). Different words, or nodes, are linked to other nodes that share semantic relationships. The strength of these links varies, depending on the various factors like degree of meaning which overlaps between words and/or the frequency of co-occurrence of words. For instance, by hearing the word *dog*, the conceptual node representing that particular word is activated. Then the activation spreads and gets triggered such that nodes bearing strong links to the activated node (e.g., *cat* or *animal*) are immediately activated. These words are produced early on in free or continuous word association, whereas weakly linked nodes (e.g., *leash*) receive a smaller and/or delayed activation and are produced later using free or continuous word association task

Lexical-Semantic Organization in monolingual Children are exposed to greater amount of information of their fast acquisition of vocabulary in the school years. A typical school-age child acquires 3,000–5,000 new words each year and about 10 to 13 words per

day (Miller & Gildea, 1987). Authors have discussed how children learn words suggesting that mastering the mechanics of uttering and recognizing a word and concept that masters the learning processes. It was suggested that the children's understanding of meaning of a word grows in rapid stage and with slow stage. In this study it is also discussed the factors which affects the growth of vocabulary.

2.7. Lexical –semantic organization in typically developing bilingual children

Studies have been carried out on bilingual children's lexical–semantic knowledge which provides more insight on parallel development of two language systems. In extended versions, these studies may also provide an insight on the factors which effects the lexical–semantic development, which are like cognitive maturity, age, exposure and schooling of an individual, or age of reading acquisition, and specific linguistic factors like competence in a particular language.

Lexical semantic organization in bilingual children has been studied by Sheng, Karla McGregor, and Viorica Marian (2006) using repeated word association task. The aim of this study was to examine the lexical semantic organization in bilingual children by comparing their both language ability with the monolingual age-matched children. 12 children who are good at both English and mandarin language were compared with 12 English monolingual children were considered for the study and the Responses were documented as Paradigmatic and syntagmatic classes. Results showed that similar performance by both monolingual and bilingual children for the word association task however in the bilingual group, between 1st and 2nd languages word association performance was compared and correlated while on

comparing between 2 different groups, English language showed that there was a paradigmatic responses were more and helped the bilinguals during the elicitation of verbs.

Chithra and Prema(2008) has studied the lexical-semantic organization in Kannada-English bilingual children of age range 6-8 using a repeated word association paradigm task. The objectives of the study was to compare the lexical semantic organization in Kannada language of children who were Kannada –English bilinguals with that of monolingual children and also to examine the how bilingualism effects the lexical semantic organization .Responses were grouped into major classes of syntagmatic, paradigmatic, responses.. Results showed that syntagmatic types were observed in the younger age group compared to older age group and no significant difference in the lexical semantic organization in bilingual and monolingual groups .With the above results this study also indicate that word class influences the response type, however this study fails to conclude the effect of bilingualism on lexical semantic organization.

2.8. Developmental trends in responses

As discussed above various methodology have been used in the literature to study the lexical semantic organization and access in children. Since the organization principles evolve and develop over time in children a continuous track of these events is necessary. Researchers in this context have attempted to look on to the developmental trend in children and noted the crucial changes as thematic –taxonomic shift and syntagmatic- paradigmatic shift. Although both thematic and taxonomic relations are available at an early age a shift from thematic to taxonomic strategies is evident .As age increases, taxonomic relations becomes a characteristic feature in helping and moulding children’s semantic nodes . This also helps in

guiding the retrieval of semantic knowledge. Expansion of vocabulary is the major basis and cause of taxonomic response types and this also helps in increasing the word knowledge.

A parallel development takes place during the acquisition of vocabulary which is named as syntagmatic–paradigmatic shift. This phenomenon can be seen in children’s responses in various types of word association tasks. Children in the age of 5 respond to a given word stimulus with a response that imitates the syntactic sequence (e.g grapes-eating). As age increases paradigmatic types of responses were provided by the children of 6 and 9 years. children respond with a word from the same paradigm (e.g., grapes–apple). Researchers termed responses from different form of word classes as syntagmatic type and those from the same word class as paradigmatic type. This shift from syntagmatic to paradigmatic responses is strong indication of a more developed semantic system which imitates an adult’s semantic system. This pattern is typical in matured language users as reported in literature (Lippman, 1971). Syntagmatic-paradigmatic shift helps in conceptual organization changes accordingly in an individual’s interpretation of the task .This can be due to formal schooling and the acquisition of reading.

On Comparing with the thematic–taxonomic distinction, which is used mainly for categorizing object kinds like nouns, the syntagmatic–paradigmatic distinction can be correlated to all form of word classes like adjectives, nouns and verbs. Majorly Frequency of thematic and taxonomic responses is dependent upon word frequency, and word form and the particular features of the stimulus words, and more syntagmatic–paradigmatic shift is observed in high-frequency adjectives, whereas words of noun class gives paradigmatic responses even at early stages of development and verbs are more strongly syntagmatic.

Nelson (1977) concluded that the syntagmatic -paradigmatic shift was a very reliable developmental phenomenon and although there are a number of cognitive and linguistic

accounts of it, there are no generally accepted theories which explain it. She hypothesized that it represented a conceptual change which occurred during the early school years as coordinate concepts become more salient to children and as they develop a better understanding of the nature of the free word association task.

Typically developing children have showed syntagmatic – paradigmatic shift as a development of conceptualizing the mental lexicon. Cronin, (2002) has studied the syntagmatic–paradigmatic shift and reading development in typically developing children of age range of 5.4 to 6.4 with a total of 59 children using Peabody picture vocabulary test, Woodcock Reading Mastery Test, and a word association task and the responses were categorised into paradigmatic, syntagmatic, clag or sound based responses, multiword responses, non-word responses and no responses. Results have showed that the younger group gave more of syntagmatic responses and the older group gave more paradigmatic responses. as the age progressed.

Young children respond differently than older children and adults on the free word association task (Brown & Berko, 1960; Ervin, 1961; Entwisle, 1966) studied the thematic-taxonomic shift by comparing the younger children older children across the age range of 6-9. Children were asked to respond with the first word that comes to mind. Results showed that older children tend to reply with paradigmatic responses. These are words from the same grammatical form class as the stimulus word, e.g. `table' - `chair' 'sad' - `happy', and `run' - `walk'. Often paradigmatic responses are opposites, coordinates and synonyms. Young children, however, responded with words which are found with the stimulus word in discourse, e.g. `table' - `eat', sad' - `cry', and `run' - `fast'.

Rolita, George & Susan (2011) has studied thematic-taxonomic shift in the typically developing children in the age range of 6-8 years. Black and white pictures of 32 concrete objects were chosen for priming experiment. All objects were likely to be familiar to 6-year-olds. The taxonomic and thematic condition consisted of 8 pairs each of pictured objects. Results have shown that 6 year old had a better performance for thematic condition than for taxonomical condition. Whereas, 8 years old in primed conditions showed better taxonomical performance. Therefore authors have concluded that thematic to taxonomical shift is present in the typically developing children.

2.9. Lexical Semantic organization in Pathological population

Children with SLI exhibits more difficulties in learning any kind of words. These difficulties are seen in contextual learning situations in which word comprehension and production task will become a difficult task for a child with specific language impairment. After a small exposures to target words and in extended word learning new paradigms in which children are taught novel words with didactic input and many more practice opportunities. These children have showed deficits mainly in their semantic system. (Bishop, 1997) stated that children with SLI shows late onset in acquisition of vocabulary. Also, literature supports the evidence that children with SLI test lower than age-matched peers on static measures of both comprehension and expression which indicates deficit in their mental lexicons.

Study by Sheng Karla, and McGregor (2010) on determining lexical semantic organization in children with specific language impairment in 14 children with SLI, using repeated word association task. 14 age matches (AM), and 14 expressive vocabulary matches (VM) Test

stimuli consisted of nouns and verbs. The aim of the study was to determine whether children with specific language impairment show deficits in lexical–semantic organization and, if so, whether these deficits have any relation with their delay in vocabulary size and whether the deficits affect all children with SLI. The results showed fewer semantic responses, more clangs, and more errors were produced by children with SLI on comparing with AM children. Relative to the VM children, fewer semantic responses and more errors in the children with SLI were found in by-item analyses.

Examination of individual performance in the SLI group revealed that poor semantic performance was associated with a deficit in expressive vocabulary and a gap between receptive and expressive vocabularies. The study concludes that significant variability in lexical–semantic organization skills exists among children with SLI. And deficits in lexical–semantic organization were demonstrated by a subgroup of children with SLI who likely had concomitant word-finding difficulties.

Studies related to markedness in lexical semantics has been studied by Shyamala, Pallavi & Sharon, (2009) Current study aims at answering whether the marked words form a part of the vocabulary of children with delayed speech and language with mental retardation and with hearing impairment, as compared with typically developing children. 145 children and subgroups of 105 typically developing children in the age group of 5-10 years of age were taken and grouped into 20 children with severely profound sensory neural hearing impairment and 20 children with mild mental retardation. Results showed that there is a significant difference in markedness skills of typically developing children and clinical population. Markedness is observed in normal in increasing rate than compared to children with hearing impairment and mental retardation.

