TASK VARIABILITY IN LEXICAL RETRIEVAL

OF

NOUNS AND VERBS IN ADULTS

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MAY, 2016

CERTIFICATE

This is to certify that this dissertation entitled "**Task Variability in Lexical Retrieval of Nouns and Verbs in Adults**" is the bonafide work in part fulfilment of the degree of Master of Science (Speech-Language Pathology) of the student (Registration No. 14SLP003). This study 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 Diploma or Degree.

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DECLARATION

This is to certify that this dissertation entitled "**Task Variability in Lexical Retrieval of Nouns and Verbs in Adults**" is the result of my own study under the guidance of Dr. K.S. Prema, Professor of Language Pathology, 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 Diploma or Degree.

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May, 2016

Dedicated to My Lovely Parents!!

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Chapter I

Introduction

"Language as the fundamental unit of communication is a complex and dynamic system of conventional symbols that is used in various modes for thought and communication" as stated by ASHA in 1982. As it is a complex system, the processing of language and linguistic units takes place at several levels in the human brain. The linguistic units comprise of the content, form of the language and also the use of these units in right context.

Nouns and verbs are two different word classes that have been classified under lexical items and it plays an important role in language and communication. Also, it has been reported that the responses to nouns and verbs are generally differentiated by the users of languages. According to Collins English Dictionary (1998) "a verb indicates ,the occurrence or performance of an action, [or] the existence of a state, derived from the Latin word 'verbum' meaning word, and a noun refers to a person, place or thing', from the Latin word 'nomen' meaning name".

Nouns indicate objects (people, places, and things) and verbs are more 'relational' in their semantics than nouns (Genter, 1981; Langacker, 1987). In any given language nouns and verbs have different types of inflectional or grammatical markings, and/ or appear in different canonical places in the sentence structure (Maratsos, 1990). Hence, because of these differences in semantic and syntactic properties, nouns are acquired earlier than verbs during language development (Nelson, 1973).

Verbs were basically considered as syntactic entities and lack of usage of verbs in patients termed to be a sign of grammatical disorder. Verbs have been thought to be more complex than nouns because of their syntactic status in a sentence. The vocabulary of English and in other languages most likely comprise of many nouns than verbs, but the token frequency of verbs are substantially higher than that of most nouns and some verbs (eg: see, give, make, and so on are more frequent words in the language) are acquired later than nouns though the frequency of occurrence are high for these verbs than that of the nouns (Masterson et.al, 2008)

Besides evidence from acquisition, in the early 1980's aphasia researchers debated that verbs are somewhat more susceptible to brain damage. This might be because of the complex grammatical status of verbs than that of nouns (Goodglass & Geschwind, 1976; Saffran et al. 1980; Saffran, 1982). In support of the above, a few studies reported that retrieval of nouns was better than verbs in picture naming and some of the other single word tasks as well (Shapiro & Caramazza, 2003a, 2003b &others).

Further, the semantic representations of verbs have been considered to be more complex than nouns. Concrete nouns are arranged in hierarchies of numerous levels and exemplars of these levels share many semantic features among themselves whereas verbs, have a shallower semantic organization and the semantic features that are shared among themselves are less when compared to nouns (Behrend, 1988; Vinson & Vigliocco, 2002). Because of these properties of verbs, verb processing especially in patients with semantic deficits is reported to be difficult than the nouns. It has been reported that verbs also tend to be morphologically more complex than

nouns in many languages which in turn lead to potential difficulties with verbs in aphasics and children with morpho-syntactic deficits (Vigliocco et al., 2006).

It is widely known that concrete verbs are less imageable than concrete nouns (Bird et al. 2000). It is argued that the differences of word class are due to the natural imageability difference between nouns and verbs. The imageability of nouns is recognized to affect the performance in word and picture naming and the relative low imageability of verbs may, possibly, affect their retrieval in all populations than nouns. A few studies on persons with aphasia and healthy adults also reveal consistently poorer accuracy and slower retrieval of action verbs compared to object nouns (Crepaldi et al. 2012). There is also evidence that object noun and action verb retrieval are differentially influenced by factors like word frequency and imageability (Kauschke & von Frankenberg 2008).

Studies in general, indicate that the imageability and frequency are consistently identified as influencing word retrieval in children, typical adults, and in persons with aphasia. Differences in how these features impact noun and verb retrieval can provide insight into semantic organization (Kauschke & von Frankenberg, 2008; Masterson et al. 2008; Mätzig et al. 2009). Typical adults retrieve high imageability words faster and more accurately than low imageability words regardless of word class (Crepaldi et.al. 2012; Kauschke & von Frankenberg, 2008). Even though there is no direct comparison of the degree of the imageability effect between nouns and verbs, it appears that noun retrieval would benefit more from imageability because, in general, nouns are more imageable than verbs (Bird et al. 2000, 2003; Chiarello et al. 1999).

However, the effects of word frequency on lexical retrieval are more complex than that of imageability. High frequency nouns are named more quickly and accurately than low frequency nouns (Almeida et.al. 2007;Kauschke & von Frankenberg, 2008) but, for verbs, high frequency has the opposite effect (Colombo & Burani, 2002; Székely et al. 2005).

Székely et.al. (2005) attribute the frequency disadvantage for verb retrieval to counting "light verbs" (i.e., go, do and make), which are rated for high frequency, as valid responses. Picture naming is slower for light verbs than more specific but less frequent responses (e.g., make dinner vs. cook), increasing the latency for high frequency verbs. Therefore, while the imageability effect may be related to the visual aids provided by pictures, it is unlikely that the influence of frequency on lexical retrieval would change across methodologies. There are some flaws by using only picture naming task for lexical retrieval.