Jessica and Dinsmoor (2015) has compared the lexical semantic organization in children with cochlear implant to that of children with normal hearing. Authors have compared the vocabulary organization of 30 children, 10 with cochlear implant, and 10 with normal hearing matched with the age and 10 children matched with the vocabulary size. Taxonomic grouping task, taxonomic feature task and category member task were used to elicit the responses. Results showed that children with cochlear implant demonstrate a delay specifically in superordinate category relationship knowledge which can affect their day to day learning.

Studies on lexical semantic organization have majorly carried out in the western context and limited studies can be seen in Indian scenario and few studies by Chitra & Prema (2008), Janani & Prema (2008) have looked into the development of lexical semantic organization in children. However there are less studies carried out in the recent past, as categorization ability of the child changes with the development and acquisition. Lexical semantic organization is interdependent on language exposure which is found to be rich compared to past. Present study is an effort on tracking the developmental changes related to lexical semantic organization across the age groups.

CHAPTER III

METHOD

Lexical semantic organization has been studied in children through semantic fluency tasks, repeated word association tasks and studies have shown that developmental trend can also be seen in any of the word association task hence this study aimed at measuring the lexical-semantic organization in children in the range of 4-7 years using free word association task.

Objectives of the study were

The primary objective of the study was

- ✓ To determine lexical semantic organisation of children in the age range of > 4-5 years, > 5-6years and >6-7 years through free word association.

The secondary objectives of the study was

- ✓ To verify if lexical semantic organisation is dependent on lexical category considered.

Participants

Total of 60 participants in the age group of 4-7 were selected for the study and these participants were divided into 3 age groups, where group 1 consisted of 20 children in the age range of >4-5 with a mean age of 4.61 .Group 2 included of 20 children in the age range of >5-6 years with a mean age of 5.54 while group 3 comprised of 20 children in the age range of >6-7 years with a mean age of 6.42 .Each group had equal number of male and female participants(10 each).

Table 3.1: Representing participants details

	Age (in years)	Gender	Participants (N)
1	>4-5	Female	10
		Male	10
2	>5-6	Female	10
		Male	10
3	>6-7	Female	10
		Male	10

Participant selection criteria

Inclusion Criteria

- Participants with Kannada as a native language were taken for the study.
- Participants who have passed in formal testing of RELT and informal testing of ling's sounds which was carried on to rule out the hearing, were only included in the study.
- Participants who were exposed to minimum of 2 languages were included in the study.

Exclusion Criteria

- Participants were excluded from the study if they had any hearing loss developmental delay, learning disability, sensory problems and other neurological issues and this was screened using WHO ten question disability screening checklist given by (Singi, Kumar, Malhi &Kumar (2007)
- Participants who were exposed only to English language were excluded from the study.
- Participants who did not achieve the adequate language score in RELT and did not pass in ling's sounds (/a/ /i/ /u/) test were excluded from the study.

Development and validation of Test stimulus

60 random Kannada words which were concrete nouns selected from different lexical categories like animals, vehicles, common objects and so on. These words were given to three experienced Speech Language Pathologists for familiarity check where they were asked to categorize words on 3 point rating scale such as non-familiar words, familiar words and very familiar words in the perspective of children from 4-7 years. From this word list 15 very

familiar words and 15 familiar words across the age groups and 30 word stimuli was consolidated. Finalized stimuli was recorded by a female speaker using praat software and uploaded to a PC (sony laptop) presented through headphones. Recorded word stimulus was presented through auditory mode and if there is no response for auditory mode, visual cues were provided in the form of line drawings.

Instrumentation

Testing was carried out through both auditory and visual mode with stimulus presentation through headphones which was connected to laptop (sony laptop). Participants were seated 50 cm distance from the laptop screen for visual mode of presentation.

Procedure

Testing was carried out individually in a well-ventilated class room with reduced environmental noise and when children are in highest alertness. Children were comfortably seated and provided with instructions for the task. Instructions were varied depending on the responses of participants for auditory and visual mode. For auditory mode instruction given was / you will be presented with a word auditorily, once you listen to the word, say few other words which comes to your mind and indicate once you are done/ this instruction was provided in the native language of the participants (/e pada keld takshna ning yav yella padagal mansig baratte adna helbeku/) and for the visual mode, instruction given was, /you will be shown a picture of the same word, now try to say as many words as possible on looking into it/ Children were familiarized for the task with

practise trials. Once the children were clear with the instructions, headphones were placed binaurally. With the ensurance of correct fit of the headphones the stimuli was presented auditorily at a comfortable loudness level. The test stimuli were presented one after the other with 60 sec time duration in between to respond .The responses were recorded and documented. Initial presentation of stimulus was through auditory mode for 60 sec, when there was no response from the child for auditory stimuli within the time limit, visual cues were provided in the form of line drawings appropriate to the auditory stimuli with addition of 30 sec. Presentation of the stimuli is shown below in the form of schematic presentation.

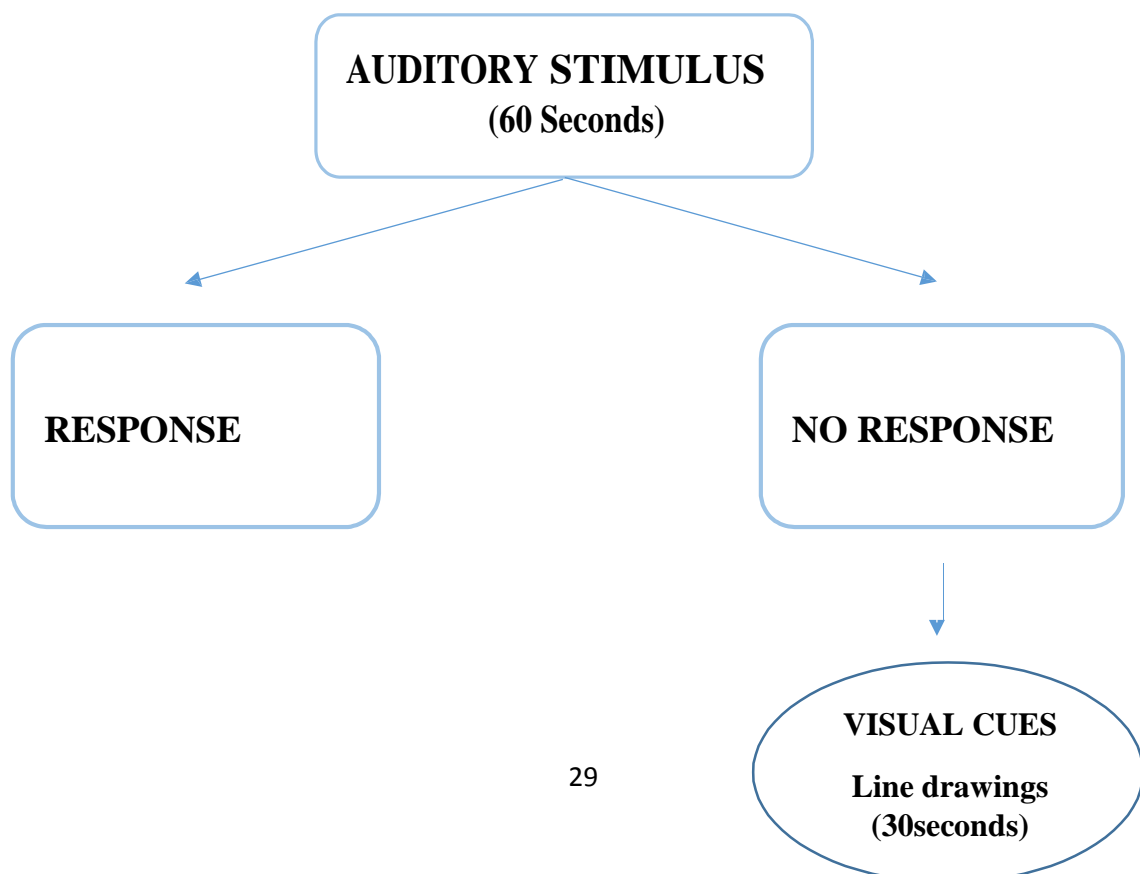


Figure 3.1: Schematic representation of stimulus presentation.

Task description

A free word association task was carried out to examine lexical semantics organization in recruited participants. The task was carried out predominantly through auditory mode in case of no responses from the participants, visual mode was adopted.

Stimulus: through auditory mode

Task description: Each Word from the 30 stimulus list was presented one by one through auditory mode through head phones and participant has to listen to each of the word. Time provided for response to each word is 60 sec.

Procedure: Participant was instructed to say the words which comes to his/her mind after listening to it. Instruction was also provided in Kannada as./e pada kelid takshna ning yav yella padagal mansig baratte adna helbeku/.

Analysis: Number of responses and type of responses given by the participant through auditory mode was recorded and documented.

Eg: for the word 'cat' - participant was expected give the responses as -dog, lion, animal, milk

In case the participant fails to respond to the stimuli which was presented through auditory mode, same stimuli was presented through visual mode.

Stimulus: through visual mode

Task description: Visual mode of presentation was carried out only when there were no responses through auditory mode to the particular stimulus and stimulus was shown in the form of line diagrams for 30 sec.

Procedure: Participant was instructed to see the stimulus on computer screen for 30 sec and say the words which comes to his/her mind.

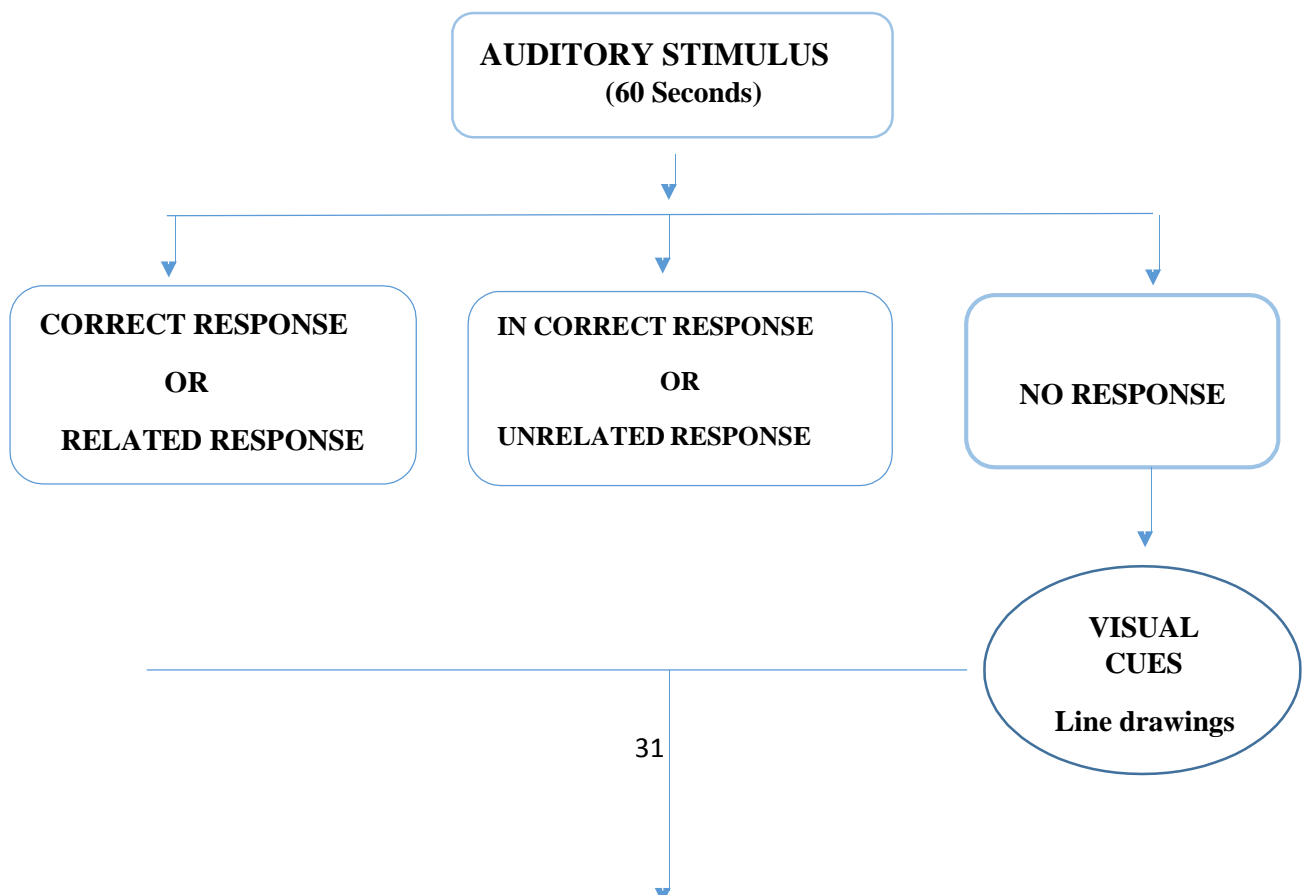
Analysis: Number of responses and type of responses given by the participant through visual mode was recorded and documented.

Eg: For the same word ‘cat’ participant was expected give the similar or varied responses as – dog, lion, tail, eyes. A sample of Line diagram used during the procedure which was provided was shown below.



Figure 3.2: Sample of line diagram

Participant’s responses were categorised into thematic, taxonomic, unrelated and no responses Stimulus presentation and response categorization is shown below in the form of schematic representation.



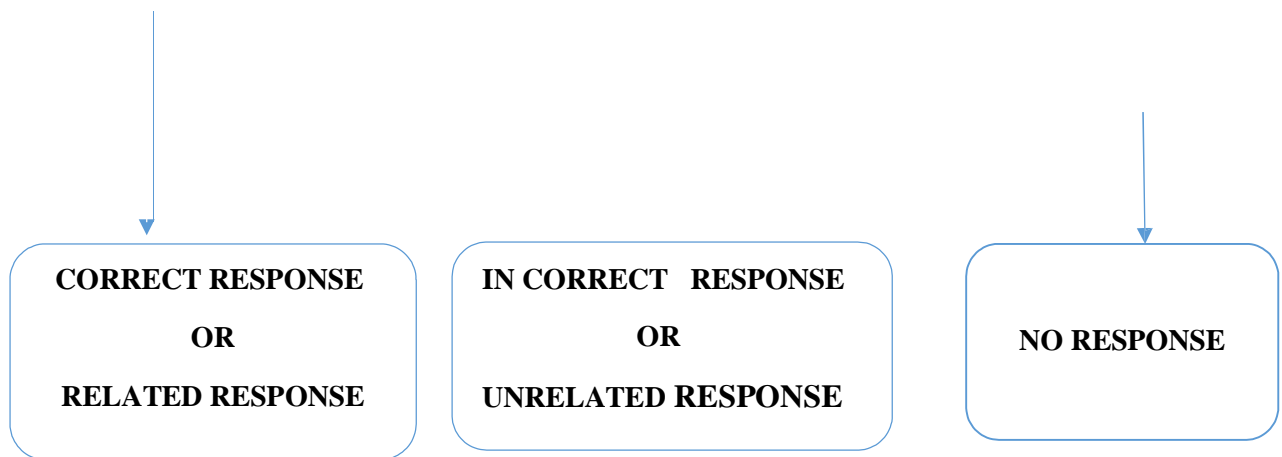


Figure 3.3: Schematic representation of stimulus presentation and response categorization.

Correct or related responses included

- a) *Thematic relations* It is type of word relation in which includes words with similar theme.(e.g.: ship-water, cow-milk,)
- b) *Taxonomic relations* It is a type of word relation which includes a category of hierarchy (e.g.: pen- pencil ,stationary)
- c) *Unrelated or Related responses* includes all the clag responses (e.g.: river-apple) and
- c) *No responses* in which participant did not provide any response for the given stimuli within the time limit.

Scoring

The responses obtained from the participants included both words and description from the description only content words were selected for further analysis. Responses obtained through auditory mode was considered for the analysis and each word-response was scored as “1 “and “0” if there were no response .Total number of responses for each category like thematic,

taxonomic, unrelated and no responses were added separately and expressed in terms of percentage.

Method of analysis

Data analysis

Recorded responses were grouped under thematic responses, taxonomic responses unrelated responses and no responses. Responses of sub-ordinate classes or super ordinate classes were grouped under taxonomic responses e.g.: ship- boat, vehicle, responses which describes the characteristics were grouped under thematic responses e.g.: ship- blue colour, water etc. Responses which does not belong to the either of the above were grouped under unrelated responses similarly no responses for both auditory and visual mode were classified.

Statistical Analysis

The measures such as thematic responses, taxonomic responses, unrelated and no responses will be coded for further analysis ,these coded values was expressed in terms of percentage which was further subjected to statistical analysis using SPSS software (version21). Descriptive statistics was carried out, depending on the results of test of normality, mean median standard deviation were derived and further statistical tests were carried out

CHAPTER III

RESULTS AND DISCUSSION

The aim of the study was to understand the lexical semantic organization of children in the age group of 4-7 years using free word association task. 60 participants in the age of 4-5, >5-6 and >6-7 years were considered. Thus the 60 participants were divided into three sub groups. Each group comprised of 20 participants with equal number of males and female participants (10 and 10).

Free word association task was carried out to examine lexical semantic organization in the recruited participants. 30 words were presented for the same purpose; the words were selected from the different lexical categories. Each word was presented one by one in the auditory mode through head phones and participant had to listen to each of the word and provide responses to each word within 60 seconds. Participant was instructed to tell the words which come to his/her mind after listening to it. The task was carried out predominantly through auditory mode in case of no responses visual mode was adopted.

Responses were categorised into thematic, taxonomic and unrelated responses. The responses were categorised under thematic responses, when there was co-occurrence in event schemas (e.g.: dog-bone, cow-milk,). Taxonomic responses on the other hand, involved members belonging to the same lexical category (e.g.: cat- hoarse, animal). Unrelated responses included all the clag responses (e.g.: river-apple) and the response was categorised as no responses when the participant did not provide any response for the given stimuli within the time limit which were subjected to statistical analysis using SPSS software (version21).The data was subjected to normality test using Shapiro Wilk' test and it was observed that the data did not abide to properties of normal distribution as $p < 0.05$ hence non-parametric tests were used to examine the objectives.

The primary objective of the study was

- ✓ To determine lexical semantic organisation of children across the age range of 4-5 years, > 5-6years and >6-7 years.