Some of the studies have reported that effects of imageability may be higher for picture naming tasks as the words that are highly imageable are possibly easier to portray and identify than low imageability words. Hence these differences in imageability during picture naming maybe due to effects on recognition rather than retrieval. There are several methods to overcome this imageability issue and one among them is a sentence completion task without any visual aids which might have minimal influence of imageability on word retrieval. Sentence completion tasks remove the element of image recognition and, as a result, may be able to clarify whether retrieval errors are due to task demands or semantic organization. Sentence completion tasks also allow more flexibility to study other features that influence word retrieval such as imageability and frequency (Berndt et.al. 2002).

It has been studied that verbs and nouns are important in construction of a sentence. It has been viewed verbs being the major element in sentence construction and it determines the argument structure of a sentence as in it determined the number of nouns required in formation of grammatically correct sentences (Raymer & Kohen, 2006). Word retrieval in picture naming task uses direct activation of visual object to phonological representations bypassing the conceptual- semantic activation (Shuren ,Geldmacher & Heilman, 1993 ; Johnson, Paivio & Clark, 1996). In a sentence context the word retrieval uses the networks of semantic and grammatical which encompasses the phonological representations helps in activation of suitable words in conveying the intended message (Thompson, Faroqi-Shah, 2002) In conversational word retrieval the visual object-phonological networks are not so important as in word retrieval in picture naming task.

1.1 Need for the study

Review of literature on the differences in verb and noun retrieval emphasizes the need to study the retrieval of nouns and verbs in Indian languages to understand the type of words that might be easy to retrieve in normal adults and that knowledge can be implemented on patients who have difficulty retrieving nouns or verbs. There is also need to study in which of the two methods i.e. picture naming task and the sentence completion task yield better retrieval of nouns and verbs. In this study in addition to noun and verb retrieval, the category of nouns or verbs that is either easy or difficult to retrieve is also measured and compared. The nature of task employed, i.e., whether recognition at the lexical level or at the sentential level that has been in the interest of several researchers to understand lexical retrieval processes in adults is also examined.

1.2 Aim of the study

The aim of the study is to examine task variability in lexical retrieval of nouns and verbs

1.3 Objectives

The objectives of the present study are as follows:

1) To investigate the retrieval of nouns and verbs in adults.
2) To compare between the two methods- picture naming and sentence completion task- for retrieval of nouns and verbs in adults.
3) To compare the reaction time and accuracy for retrieval of different types of nouns and verbs under study

1.4 Hypotheses

1. There is no significant difference in retrieval of nouns and verbs
2. There is no significant difference between picture naming and sentence completion tasks for examining nouns and verbs retrieval
3. There is no significant difference in the Reaction Time and Accuracy for retrieval of different types of nouns and verbs.

Chapter II

Review of literature

"Language is the systematic and conventional use of sounds (or signs or written symbols) for the purpose of communication or self-expression" as stated by Crystal in 1995.Language and its development have been widely studied in the recent past and it has been stated that language is a complex and multifaceted and not as simple as quoted in the above definition. Language development happens and follows its own hierarchical way from the stage of crying to cooing to babbling to words to sentences to higher language skills from infancy through adulthood.

Language representation in brain has also been extensively studied incorporating different neuro imaging techniques. It had been considered that language is lateralized to left hemisphere in past studies in 1970's. With advancement in the technology in the recent past it has been shown that language is not just lateralized to left hemisphere but has distributed networks bilaterally contributing to language function in a task- specific manner (Price CJ, 2000).

In children the neuroplasticity of language has been studied across age groups using fMRI and it has been revealed that there are age related changes contributing to the neuroplasticity, and it has also been shown that with increasing age there has been progressive involvement in the different areas of brain (inferior/middle frontal, middle temporal and angular gyri of left hemisphere and lingual and inferior temporal gyri of the right hemisphere etc.) in language processing (Szaflarski et.al, 2006).

Linguistic knowledge is not just propositional or representational knowledge but also a procedural knowledge where in a large storage of language possible. There are linguistic chunks where the linguistic knowledge will be stored and these chunks are influenced by the frequency of usage. In memory representation of language consists of units that can constitute utterances or intonation units i.e. not just words, but also phrases and constructions (Bybee, 1998).

2.1 Language

Language as a complex system has been classified into 5 major components under 3 main headings; form (phonology, morphology & syntax), content (semantics) and use (Pragmatics). The meaningful words that are used in language to communicate the intent fall under the sematic component of the language. These words are classified into different word classes. Nouns and verbs are two different word classes that have been classified under lexical items and it plays an important role in language and communication. Also, it has been reported that the responses to nouns and verbs are generally differentiated by the users of languages

2.2 Lexicon

Linguistic units such as the sounds, words, word classes are all stored in mental lexicon. Lexicon helps in selecting or retrieval of the appropriate word from the mental lexicon and also helps in deriving meaning out of it. Studies have shown that the lexical entries contain information regarding the phonological, syntactical and semantically aspects of any word and also information regarding the grammatical usage of these words (MacDonald, 1997; McRae, K. et.al.1998)

Word class classification is a complicated issue and it has been debated over years. This word class classification depends on the properties of words namely, the syntactic properties, morphosyntactic properties that are related with the particular class. It has been said that it also depends on the semantic properties but it is not dependent on language specific characteristics (Schachter, 1985; Maratsos, 1982; Braine, 1987). There are various distinctions possessed between various word classes.

The storage of these word class distinctions in the brain is not completely comprehended. There are two major distinctions possessed and the first distinction is with respect to the content words (includes nouns, verbs) and the functional words (includes determiners, conjunctions etc.) and the second distinction is with respect to content words that is the distinction between nouns and verbs. These distinctions of nouns vs. verbs are with respect to the abstract vs. concrete, less vs. more inflectional categories, lexical- semantic vs. grammatical information.