The secondary objectives of the study were

- ✓ To study the distribution of responses across gender
- ✓ To understand the type of responses and its relevance to age.
- ✓ Additional qualitative analysis was carried to understand the responses in relevance to the different lexical categories considered.

The results of the present study are discussed under the following headings:

- 1) Comparing the performance of children in the age range of 4-5 years, >5-6years and >6-7years for different types of responses (Taxonomic, Thematic, unrelated)
- 2) Comparing the types of responses across gender
- 3) Comparing the each types of responses across the age groups of 4-5 ,>5-6, and>6-7years.

1) Comparing the age groups for different types of responses (Taxonomic, Thematic, Unrelated) in each age group

Total participants were divided into 3 age groups (4-5,>5-6 and >6-7years) and the performance of the children was compared across the age groups. The responses produced by the participants were categorised under thematic (THE), taxonomic (TAX) and unrelated responses(UR). The responses were converted into percentage as the N (number of responses) varied across each stimulus and the upper limit for responses cannot be imposed in such studies

Table 4.1

Mean, Median and SD for the Group I (>4-7 years) for different response categories.

Age Group	PTHE			PTAX			PUR		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
>4-5 years	56.36	58.50	26.40	21.18	20.15	16.79	20.13	12.00	18.89
>5-6 years	57.70	77.40	36.95	30.13	18.20	29.31	11.58	3.90	16.87
>6-7 years	47.50	46.70	28.58	41.45	33.65	26.20	10.91	5.40	12.91

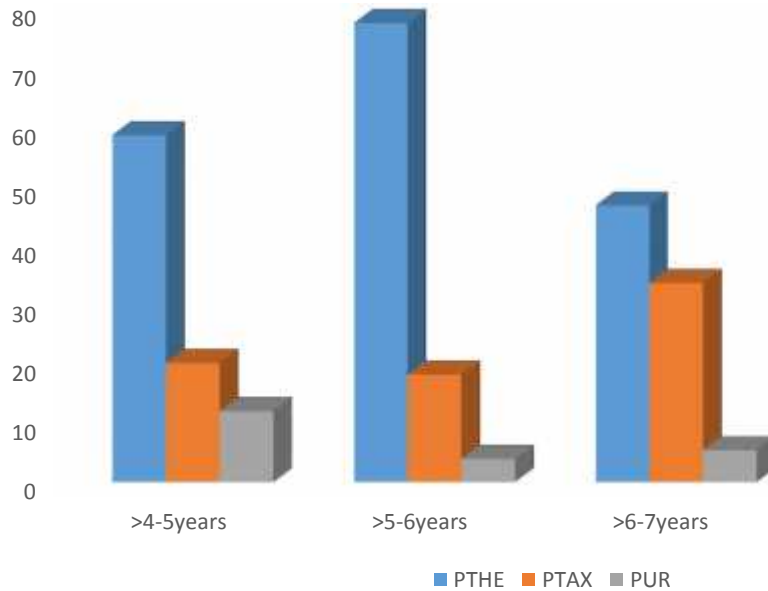


Figure 4.1: Median scores for the age group of >4-5, >5-6 and >6-7 across different response categories.

As shown in the table 4.1 ,in the age range of 4-5 years- mean, median and SD values were highest for thematic (THE) responses (Mean=56.36 Median=58.50) followed by taxonomic (TAX) responses (Mean=21.18, Median=20.15) and lowest for UR responses (Mean =20.13 Median= 12.00, SD=18.89). Standard deviation also followed the same trend.

Similarly in the age range of >5-6 years mean, median and SD values were highest for THE responses (Mean=57.70, Median=77.40) followed by TAX responses (Mean=30.13 Median=18.20) and lowest for UR responses (Mean=11.58, Median=3.90,)

In the age range of >6-7 years mean, median and SD values were highest for THE responses (Mean=47.50, Median=46.70,) followed by TAX responses (Mean=41.45, Median= 33.65) and lowest for UR responses (Mean=10.91, Median=5.40). It was observed that thematic responses were more followed by taxonomic and no responses. This trend holds well across the three age groups.

In order to verify if there was any significance on comparing different response categories in each age groups. Wilcoxon sign rank test was used. In the age group of 4-5 years THE responses were compared to TAX responses and /Z/ score obtained was 3.223 ($p < 0.05$), THE was compared to UR responses the /Z/ score was 3.093 ($p < 0.05$). On comparing TAX and UR /Z/ score obtained was 2.18 ($p > 0.05$) Statistically significance difference was seen on comparing THE and TAX ($p < 0.05$), THE versus UR ($p < 0.05$) whereas no significant difference was found when TAX responses were compared with UR responses ($p > 0.05$).

In the age group of >5-6 years, THE responses were compared with TAX responses . /Z/ score obtained was 2.016 ($p < 0.05$), In the same lines, THE responses were compared to UR responses, /Z/ score obtained was 3.174 ($p < 0.05$). On comparing TAX and UR responses, /Z/ score was 2.427 ($p < 0.05$). Statistical significance was found on comparing all the three response types ($p < 0.05$) in this age group.

Similar comparisons was carried out for >6-7 years age group THE responses were compared with TAX responses and /Z/ score obtained was 448 ($p > 0.05$), THE responses were compared

to UR responses, /Z/ score was 3.25 ($p < 0.05$). On comparing TAX and UR responses /Z/ score of 3.510 ($p < 0.05$) was obtained. Statistical significance was found on comparing THE versus UR ($p < 0.05$) and TAX versus UR ($p < 0.05$). Whereas on comparing THE versus TAX no statistical significance was found ($p > 0.05$).

This is in consonance with the findings of Janani and Prema, 2008 where authors have studied the development of lexical categorization in the age range of 2.6-5.5 years using free word association task and they have concluded that any changes in conceptualizing and ability occurs after 4.5 years of age. In relating this with the present study there was a significant changes in conceptualizing and categorising ability of children on comparing 4-5 and >6-7 age groups.

Results have shown that there was statistical significant difference on comparing all the three types of response categories between >5-6 and >6-7 years of age. Earlier studies have shown that the trend of responses would change from taxonomic to thematic over age. However in the present study, such trend was not observed. Children in the age range of 4-5 years, > 5-6 years and >6-7 years produced more thematic responses compared to taxonomic responses. One more significant finding which can be derived from the study is that the unrelated responses decreased with age. This showed the emergence of lexical semantic organisation in children, in other words children would learn associating words.

2) Comparing males and females across different response categories (Taxonomic, thematic, unrelated).

In each age group, 10 males and 10 females were considered. The performance on free word association task was compared across the genders for the three different response categories and results are discussed for each age group.

In the range of >4-5years

Table 4.2

Mean, median and SD values of males and females across different response categories in the age range of >4-5 years.

Age	Gender	PTHE			PTAX			PUR		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
>4-5years	Male	57.76	57.45	30.77	18.46	15.55	20.24	13.65	7.70	16.03
	Female	54.82	58.50	22.31	23.90	22.05	13.00	26.62	19.60	20.07

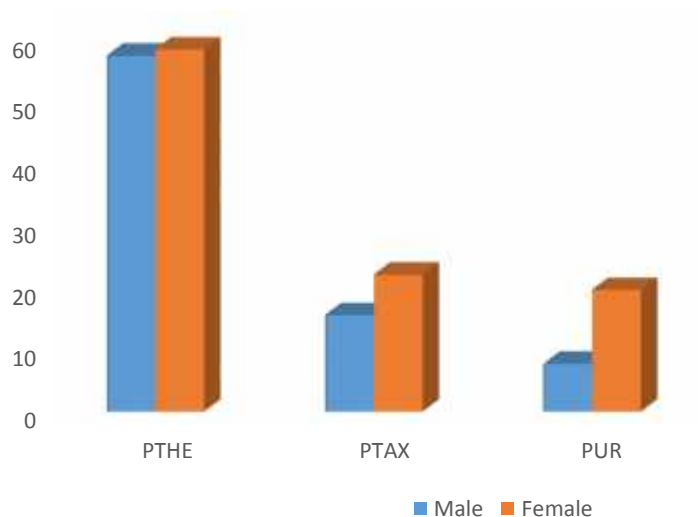


Figure 4.2: Median scores of male versus female across different response categories in the age range of >4-5 years.

The performance of children in each age group was compared across the two genders for all the three response categories (Taxonomic, thematic and unrelated). As shown in the table 4.2, in the age group of 4-5 years, Mean, median and SD values for females were higher than males for all the three response categories.

Wilcoxon's sign rank test was carried out to check the level of significance between gender and types of response categories in the age range of >4-5 years. The Z score obtained for THE response was 3.27 ($p > 0.05$), the Z score obtained for TAX response was 9.49 ($p > 0.05$) and Z score for UR response was 1.930 ($p > 0.05$). Statistically significant difference was not found between the two genders for any of the response categories. Hence in this age group, gender had no effect on the type of response categories.