The model has been proposed called the simple recurrent network model (SRN) which explains the processing of events and behaviours over time (Elman, 1990). Model consists of 4 units, input units, output units, hidden units and context units. (Figure 1)

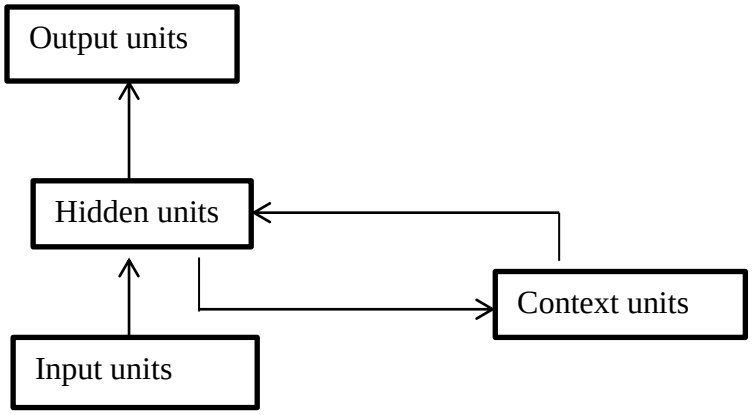


Figure 1: Flow chart of four units of SRN model

This model also gives information regarding how the major categories like nouns and verbs are distributed in the network. To induce the information of these nouns and verbs, information is not carried by the form of an input but uses network which has distributional information. Analysis of the network's hidden-unit patterns revealed that the patterns evoked in response to each word reflected the word's category and it has been given in a hierarchical clustering where structure of word's hidden unit activations are measured in terms of Euclidean distance in the hidden unit space. In this different types of nouns and verbs (animates and inaimates ; transitive and intransitive) are represented in a hierarchical way like mouse ,cat and dog are animals ;woman, girl, man, boy being humans ; plate ,glass being inanimate nouns etc. Likewise in verbs transitive and intransitive verbs are also represented.

2.3 Nouns and Verbs

As we have seen earlier how these nouns and verbs forms a major part of the mental lexicon it is very important to study the lexical information associated with nouns and verbs and how it does affect the retrieval of nouns and verbs from the mental lexicon in all the individuals. Verbs are set of word class which describes an

action that's taking place and the nouns represent the person, place, or a thing. Both nouns and verbs are important in describing an event. Change of a verb or a noun in describing an event can change the meaning of that event.

It has been studied that verbs seems to be less concrete than nouns that is same verb has different meanings when used with different nouns (Genter, 1981; Kersten 1998). For example, the word 'run' gives different meaning when used with nouns like dog, politicians, or a car. Hence because of these multiple meanings attached to verbs than nouns it has been suggested that verbs are recalled poorly than nouns (Earles & Kersten, 2000). In a study for a memory for nouns and verbs, it has been indicated that in a sentence recall task nouns were retrieved better than verbs, amongst nouns the subject nouns were better than an object nouns (Clark, 1966; Horowitz & Prytulak, 1969).

Age wise differences also have been found in memory for nouns and verbs and the studies have suggested that younger adults have poor memory for nouns and verbs. Older adults recall nouns better than verbs, verbs may be difficult to remember for older adults may be because the verbs being abstract and less specific than nouns. In a task with verb- noun pairs older adults were able to recall nouns and was not able to recall verbs as easily as they did for nouns. The difference in the nouns and verbs recall is more for older adults than for younger adults (Earles et.al 1999; Earles & Kersten, 2000)

2.4 Lexical representation of nouns and verbs in brain

Several Neuroimaging studies have been carried out to determine the Lexical or Neural representation of nouns and verbs in monolingual and bilingual brain. It has been studied that nouns and verbs are processed in different areas of the brain and this has been confirmed through various neuro imaging procedures with the help of behavioural tasks like object naming, action naming, lexical decision tasks etc.

It has been revealed that verbs have maximal activations in the prefrontal and frontal regions and nouns had greater activations or neural responses in the middle and posterior temporal regions using PET, ERP, fMRI and for the tasks like word generation, picture naming, lexical decision (Haxby, Lalonde, Wiggs, & Ungerleider, 1995). Another study using PET has found that in processing of verbs greater activation occurred not only in dorso lateral frontal cortex but also in temporal, parietal and occipital lobes (Perani et.al. 1999).

In a PET study done on normal adults of the age range of 18-40, lexical decision task and the semantic categorization task which used more semantically demanding task were employed and the results suggests, unlike other neurological studies which suggested the neural specialization of different word class, this study's results suggest that there was a robust activation of semantic network from left inferior frontal cortex to the inferior temporal lobe, but there was no difference with respect to the function of word class (Tyler, Russell, Fadili & Moss, 2001).

And also it has been concluded that conceptual knowledge is represented within a non-differentiated distributed system where in the data being within the framework of cognitive accounts.

Recent studies have made use of fMRI in investigating the lexical representation of nouns and verbs in brain. A study using fMRI (Shapiro, Moo & Caramazza, 2005) have made use of the production of nouns and verbs in the context like short phrases and sentences. And the results revealed that there were four basic areas in brain which were activated maximally in the production of nouns and verbs and these areas are, the left prefrontal cortex, left superior parietal lobule, and left superior temporal gyrus. For nouns there was greater activation in left anterior fusiform gyrus and for verbs it was found in the left prefrontal cortex.

2.5 Nouns and verbs retrieval

Many studies have been conducted in investigating the retrieval of nouns and verbs in normal children, younger adults, and older adults and in aphasic patients. Literature states that retrieval of verbs are difficult when compared to retrieval of nouns and they are more vulnerable to disruption during brain damage conditions. This difference in retrieval of nouns and verbs may be due to verbs being acquired later than nouns in the developmental period in normal children and also verbs being complex by having variable meanings attached to it than compared to nouns across languages (Gentner, 1981) and also in few conditions it is difficult to comprehend by the normal individuals (Reyna, 1987).

In contrary to the above studies there are studies which have suggested that verb production being superior to noun production in various tasks (Zingeser & Berndt, 1988). This study rule out the statement that was stated for verbs as ‘Verbs are naturally more vulnerable to disruption’ and it clearly says that verbs may also be selectively spared (Zingeser & Berndt, 1988).