As explained, in the age range of 4-5 years gender had no effect on any three response categories. This could be because of the similar kind of performance in both the genders. i.e. Males and females would have performed equally well on the task. This finding is not in consonance with

the studies which conclude that female perform better compared to male on free word association task (Janet,1987)

In the range of >5-6years

Table 4.3

Mean, median and SD values of males and females across different response categories in the age range of >5-6 years

Age	Gender	PTHE			PTAX			PUR		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
>5-6 years	Male	44.64	39.85	34.28	39.35	29.00	26.01	15.89	7.05	20.87
	Female	70.77	87.75	36.43	20.92	7.55	30.80	7.27	1.85	11.13

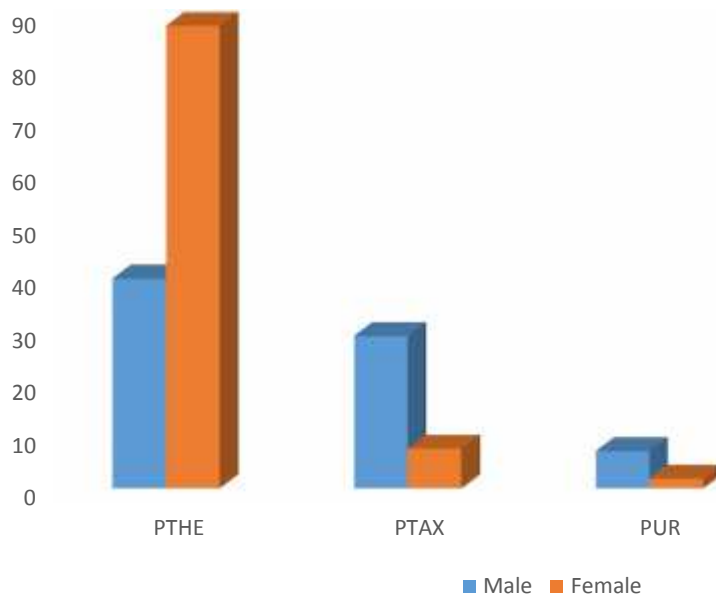


Figure 4.3: Median scores of male versus female across different response categories in the age range of >5-6years

As shown in the table 4.3, the performance of males was compared with females in the age group of >5-6 years for three response caetgories. Under thematic response category, Mean andmedian

values for females (Mean=70.77, Median=87.75) were higher than males (Mean =44.64 ,Median =39.85) ,whereas for the taxonomic response category, males showed higher Mean and median values (Mean=29.00, Median=7.05) compared to females (Mean=20.92, Median=7.55). For unrelated response category, males showed higher mean and median values (Mean=15.89, Median=7.05) than females (Mean=7.27, Median=1.85) Standard deviation was higher for females compared to males in all the response category.

In order to verify if there was any statistically significant significance between gender on the three of response categories Wilcoxon's sign rank test was carried out. The /Z/ score obtained for THE response was 1.739 (p>0.05), the /Z/ score for TAX response was 1.966 (p<0.05), for UR response /Z/ score was 1.447 (p>0.05). Statistically significant difference was found only for TAX type of response (p<0.05) whereas THE and UR types of response categories did not show any statistical significance (p>0.05) hence in this age group gender had a significant effect only for TAX type of responses. Males performed better compared to females. This fact lacked support through earlier studies.

In the age range of >6-7 years

Table 4.4

Mean, median and SD values of males and females across different response categories in the age range of >6-7 years

Age	Gender	THE			TAX			UR		
		Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
>6-7 years	Male	49.11	54.25	26.36	40.52	30.50	26.55	10.23	5.20	14.34
	Female	45.90	38.85	32.00	42.38	43.50	27.25	11.60	5.40	12.05

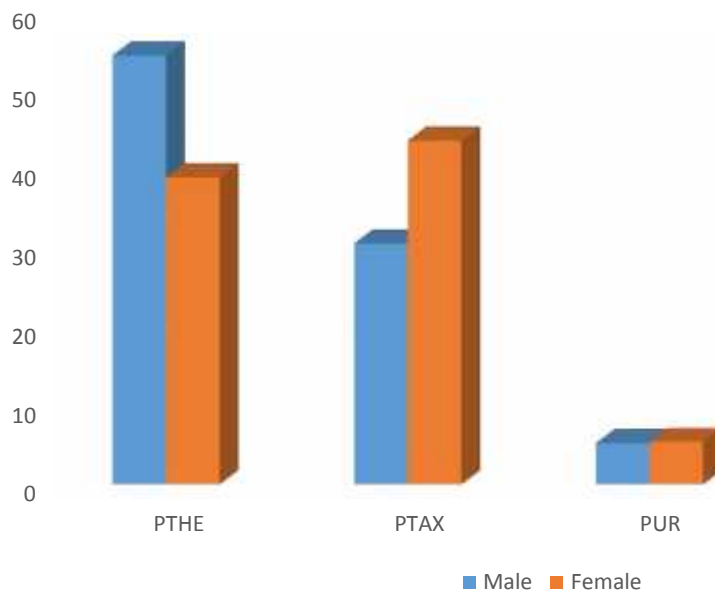


Figure 4.4: Median scores of male versus female across different response categories in the age range of >6-7 years.

As shown in the table 4.4 ,in the age group of >6-7years, In thematic response category- mean and median values were higher for males (Mean=49.11,Median=54.25)than females (Mean=45.90,Median=38.85)whereas for taxonomic response category mean and median values were higher for females(Mean=42.38,Median=43.50)than for males(Mean=40.52,Median=30.50) Similarly in unrelated response category mean and median values were higher for females (Mean=11.60,Median=5.40)than for males(Mean=10.23,Median=5.20). Standard deviation was higher in females compared to males in both thematic and taxonomic category ,whereas standard deviation was higher in males compared to females in unrelated response category.The responses did not follow a particular trend for this age group. Males performed better compared to females when the taxonomic responses were taken into consideration. Under taxonomic responses, females performed better compared to males while the performance of males and females was uniform for the unrelated responses.

Wilcoxon's sign rank test was carried out to verify if there was any significant difference between the two genders for the three types of response categories in the age range of >6-7 years. The /Z/ score obtained for THE response was .302 ($p>0.05$), the /Z/ score for TAX response was .454 ($p>0.05$). For UR response /Z/ obtained was .454($p>0.05$). Statistically significant difference was not found between gender and any of the response categories. Hence in this age group, gender had no effect on the type of response categories. The overall results showed that the performance of males and females were parallel on word association task.

3) Comparing the different types of responses (Taxonomic, thematic, Unrelated) across the age groups.

Responses were categorised into 3 types PTHE (percentage of thematic responses) PTAX (percentage of taxonomic responses) and PUR (percentage of unrelated responses) categories. In the current section, the performance on the three response categories was compared across the three age groups. The motive was to observe if there was any trend in response and also to verify if this trend varied as a function of age.

Table 4.6 Mean, median and SD for different response categories in all the age groups.

Response category		>4-5years	>5-6years	>6-7years
PTHE	Mean	56.36	57.70	47.50
	Median	58.50	77.40	46.70
	SD	26.40	36.95	28.58
PTAX	Mean	21.18	30.13	41.45
	Median	20.15	22.90	33.65
	SD	16.79	29.31	26.20
PUR	Mean	20.13	11.58	10.91
	Median	12.00	6.90	5.40

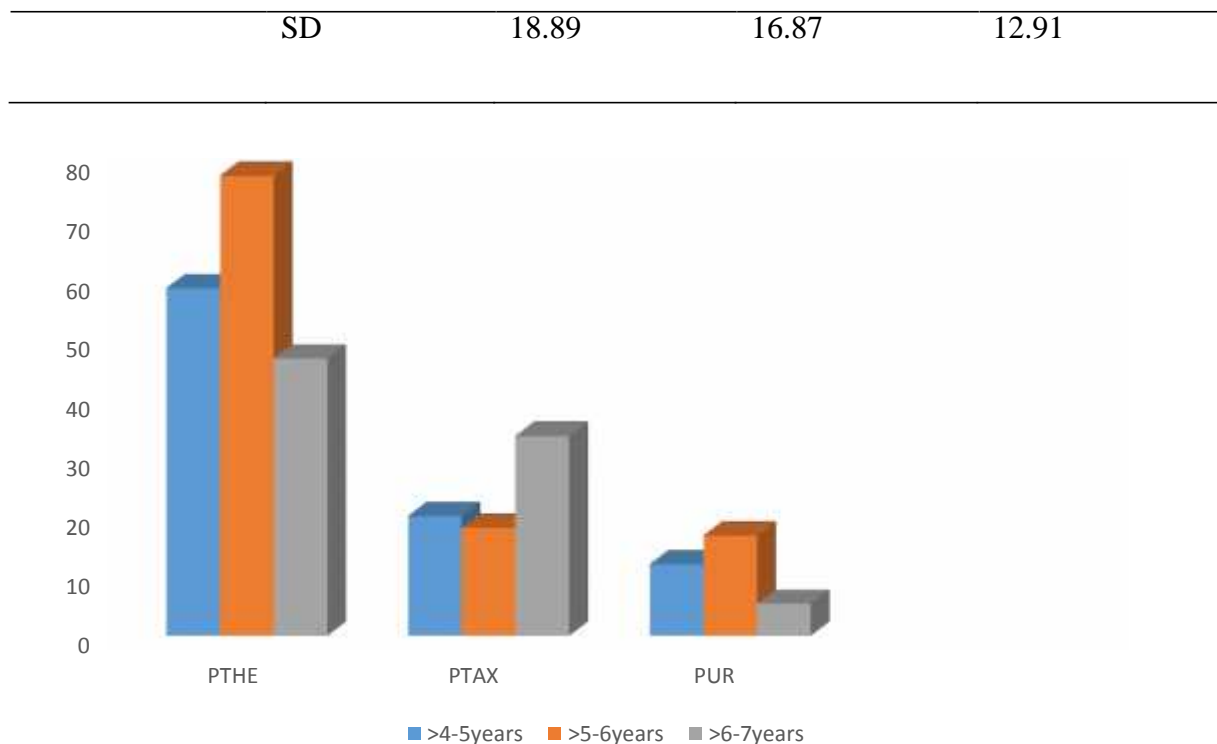


Figure 4.5: Median scores for different types of response categories in 4-5, >5-6 and >6-7 years of age.

As shown in the table 4.5, In thematic response category mean and median values were highest in >5-6 years (Mean=57.70,Median=77.40) followed by 4-5 years (Mean=56.36,Median=58.50)and lowest for >6-7 years (Mean=47.50,Median=46.70).For taxonomic response category, mean and median values were highest for>6-7 years(Mean=41.45,Median=33.65)followed by>5-6years (Mean=30.13,Median=22.90)and lowest in 4-5years(Mean=21.18,Median=20.15). For unrelated response category, mean and median values were highest in 4-5years(Mean=20.13,Median=12.00) followed by >5-6 years(Mean=11.58,Median=6.90)and lowest in > 7 years(Mean = 10.91, Median =5.40)

For thematic response category standard deviation was higher in >5-6 followed by >6-7years and lowest for 4-5years, similar trend was observed in taxonomic response category, whereas for

unrelated response category, standard deviation was highest in 4-5years followed by >5-6years and lowest in >6-7years.

Kruskal-Wallis test was carried out to compare different types of response categories across the age group of >4-5,>5-6 and >6-7years.

On comparing between thematic response category and the age range of 4-5,>5-6 and >6-7 years chi square obtained was $\chi^2 = 1.259$ ($p > 0.05$) and on comparing taxonomic response category across the age range of 4-5,>5-6 and >6-7 years, chi score obtained was $\chi^2 = 6.174$ ($p < 0.05$). Similarly on comparing unrelated response category across the age range of 4-5,>5-6 and >6-7 years chi square obtained was $\chi^2 = 6.337$ ($p < 0.05$). Statistically significant difference was found in TAX and UR responses ($p < 0.05$) across the age range of 4-5,>5-6 and >6-7 years, whereas THE responses showed no significant difference across age range (4-5,>5-6 and >6-7 years).

As explained from the above results, taxonomic and unrelated response categories showed statistically significant difference across all the three age group (4-5,>5-6 and >6-7 years). As children learn new words categorization ability also increases with the vocabulary size. A supporting study by Cronin, (2002) where the author have studied the syntagmatic-paradigmatic shift (syntagmatic relations includes thematic type of responses and paradigmatic relations includes taxonomic type of responses) in typically developing children using word association task and concluded that the younger group gave an increasing number of syntagmatic responses and the older group gave more paradigmatic responses as the year progressed.

Results have also indicated that apart from taxonomic type of responses unrelated responses also showed significant difference across the age range. Firstly this can be due to less language or learning exposure of the children in all the age range, secondly it can be due to more concentration on vocabulary building through outside environmental exposure than on

categorical learning. It can also attribute to different level of understanding the instruction given for the free word association task. Supported study done by (Clark, 1987, 1990) where author have explained that a child, hearing a new term, assumes that the speaker or instructor means something different from what has already been labelled or learnt through his environment.

Qualitative analysis

Qualitative analysis will be discussed by

- a) Verifying if lexical semantic organization is dependent on lexical category considered. For the current study 30 words were selected from 12 different lexical categories and one noun not belonging to these category was considered.
- b) Average number of responses for auditory and visual mode of stimulus presentation.

a) On verifying the responses based on lexical categories.

Table 4.6

Lexical categories and number of lexical items selected in each category for 4-5,>5-6 and >6-7 years.

Lexical Categories	Number of words
Animals	6
Vehicles	4
Fruits	2
Vegetables	1
Kitchen items	3
Ornaments	3
Body parts	1
Playing objects	2
Stationary items	2
Common objects	3
Clothes	1
Footwear	1
Building	1

Responses were categorised into different types (Taxonomic, thematic and unrelated) and discussed with respect to lexical categories in each age group.

In the age range of >4-5 years

Table 4.7: Distribution of thematic, taxonomic and unrelated response categories across lexical categories(in the order of hierarchy) in the age range of 4-5 years.

Taxonomic	Thematic	Unrelated
Animals	Animals	Ornaments
Fruits	Fruits	Clothes
Stationary items	Vegetables	Footwear
Body parts	Body parts	Building
Kitchen items	Stationary items	Playing objects
Vegetables	Vehicles	Kitchen items
Playing objects	Common objects	Vegetables
Vehicles	Ornaments	Common objects
Ornaments	Playing objects	Fruits
Footwear	Kitchen items	Stationary items
Common objects	Footwear	Body parts
Clothes	Building	Vehicles
Building	Clothes	Animals

In the age range of 4-5years, the distribution of three response types is discussed in relevance to the 13 lexical categories. Taxonomic response are as shown in table 4.7. Taxonomic response were more for the lexical categories in the order of Animals >Fruits >Stationaryitems>Bodyparts>Kitchenitems>Vegetables>Playingobjects>Vehicles>Orname nts >Footwear>Common objects>Clothes>Building. Similarly thematic response were more for the lexical categories in the order of Animals> Fruits> Vegetables> Body parts> Stationary items> Vehicles> Common objects>Ornaments>Playing objects>Kitchen items>Footwear>Building>Clothes, and unrelated responses were more for lexical categories in the order of Ornaments > Clothes > Footwear > Building >Playing objects

>Kitchen items>Vegetables>Common objects>Fruits>Stationary objects> Body parts> Vehicles>Animals.

In general Taxonomic and thematic responses were more for ‘Animals, fruits, stationary items, body parts and vegetables, whereas both taxonomic and thematic responses were less for ‘Footwear’ common objects, clothes and building.

In the age range of >5-6 years

Table 4.8: distribution of thematic, taxonomic and unrelated response categories across lexical categories (in the order of hierarchy) in the age range of >5-6 years.

Taxonomic	Thematic	Unrelated
------------------	-----------------	------------------

Fruits	Animals	Building
Vegetables	Playing objects	Clothes
Animals	Fruits	Ornaments
Playing objects	Vegetables	Footwear
Stationary items	Vehicles	Stationary items
Kitchen items	Body parts	Kitchen items
Vehicles	Stationary items	Vehicles
Body parts	Common objects	Playing objects
Ornaments	Kitchen items	Common objects
Common objects	Footwear	Vegetables
Footwear	Clothes	Fruits
Building	Ornaments	Body parts
Clothes	Building	Animals

As depicted in the table 4.8, in the age range of 4-5years, the distribution of three response types is discussed in relevance to the 13 lexical categories.. Taxonomic response were more for the lexical categories in the order of Fruits >Vegetables>Animals>Playing objects>Stationary items>Kitchen items>Vehicles>Bodyparts>Ornaments>Common objects>Footwear>Building>Clothes. Similarly thematic response were more for the lexical categories in the order of Animals >Playing objects> Fruits> Vegetables> Vehicles> Body arts>Stationary items>Common objects>Kitchen items> Footwear >Clothes> Ornaments>Building, and unrelated responses were more for lexical categories in the order of Building>Clothes>Ornaments>Footwear>Stationary items>Kitchen items >Vehicles >Playing objects> Common objects >Vegetables >Fruits> Body parts >Animals. In general taxonomic and thematic responses were more for ‘animals’ ‘vegetables’ ‘fruits’ and playing

objects, whereas both taxonomic and thematic responses were less for ‘ornaments’, footwear’, ‘clothes’ and building.

In the age range of >6-7 years

Table 4.9: Distribution of thematic, taxonomic and unrelated response categories across lexical categories (in the order of hierarchy) in the age range of >6-7 years.

Taxonomic	Thematic	Unrelated
Animals	Stationary items	Clothes
Vehicles	Kitchen items	Footwear
Stationary items	Ornaments	Common objects
Fruits	Fruits	Clothes
Vegetables	Animals	Ornaments
Body parts	Vegetables	Building
Kitchen items	Playing objects	Vegetables
Ornaments	Vehicles	Stationary items
Footwear	Common objects	Fruits
Common objects	Body parts	Vegetables
Building	Building	Kitchen items
Playing objects	Clothes	Playing objects
Clothes	Footwear	Animals

As depicted in the table 4.9, in the age range of >6-7years, the distribution of three response types is discussed in relevance to the 13 lexical categories. Taxonomic responses were as shown in table 4.9. Taxonomic response were more for the lexical categories in the order of Animal> Vehicles >Stationary items> Fruits> Vegetables >Body parts> Kitchen items>

Ornaments >Footwear >Common objects >Building >Playing objects>Clothes. Similarly thematic response were more for the lexical categories in the order of Stationary items>Kitchen items> Ornaments> Fruits>Animals>Vegetables>Playing objects>Vehicles> Common objects> Body parts >Building >Clothes >Footwear, and unrelated responses were more for lexical categories in the order of Clothes> Footwear> Common objects> Clothes> Ornaments> Building> Vegetables>Stationary items>Fruits>Vegetables>Kitchen items> Playing objects>Animals.