In brain damaged individuals it has been found that there is a double dissociation between noun and verb production. In agrammatic patients it has been found that verbs are worse than nouns and in anomic patients nouns being worse than verbs in a group of Italian patients (Miceli, Silveri, Villa, & Caramazza, 1984). Similar patterns in the production of nouns and verbs have also been studied in English speaking patients using the tasks like picture naming, naming from definition and the connected speech tasks. Compared to normal controls relative advantage of production of nouns for agrammatic patients and verb production advantage for anomic patients were found (Zingeser & Berndt, 1990).

It has been suggested that nouns are derived from the semantic category of concrete objects and verbs derived from the semantic category of picturable actions (Berndt, Mitchum, Haendiges & Sandson, 1997) therefore the deficits in nouns and verbs are linked to the semantic category, a specific deficits for actions and objects (McCarthy & Warrington, 1985).

2.6 Tasks and measures for study of Nouns and verbs retrieval

In retrieval of nouns and verbs many studies have employed different tasks, this could include picture naming task, memory tasks, sentence completion task and so on.

In a memory tasks for nouns and verbs conducted on younger and older individual (Earles & Kersten, 2000) were asked to remember and recall the pairs of nouns, verbs and verb-noun pairs that were presented on the computer screen. Four sets of word pairs where in the participants were asked to combine and read the two sets of word pairs by performing action for the respective word pair and for the other

2 sets read without any action. Following the presentation the participants were asked to recall those word pairs in which half of them were given free recall and the other half with cued recall. The results revealed that memory for verbs were greater than memory for nouns. For free recall of noun – verb pair task there was no difference between nouns and verbs recall in younger adults but in older adults nouns were recalled better than verbs from the list. For cued recall of verb –noun pairs older adults were able to remember more nouns than verbs but there was a non-significant trend observed. When verb pairs and noun pairs were compared there was age differences seen for both cued and free recall. Both the recalls were greater for verb pairs than for noun pairs.

Visual naming task was employed in the retrieval of nouns and verbs which included actions and objects naming in another study (Raggi et.al, 2002). This study investigated the Verb-Noun double dissociation in aphasic lexical impairments and also the role of frequency and imageability and aimed at assessing the prevalence of selective impairment of verbs and nouns, to determine whether verb or noun superiority is associated with a particular type of aphasia and the differences among verb types. Participants included in the study were fifty eight mild to moderate aphasic patients and forty five normal controls. Stimuli used in this study were line drawings for both actions and objects. They had included the lexical-semantic variables such as oral word frequency, age of acquisition and familiarity also they had further distinguished between the verb types i.e. transitive and intransitive verbs. Each correct response were given scores and the errors which were considered while scoring were circumlocutions, self-corrections and latency of naming more than 3 seconds. The results revealed, that in majority of the aphasic patients the noun

superiority was observed, in contrary to that in some patients there was an opposite pattern observed.

The second goal was to study whether the specific pattern of aphasic impairment related to the verb and noun dissociation. The findings suggest that noun superiority is the only type of dissociation seen in non-fluent type of aphasia especially with agrammatic patients and also they have found the noun superiority in wernicke's aphasics and the verb superiority in anomic aphasia patients. The third goal dealt with the nature of verb and noun superiority effects. The findings have shown that there is an interaction of frequency with the verb superiority effect and there in an interaction between imageability and noun superiority effect. The fourth aim was to see the dissociations among the verb types and the results revealed that transitive verbs were impaired greatly in agrammatic patients and the ergative verbs were more impaired than intransitive verbs in non-fluent patients.

Another study which used picture naming task have made some modifications that is they have used the timed picture-naming Paradigm, that is how fast the individual can name pictures in a given time (Szekely et.al, 2005). In this study adult native English speakers were taken as participants and asked the participants to name as quickly as possible the objects (520) and actions (275) and it was compared on a timed picture –naming paradigm.

There was a massive differences in all observed, between the object and picture naming on all the dependent variables. The variables like frequency, age of acquisition or picture complexity did not influence or match for the measures of naming difficulty but it differed invariably on their other lexical and pictorial

properties. The frequency effects for nouns and verbs were inversely related to each other that is higher frequency led to the quicker RTs where as in verbs higher frequencies were associated with the slower RTs.

A review study has been conducted to see the noun and verb differences in picture naming which includes the past studies which used picture naming tasks in retrieval of nouns and verbs and has provided new evidence in this regard (Matzig, Druks, Masterson & Vigliocco, 2008). Firstly they have critically looked into all the past studies related to verbs and nouns dissociation in picture naming task. Secondly they have carried out an experimental study including aphasic patients of different severity and lesion sites and age matched neurologically unimpaired individuals using a new object- action picture naming task.

In the literature review they have found that inconsistent verb deficits were largely reported than the inconsistent noun deficits. The latencies that was measured in noun-verb retrieval in normal individuals has shown that actions were slower in response than objects and this is due to the demands that placed on the action naming than object naming and not the true word class differences. They have also found that the noun deficits are majorly seen in temporal lobe damage and verb deficits are correlated with the frontal and parietal lobe lesions.

In an object and action naming study 100 objects and 100 actions were presented one after the other and were asked the participants to name as quickly as possible and the latencies were measured for each of the response. The results revealed that the naming latencies were longer for aphasic patients than the comparison or control group. In both these groups the latencies were longer and errors

were seen more for action picture naming than for object picture naming in not just anterior lesion patients but also for posterior lesion patients which agrees well with other past studies. There were different types of errors for object picture naming like semantic errors than the action picture naming which had errors like circumlocutions and misinterpretation of the picture errors. The same kind of difficulties seen in both the groups suggests that action naming is more difficulty than the object picture naming; this might be due to the lower imageability for actions than for objects.