In general taxonomic and thematic responses were more for ‘stationary items’, ‘vehicles’, ‘fruits’ and ‘animals’, whereas both taxonomic and thematic response were less in ‘playing objects’, ‘building’, ‘common objects’ and ‘footwear’.

b) Average number of responses for auditory and visual mode of stimulus.

Responses obtained were grouped into auditory and visual responses and converted into percentage for all the three types of response categories in each age group. The stimulus was presented in auditory modality, if there was no response obtained over a stipulated duration (60 seconds), visual modality was employed. For the purpose of analysis, the total number of responses produced by children of a particular age group was computed and the distribution of responses across the two modalities was tabulated. For example the taxonomic responses produced by children were taken into consideration and the percentage of responses elicited for auditory mode and visual mode was calculated.

In the age range of 4-5 years

Table: 4.10 :Percentage of different types of responses in the age range of 4-5 years

Age group	Type of response	Auditory mode (in percentage)	Visual mode (in percentage)
	Taxonomic	77.09	22.91
4-5 years	Thematic	65.45	34.55

As depicted in the table 4.10, in the age range of 4-5 years, children provided 77.09 % of responses in auditory mode and 22.91 % in visual mode for taxonomic response category. Similarly children provided 65.41 % in auditory mode and 34.55 % in visual mode for thematic response category. For both taxonomic as well as thematic response type, greater percentage of response was obtained for auditory compared to visual modality.

In the age range of >5-6 years

Table: 4.11 Percentage of different types of responses in the age range of >5-6 years

Age group	Type of response	Auditory mode (in percentage)	Visual mode (in percentage)
	Taxonomic	62.3	37.7
>5-6years	Thematic	73.55	26.55

As depicted in the table 4.11, In the age range of >5-6 years, children provided 62.3 percentage in auditory mode and 37.7 percentage in visual mode for taxonomic response category. Similarly children provided 73.55 percentage in auditory mode and 26.55 percentage in visual mode for thematic response category. For both taxonomic as well as

thematic response type, greater percentage of response was obtained for auditory compared to visual modality as in the previous age group.

In the age range of >6-7 years

Table: 4.12: Percentage of different types responses in the age range of >6-7 years

Age group	Type of response	Auditory mode (in percentage)	Visual mode (in percentage)
	Taxonomic	82.96	17.4
>6-7years	Thematic	65.2	34.8

As depicted in the table 4.12, In the age range of >6-7 years, children provided 82.96 %in auditory mode and 17.4 % in visual mode for taxonomic response category. Similarly children provided 65.2 % in auditory mode and 34.8 %in visual mode for thematic response category. Overall children provided more percentage of thematic and taxonomic responses in auditory mode compared to visual mode for all the age groups.

CHAPTER V

SUMMARY AND CONCLUSIONS

Language is the principal signalling-system or instrument of communication used by humans for the transmission of information, ideas, etc. Communication by means of language is carried out through a number of mediums like speech, writing and traditionally less centrally through singing. Human language may be distinguished from the signalling systems of other species chiefly by its grammatical and semantic complexity and its flexibility. (Encyclopedia of Language and Linguistics, 2006). Semantics being one of the crucial components of language deals with the learning of the words. The minimal distinctive unit in the semantics of the

language is called lexemes. The study of meanings, forms, and application of these lexeme and its relation with other linguistic structure is called lexical semantics. There are different ways in which meaning of a word which can be described in various lexical relations like synonyms, antonyms, hypo and hypernyms.

These relationships between general item and specific item is described using two hierarchical forms of thematic and taxonomic relations. Basic organizational principles of lexical-semantics consists of thematic relations which involve co-occurrence in event schemas (e.g.: dog-bone) and taxonomic relations which involves hierarchical category membership (e.g.: dog- hoarse, animal). There are various methods like priming task, semantic fluency task, and word association tasks, which can be used to tap on lexical semantic organization of an individual. Acquiring a language includes learning its semantics –that is learning how meanings are linguistically realized. Learning how the semantic meanings are connected to its lexicon is called as lexical semantic organization.

Lexical-semantic organisation in children are studied much in western context (Sheng et al 2006; Sheng et al 2010; Sheng et al 2016) compared to Indian context. However in Lndian context studies by (Chithra,2008; Janani. 2009) have been carried out in normal young population of age range 6-8 with repeated word association task. However the number of studies carried out are limited.

The responses in the earlier studies were grouped into paradigmatic and syntagmatic responses whereas these responses produced by children can also fit in to other categories like taxonomic and thematic relationships which would likely be tapped on an open free word association task. Thus the responses in the current study were categorised under taxonomic, thematic and unrelated categories. Age considered for these study was 5-8 years whereas the present study considered the children across the age group of 4-7 years.

The aim of the present study was to study lexical semantic organization in children from 4-7 years (4-5, >5-6, >6-7 years) using free word association task. Participants in the prescribed age range were selected on random basis. Kannada was the native language of the participants. Language ability of children was formally assessed through Receptive Expressive Language Test (RELT). These children were required to have hearing sensitivity which was informally screened using Ling's six sounds.

Total of 60 participants in the age group of 4-7 were selected and were divided 3 age groups. Group 1 consisted of 20 children in the age range of >4-5 with a mean age of 4.61. Group 2 included 20 children in the age range of >5-6 years with a mean age of 5.54, while group 3 comprised of 20 children in the age range of >6-7 years with a mean age of 6.42. Each group had equal number of male and female participants (10 each).

Children were tested in a well-ventilated class room.. The participants were instructed to tell the words which would come to their mind as soon as they hear the target stimuli. Instructions in Kannada were also provided as following./e pada keld takshna ning yav yella padagal mansig baratte adna helu helbeku/. The time duration to respond to each word was 60 seconds. Initial presentation of stimulus was through auditory mode for 60 sec, when there was no response from the child for auditory stimuli within the time limit, visual cues were provided in the form of line drawings appropriate to the auditory stimuli with addition of 30 sec. The responses were recorded and categorised into thematic taxonomic unrelated response and no response eventually.

The aim of the study was to understand the lexical- semantic organisation in children from 4-7 years. Three objectives were coined for the same. The first objective was to study lexical semantic organisation across the three age groups (4-5 years, >5-6 years and > 6-7 years). The responses produced by the participants were categorised into taxonomic, thematic and unrelated response types. The participants from all the three groups produced more thematic

responses followed by taxonomic and unrelated responses. Statistically significant difference on Wilcoxon's signed rank test (a non parametric test used to carry within in group analysis) was seen when the thematic responses was compared with taxonomic and unrelated responses in pairs. Statistically significant difference was not observed when the taxonomic responses was compared with unrelated responses. This result was uniform for all the three groups. The results obtained were not in consonance with earlier studies conducted in this direction. Most of the earlier studies had indicated that the younger children would produce more taxonomic responses; this eventually would be replaced with thematic responses. However from the derived findings it can be observed that children would produce more thematic followed by taxonomic responses.

The second objective was to study lexical semantic organisation in specific genders for the three age groups. The results were again analysed separately for taxonomic, thematic and unrelated response categories. The responses produced by male and female children did not abide a uniform pattern. For certain responses, males over performed females and for certain other responses the visa versa was observed. Thus making it difficult to generalise the performance across the two genders. Statistically significant difference was not observed across males and females.

The third objective was to understand the distribution of responses in relevance to age. Taxonomic responses, produced by children from 4-5 years was compared with the performance of children of > 5-6 years and >6-7 years. In the same line, comparison was carried for thematic responses and unrelated responses also. Taxonomic responses were seen more in children of >6-7 years compared to the other groups while thematic responses were seen more in children of >5-6 years. Unrelated responses were more in children from 4-5 years and the unrelated responses significantly reduced across age. Kruskal Wallis test was carried to verify if there was any significant difference between age. The Chi square

values showed significant difference indicating that the response typology would change with respect to age.

In addition to the preset objectives, two other additional objectives were taken up. The first additional objective was to study the distribution of responses for the various lexical categories. Nouns from various lexical categories were considered and the responses produced under the three response types was analysed with respect to these categories. It was observed that the number of responses varied with respect to the lexical category and the results have been discussed in detail.

The second additional objective was to decipher the relationship between the modality of presentation and the responses elicited. The task given to the participants was auditory association task, where the participants were asked to give as many words which would come to their mind after hearing the target word, in case the participant failed to produce a response a line drawing of the target was shown to the participants. In this objective the distribution of responses was studied across the auditory and visual modality for the three age groups and for thematic, taxonomic responses. It was seen that the participants responses were predominantly more for the stimulus presented in auditory modality compared to the visual modality probably because the first mode of response elicitation was auditory and visual modality was used only as supplementary mode for response elicitation .

Implication of the study

- The trend of responses according to age range will be determined which can serve as a reference for studying lexical-semantics organization in clinical population further.
- The results would enable to draw inferences regarding semantic and associative relationship shared by words in the lexicon in relevance to various lexical categories

Limitations of the study

- Participants considered from different places and schools and cultural backgrounds for the study would have resulted in heterogeneity.
- Limited number of participants in each age group

Implications for future research

- Study can be extended to bilinguals and other languages
- Study can be conducted in clinical population like SLD, SLI etc
- Study can also be done in children who are relatively older

REFERENCES

- Anderson, A. H. (2006). *Encyclopedia of language & linguistics* (Vol. 1). K. Brown, L. Bauer, M. S. Berns, J. E. Miller, & G. Hirst (Eds.). Amsterdam: Elsevier.
- Battig, W. F., & Montague, W. E. (1969). Category norms for verbal items in 56 categories: A replication and extension of the Connecticut norms. *Journal of Experimental Psychology*, 80, 1–46
- Balota, D. A., & Chumbley, J. I. (1984). Are lexical decisions a good measure of lexical access? The role of word frequency in the neglected decision stage. *Journal of Experimental Psychology: Human perception and performance*, 10(3), 340.

- Berlin, B. (1978). Ethnobiological classification. In E. Rosch & B. B. Lloyd (Eds.), *Cognition and categorization* (pp. 9–26).
- Bishop, D. (2014). *Uncommon Understanding (Classic Edition): Development and disorders of language comprehension in children*. Psychology Press.
- Brown, R., & Berko, J. (1960). Word association and the acquisition of grammar. *Child Development*, 1-14.
- Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological Review*, 82, 407–428.
- Chithra, R., & Prema, K. S. (2008). Lexical-Semantic Organization in Bilingual Children. Student Research at AIISH, Vol VI, All India Institute of Speech and Hearing, Mysore
- Clark, E. V. (1987). The principle of contrast: a constraint on language acquisition. In B. MacWhinney (Ed.), *Mechanisms of language acquisition* (pp. 1–33). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Clark, E. V. (1990). On the pragmatics of contrast. *Journal of Child Language*, 17, 414–431.
- Cronin, V. S. (2002). The syntagmatic-paradigmatic shift and reading development. *Journal of Child Language*, 29, 189-204.
- De Deyne, S., & Storms, G. (2008). Word associations: Network and semantic properties. *Behavior Research Methods*, 40(1), 213-231.
- De Groot, A. M. B. (1980). Oral word association norms: 100 word associations to 460 Dutch nouns.

- De Groot, A. M. B. (1989). Representational aspects of word imagenability and word frequency as assessed through word association. *Journal of Experimental Psychology; Learning, Memory and Cognition*, 15, 824-845.
- Dinsmoor, J. K. (2015). *Lexical Semantic Organization of Children with Cochlear Implants* (Doctoral dissertation, Texas Christian University Fort Worth, Texas).
- Elbers, L., & van Loon-Vervoorn, A. (1980). Acquiring the lexicon. In Gillis, S. & De Houwer, A. (Eds), *The acquisition of Dutch*, 301-378.
- Entwisle, D. (1966). *Word association in young children*. Baltimore, MD: Johns Hopkins University Press.
- Ervin, S. M. (1961). Changes with age in the verbal determinants of word-association. *The American journal of psychology*, 74(3), 361-372.
- .
- Fitzpatrick, T. (2006). Habits and Rabbits; Word associations and the L2 lexicon. In *EUROSLA Yearbook*, 6,(121-145). Amsterdam: John Benjamin's publishing Company.
- Fitzpatrick, T. (2007). Word association patterns; unpacking the assumptions. *International Journal of Applied Linguistics*, 17, 319-331.
- Forster, K. I., & Davis, C. (1984). Repetition priming and frequency attenuation in lexical access. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 10, 680-698.

- Gleason, J. Berko & Ratner, N. Bernstein. (1998) *Psycholinguistics*, 2nd edition. New York: Harcourt Brace.
- Hashimoto, N., McGregor, K. K., & Graham, A. (2007). Conceptual organization at 6 and 8 years of age: Evidence from the semantic priming of object decisions. *Journal of Speech, Language, and Hearing Research*, 50(1), 161-176.
- Henriksen, B. (1999). Three dimensions of vocabulary development. *Studies in Second Language Acquisition*, 21, 303-317.
- Hurks, P. P., Schrans, D., Meijs, C., Wassenberg, R., Feron, F. J. M., & Jolles, J. (2010). Developmental changes in semantic verbal fluency: Analyses of word productivity as a function of time, clustering, and switching. *Child Neuropsychology*, 16(4), 366-387.
- Koren, R., Kofman, O., & Berger, A. (2005). Analysis of word clustering in verbal fluency of school-aged children. *Archives of Clinical Neuropsychology*, 20(8), 1087-1104.
- Lippman, M. Z. (1971). Correlates of contrast word associations: Developmental trends. *Journal of Verbal Learning and Verbal Behavior*, 10(4), 392-399
- Mcnamara, T. P., & Holbrook, J. B. (2003). Semantic memory and priming. In A.F. Healy and R.W. Proctor (Eds). *Experimental psychology*.447-474.
- Miller, G. A., & Gildea, P. M. (1987). How children learn words. *Scientific American journal*, 257, 94-99.
- Morton, J. (1969). Interaction of information in word recognition. *Psychological review*, 76(2), 165.
- Nelson, D. L., & Brooks, D. H. (1974). *Relative effectiveness of rhymes and synonyms as retrieval cues. Journal of Experimental Psychology*, 102,503–507.

- Nelson, K. (1977). The syntagmatic-paradigmatic shift revisited: A review of research and theory. *Psychological bulletin*, 84(1), 93
- Nelson, K. (1991). Varied domains of development; A tale of LAD, MAD, SAD, and RARE and surprising events in our RELMS. In Kessel, F., Bornstein, M., & Sameroff, A. (Eds), *Contemporary constructions of the child; Essays in honor of William Kesen* (pp.123-142). Hillsdale, NJ: Erlbaum.
- Nelson, K. (1991). Concepts and meaning in language development. *Biological and behavioral determinants of language development*, 89-115.
- Nelson, D. L., McEvoy, C. L., & Dennis, S. (2000). What is free association and what does it measure?. *Memory & cognition*, 28(6), 887-899.
- Owens, R. E. (2000). *Language development: An introduction* (6th ed.). Boston: Allyn and Bacon.
- Smith, E. E., Shoben, E. J., & Rips, L. J. (1974). Structure and process in semantic memory: A feature model for semantic decisions. *Psychological review*, 81(3), 214.
- Schmitt, N. (1998). Quantification word association responses: What is Native- like? *Systems*, 26, 389-401.
- Sheng, L., McGregor, K. K., & Marian, V. (2006). Lexical–semantic organization in bilingual children: Evidence from a repeated word association task. *Journal of Speech, Language, and Hearing Research*, 49(3), 572-587.
- Sheng, L., & McGregor, K. K. (2010). Lexical–semantic organization in children with specific language impairment. *Journal of Speech, Language, and Hearing Research*, 53(1), 146-159

Shyamala K. C., Sri Pallavi, M., & Sharon, S. S. (2009). Comparison of Markedness in Lexical Semantic Abilities in Normal Children and Children with Hearing Impairment. *Proceedings of 2nd National Women's Science Congress*. All India Institute of Speech and Hearing, Swadeshi Vijnana Andolana - Karnataka Mysore, India, 240 -244.

Tulving, E., & Schacter, D. L. (1990). Priming and human memory systems. *Science*, 247(4940), 301.

APPENDIX

List of words used for free word association task

/bekku/ ಬೆಕ್ಕು Cat	/ujja:le/ ಉಜ್ಜಲೆ ಲೆ	/ailu/ ರೈಲು ಲಕ
/ha agu/ ಹಡಗು Ship	/i: u i/ ಈರುಳ್ಳಿ Onion	/en u/ ಚೆಂಡಕ Ball
ku i/ ಕುಳಿ ಓಣಿ Chain	/pennu/ ಪೆನ್ನ ಕಟ್ಟು Pen	/na:ji/ ನಾಯಿ Dog
/a e/ ತಟ್ಟೆ ಲೆ Plate	/ppali/ ಚಪ್ಪಲಿ Slipper	vima:na/ ವಿಮಾನ Aeroplane
/sara/ ಸಾರಿ	/a:ne/ ಅನೆ	/mane/ ಮನೆ

ಸರ Necklace	ಆನ ಂ Elephant	ಮನ ಂ Horse
/bassu/ ಬಸಕ ಬ Bus	/ pus aka/ ಪುಟ ಸತಕ Book	/ka:lu/ ಕಯಲಕ Leg
/mi:nu/ ಮೀನುಕ Fish	/ a i / ಭಿತ್ತಿ Umbrella	/si:re/ ಸೀರೆ ರ Saree
/d a:k i/ ದಾಯಿ Grapes	/ga ija:ra/ ಗಡಿಯಾಯಿ ರ Clock	/ko: i/ ಕಿ ಚಿ Monkey
/ ama a/ ಚಮಚ Spoon	/hasu/ ಹಸಕ Cow	/se:bu/ ಸೀಬೆ ಬಕ Bak
/ungu a/ ಉಂಗುಕರ Ring	/lo: a/ ಲೋಟ Glass	/ba e/ ಬಳ ಂ Basket

LINE DIAGRAMS