A study to investigate the verbs and nouns importance of being imageable (Bird, Howard & Franklin, 2003) used the tasks naming, reading, and writing. There are many differences reported between nouns and verbs i.e. semantic, syntactic and phonological differences. In this study they have majorly concentrated on the semantic differences and its performance in both control/normal group and the group containing aphasia patients. It has been shown that there was no word class effects seen in naming, reading, writing and assessments using imageability controlled lists of nouns and verbs. Some of the patients presented with the verb deficits in verb specific reading and writing on homonym tasks which were due to lower imageability on the verb homonyms. When the imageability was controlled and the verbs removed from the sentence context none of the patients showed noticeable verb deficit. In some cases the noun naming was poorer than verb naming. In this context where the patients found verbs easier than nouns disproves the argument that verbs being more difficult because of their increased complexity than nouns. It was concluded that the differences seen in word class in these patients may be due to the semantic representation with which it was associated with than that of the syntactic classification.

In the recent past there has been a study which has tried tasks other than traditional picture naming, word recall and lexical decision task in the retrieval of nouns and verbs. One such study has used sentence completion task which extend upon the results of picture naming tasks in retrieval of nouns and verbs (Abel, Maguire, Naqvi & Kim, 2014). In this study the participants were normal adults (undergraduate students) and they were asked to fill in the blank that was provided at the end of the sentence with an appropriate word (nouns or verbs) that comes to their mind. The stimuli included 252 sentences which contained 129 noun sentences and 123 verb sentences. Each responses of the participant were scored as correct or incorrect.

The investigators reported that verbs were better than nouns in out of category responses and for within category responses nouns were better than verbs. Further, the imageability and the frequency had a differential influence on nouns and verbs non-target responses types. Nouns were more imageable than verbs and the verbs had greater frequency than nouns. However, no significant difference reported on statistical analysis.

In summary, looking into the literature for the lexical retrieval of nouns and verbs, all the studies are contradicting to each other by suggesting that in some nouns are retrieved better than verbs and in others verbs are better than nouns. The retrieval of nouns and verbs also has found aging effects that is the older individuals retrieve nouns and verbs poorly than compared to younger individuals. There have been many tasks employed in the lexical retrieval of nouns and verbs. Each of the tasks has its own advantage for the retrieval of nouns and words based on the degree of imageability and the frequency of usage of the nouns and verbs in an everyday

context. In view of the above, the present study is designed to investigate noun and verb retrieval in adults who are native speakers of Kannada by employing tasks at word and sentence levels.

Chapter III

Method

The present study aimed to investigate the task variability in lexical retrieval of nouns and verbs in adults. In order to study this, following methodology was used.

3.1 Participants

In this study total of 30 typical adults (M=15; F=15) were selected in the age range of 25-30 who met the following inclusionary criteria.

1. Native speakers of Kannada language.
2. Minimum of ten years of exposure to schooling (SSLC)
3. No history of any speech, language, neurological, hearing problems

3.2 Study Design

Comparative group design with counter balanced paradigm was employed. In this study the Independent variables were nouns and verbs and Dependent variables were reaction time and accuracy that was compared across groups and within group individuals.

3.3 Stimuli

Two tasks were considered i.e. picture naming task and sentence completion task for the retrieval of nouns and verbs in the present study. For picture naming task standardized Line drawing pictures were taken for all nouns and verbs that were considered for the study. For nouns the pictures were borrowed from BNT (Boston

naming test- Shyamala, 2010) and for verbs it was taken from ANT (Action naming test- Rangamani & Prema, 2011). Fifteen pictures for nouns and fifteen pictures for verbs were taken for the study. Sample pictures are given below (Figure 2)

Noun Pictures from BNT Verb Pictures from ANT

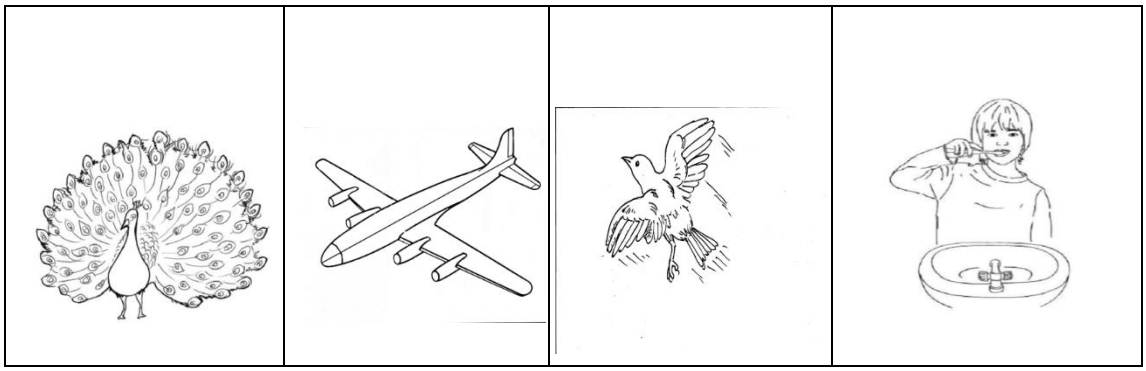


Figure 2: Examples of BNT and ANT pictures

For sentence completion task, appropriate sentences for the same set of 15 nouns and 15 verbs that were taken for picture naming task were made and were subjected to judgment by 5 Kannada speaking individuals (who were native speakers of Kannada and have studied Kannada for more than 10 years) for the familiarity and appropriateness of these sentences. CLOZE procedure was followed in which the individuals were given the sentences to fill-in the blank provided at the end of sentence and most of the sentences were given rating as mostly familiar and few as fairly familiar but none as unfamiliar. Therefore, these set of sentences were only used for the study.

Some of the examples of the sentences that were considered in the study are as follows:

Verbs:

1. ಪೇಪರನ್ನು ಕತ್ತರಿಯಿಂದ --------

   (/pe:parannu/ /kattariyinda/----)

2. ಬಾಳೆಹಣ್ಣನ್ನು ತಿನ್ನುವ ಮೊದಲು ಸಿಪ್ಪೆಯನ್ನು------

   (/ba:LehaNNannu/ /tinnuva/ /modalu/ /sippeyannu/-----)

3. ಬಾಚಣಿಗೆಯಿಂದ ತಲೆಯನ್ನು -------

   (/ba:tʃaNigeyinda/ /taleyannu/-----)

Nouns:

1. ಆಕಾಶದಲ್ಲಿ ಹಾರಾಡುವ ವಾಹನ -------

   (/a:ka:ʃadallI/ /ha:ra:Duva/ /va:hana/------)

2. ಅತಿ ಸುಂದರವಾಗಿ ನರ್ತನ ಮಾಡುವ ಪಕ್ಷಿ------

   (/ati/ /sundarava:gi/ /nartana/ /ma:Duva/ /pakʃi/----)

3. ಅತಿ ನಿಧಾನವಾಗಿ ಚಲಿಸುವ ಪ್ರಾಣಿ -----

   (/ati/ /nidha:nava:gi/ /tʃalisuva/ /pra:Ni/-----)

The standardized line drawing pictures that were taken from ANT (Action naming test) and BNT (Boston naming test) and the sentences were presented through DMDX software. Each picture was presented for 2000 millisecond (ms) with an inter stimulus interval of 500 millisecond and the participants were instructed to name the picture that was displayed as quickly as possible and the responses were recorded in

DMDX 4.0 version software. The sentences appeared on the laptop screen (Acer Aspire E15 laptop was used with the screen resolution of 1366 * 768) for a duration of 4000ms with inter stimulus interval of 500ms and the participants were asked to complete the sentences by using appropriate nouns or verbs as quickly as possible.

In view of one of the aims of the study being to measure the difference between the accuracy of retrieval of different types of nouns and verbs, the nouns and verbs that were taken for this study were classified as per linguistic rules of Kannada language. (Table 1)

Table 1
Types of nouns and verbs

Nouns	***Verbs***
Human Nouns	
Masculine example: /hUDUga/ 'boy' /ra:dza/ 'king'	**Transitive verbs** eg. /ma:dU/- 'do'
Feminine example: /kamala/ 'lotus' /hUdUgI/ 'girl'	**Intransitive verbs** eg. /malagU/-'sleep'
Non-Human/Neuter nouns example:/mara/- 'tree'	

The number of different types of nouns and verbs were not equally distributed i.e. the number of non-human nouns taken were 11 and the human nouns taken were 4 and in the verb types the number of transitive verbs taken were 3 and the number of intransitive verbs taken were 12. List of nouns and verbs that were selected in the study are given in Appendix.

3.4 Procedure

All the participants were individually tested. The participants were made to sit comfortably and the testing was done in a room with minimal noise or any interferences. The duration of recording for each of the participant was approximately 10 minutes.

Participants were instructed to name the pictures as soon as possible and for the sentence completion tasks they were asked to read the sentence in mind and then answer the blank that was provided at the end of each sentence loudly as fast as possible. Two groups; i.e. Group I and Group II were made which were counter-balanced in the presentation of the task. (Table 2)

Table 2
Counter-balance design

Picture naming task	Sentence completion task
Group I	Group II
Group II	Group I

Each group had 15 participants, Group I was presented with picture naming task first followed by sentence completion task, and for the other group i.e. Group II sentence completion task was presented first followed by the picture naming task. In both the tasks (picture naming and sentence completion task) nouns were presented first followed by verbs as the literature supports the easy retrieval of nouns than verbs.

In both the methods only verbal responses were considered. For the accuracy purpose, clinician noted down the responses of the participants as right or wrong and if any other variations seen in the response. As we considered verbal responses in both the tasks the reaction time was measured using Check vocal software. The reaction time and accuracy was measured for all the nouns and verbs in both the tasks and for both the groups. The data was coded and subjected to statistical analysis.

Chapter IV

RESULTS AND DISCUSSION

The present study aimed at investigating task variability in the retrieval of nouns and verbs in adults. The design employed in this study was within group comparative design which was counterbalanced for the stimuli presentation. Further the task designed for the study are picture naming and sentence completion tasks including the nouns and verbs selected for the study.

The measures used were accuracy and reaction time for the retrieval of nouns and verbs in two different tasks i.e. the picture naming task and the sentence completion task. The values for reaction time were measured in check vocal software and for accuracy manually the number of correct responses was noted down along with the errors made. All these values were then fed into SPSS software for the analysis.

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

a) Comparison of retrieval of nouns and verbs in Group I and Group II
b) Comparison of reaction time and accuracy for retrieval of nouns and verbs for picture naming and sentence completion task-
c) Comparison of accuracy for retrieval of different types of nouns and verbs under study

In this study Comparative group design with counter balanced paradigm was employed. The Independent variables were nouns and verbs and Dependent variables were reaction time and accuracy, which was compared across groups (Group1

&Group II) and within group individuals.

The results are discussed with reference to the objectives of the study under the following sections:

Objective 1*: Comparison of retrieval of nouns and verbs in Group I and Group II*

Statistical analysis was done using SPSS (Statistical Package for the Social Sciences) - version 21.0 software. Reaction time and accuracy were compared across both the groups.

4.1 Reaction time

Shapiro-Wilk test of normality condition was done for both the reaction time and accuracy measures. The normality was satisfied for the reaction time measure and hence the parametric test (Mixed ANOVA-2 way repeated measures ANOVA) was performed.

Table 3
Overall Mean, Median, SD of Reaction time

	N	Mean	SD	Media
NPRT1	15	819.56	98.19	806.78
NPRT2	15	944.25	194.53	899.87
NPT	30	881.91	164.15	849.62
VPRT1	15	945.25	107.13	937.18
VPRT2	15	1021.1	159.68	968.94
VPT	30	983.18	139.06	954.61
NSRT1	15	2240.4	358.04	2275.5
NSRT2	15	2069.2	204.79	2119.7
NST	30	2154.8	299.52	2167.4
VSRT1	15	2195.5	407.28	2118.3
VSRT2	15	2164.2	328.01	2233.7
VST	30	2179.8	363.69	2183.9

NPRT1:Noun Picture RT in Group I; NPRT2: Noun picture RT in Group II; NPT: Noun Picture RT in total; VPRT1:Verb Picture RT in Group I;VPRT2: Verb picture RT in Group II; VPT: Verb picture RT in total; NSRT1: Noun sentence RT in Group I;NSRT2:Noun sentence RT in Group II; NST: Noun sentence RT in total; VSRT1:Verb sentence RT in group1; VSRT2: Verb sentence RT in Group II; VST: Verb sentence RT in total

Group I both nouns and verbs were better retrieved than Group II in picture naming task (nouns gp1:gp2=819.56:944.25; verbs gp1:gp2=945.25:1021.11). In sentence completion task nouns and verbs both were retrieved better in Group II than when compared to Group I(nouns in gp1:gp2=2240.46: 2069.24; verb in gp1: gp2=2195.5: 2164.24). Overall mean scores for 30 subjects for nouns and verbs revealed nouns were retrieved better than verbs in both the tasks (881.91-NPT ; 983.18-VPT; NST: 2154.85; VST: 2179.87). (Table 3)

Leven's test of equality of variances was performed for between group comparison and the equality of variances were assumed ($p>0.05$). Hence it shows both the groups were homogenous in nature.

4.2 Accuracy

For the accuracy measure normality was not satisfied in Shapiro-Wilk test of normality and hence the non-parametric test was performed (Mann Whitney U test)

Table 4
Overall Mean, SD, Median for Accuracy

	N	Mean	SD	Media
NPA1	15	14.87	.352	15
NPA2	15	14.73	.594	15
NPT	30	14.8	.484	15
VPA1	15	14.93	.258	15
VPA2	15	14.53	.640	15
VPT	30	14.73	.521	15
NSA1	15	13.53	.990	13
NSA2	15	14.13	.834	14
NST	30	13.83	.950	14
VSA1	15	14.13	.834	14
VSA2	15	14	1	14
VST	30	14.07	.907	14

NPA1: Noun picture accuracy in Group I; NPA2: Noun picture accuracy in group2; NPT:Noun picture accuracy in total; VPA1:Verb picture accuracy in Group I; VPA2:Verb picture accuracy in group2; VPT:Verb picture accuracy in total; NSA1:Noun sentence accuracy in Group I; NSA2: Noun sentence accuracy in group2; NST: Noun sentence accuracy in total; VSA1:Verb sentence accuracy in Group I; VSA2:Verb sentence accuracy in group2; VST:Verb sentence accuracy in total.

For accuracy measure ceiling effect has been reached i.e. all the participants in both the groups and both the tasks have performed equally and accurately. No significant difference found in nouns and verbs retrieval in both the groups.

Mann-Whitney test was done for comparison of groups and there was no significant difference found between the groups.

***Objective 2**: Comparison of retrieval of nouns and verbs for picture naming and sentence completion task*

For comparison of retrieval of nouns and verbs in two different tasks reaction time and accuracy for both the tasks were measured and analysed using SPSS software.

4.3 Reaction time

Shapiro-Wilk test of normality condition was done for both the reaction time and accuracy measures. The normality was satisfied for the reaction time measure and hence the parametric test (Mixed ANOVA) was performed.

In picture naming task both the groups retrieved nouns better than verbs. In sentence completion task, in Group I verbs were better than nouns (the RT of Nouns (2240.46) > Verbs (2195.5) and in Group II nouns were better than verbs (RT Nouns (2069.24) <Verbs (2164.2488). (Table 3)

Nouns and verbs both better retrieved in picture naming task than the sentence completion task. (Figure 3)

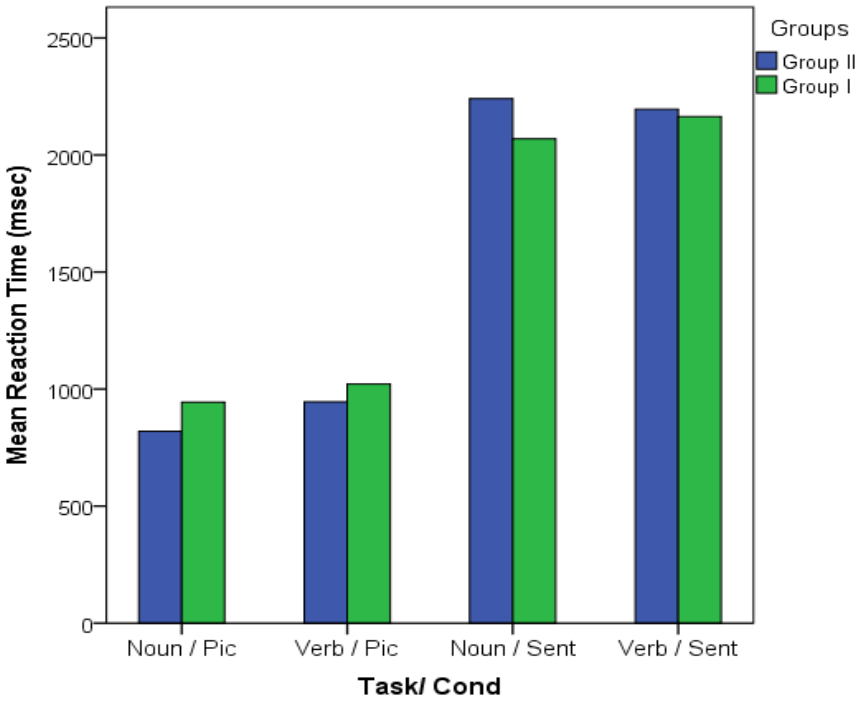


Figure 3: Reaction time for nouns and verbs in picture naming and sentence completion tasks in both the groups

Mixed ANOVA for reaction time measure was performed for both within subject factors and between subject factors.

In test for within subject effects, the conditions that were considered are picture naming and sentence completion and the tasks that were considered are nouns and verbs. Sphericity was assumed ($p>0.05$) as all are equal for within groups. The within subject effects test results are as follows:

1. Between the two conditions i.e. picture naming and sentence completion there was a significant difference ($p= 0.00$) i.e. picture naming task was better than sentence completion task (Table 3). Hence the effect is present for both the conditions ($F (1, 28) =474.66$, eta squared $=0.944$).

2. Between the two tasks (nouns and verbs) there was a significant difference ($p=0.004$) i.e. nouns were better than verbs in picture naming task in both the groups and for sentence completion task in Group II verbs were better than nouns and in Group I nouns were better than verbs (Table 3). Hence the effect is seen for both the tasks as well ($F(1,28)=10.05$, eta squared = 0.264)
3. Between condition and group no significant interaction found ($p>0.05$, $p=0.086$). Despite counterbalancing the groups there was no significant difference found this shows that the groups are homogenous in nature.
4. Between task and the group there was no significant interaction ($p>0.05$). Also there was no significant difference between the groups which shows the method has not been affected.

Leven's test of equality of variances was performed for between group comparison and the equality of variances were assumed ($p>0.05$). Hence it shows both the groups are homogenous in nature. Tests of between subject effect shows that there was no significant difference found ($F (1, 28) =0$, eta squared= 0)

4.4 Accuracy

For the accuracy measure the normality was not satisfied in Shapiro-Wilk test of normality and hence the non-parametric test was performed (Mann Whitney U test, Wilcoxon Signed rand test).

Accuracy scores for retrieval of nouns and verbs in picture naming and sentence completion tasks, ceiling effect has been reached i.e. all the participants in both the groups and both the tasks have performed equally and accurately. No significant difference found between nouns and verbs retrieval in both the conditions (Table 4).

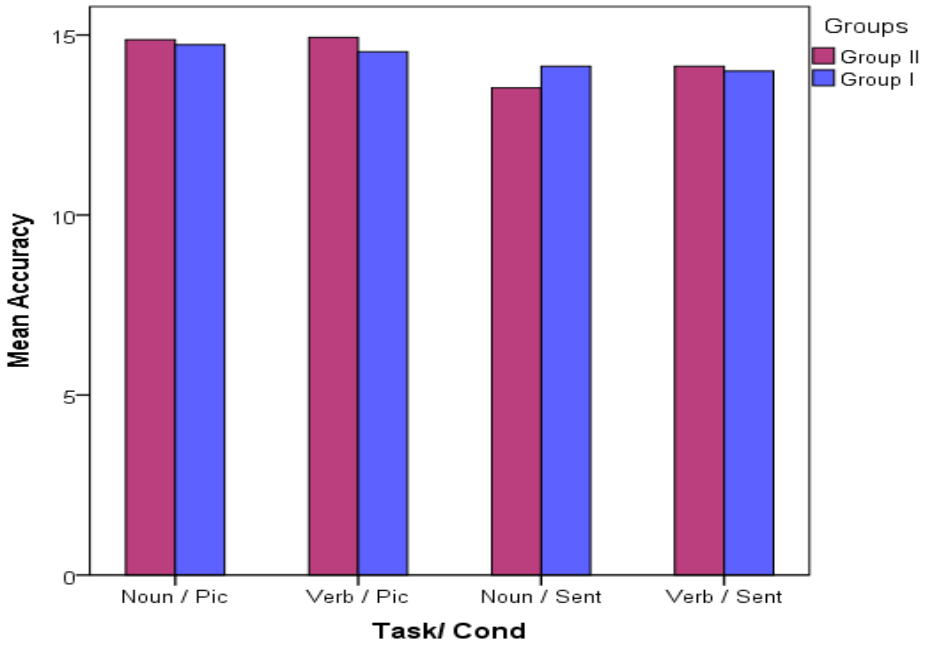


Figure 4: Accuracy of nouns and verbs in picture naming and sentence completion task in both the groups

Mann-Whitney U test was done for comparison of groups and there was no significant difference found between the groups.

Wilcoxon signed rank test was done to examine the difference in retrieval of nouns and verbs in pictures and sentences. The results are as follows:

1. In Group I, there was a significant difference between the verbs sentence and nouns sentence completion task (p=0.013), nouns sentence and nouns picture naming task (p=0.003) and verbs sentence and verbs picture naming task

(p=0.010). But no significant difference between nouns and verbs picture naming task(p=0.317)

2. In Group II there was a significant difference between nouns sentence and nouns picture naming task (p=0.024). No significant difference was found in other conditions and tasks(p>0.05)

***Objective 3**: Comparison of accuracy for retrieval of different types of nouns and verbs under study*

To investigate the above objective, descriptive statistics was employed. The accuracy of the retrieval of different types of nouns and verbs in two different tasks were measured manually and mean score of the accuracy was calculated and also the percentage of accurate responses was calculated from the obtained mean score. Statistical analysis could not be done as the number of nouns and verbs in each of the classified types were less.

4.5 Nouns

The nouns were classified as non-human (NH) nouns (n=11) and the human (H) nouns (n=4).

1. In picture naming task the mean percentage of non-human nouns (97.8%) were greater than that of human nouns (95.75%) though the difference between the percentage of non-human and human nouns is not large. Although the number of items taken in each type for the study was not equal, but grossly it can be interpreted as non-human nouns were retrieved better than the human nouns based on the calculated percentage.

2. In sentence completion task the mean percentage of NH nouns (91.18%) were greater than that of the H nouns (87.5%). Hence it indicates retrieval of NH nouns were better than human nouns. However, in both the tasks retrieval of NH nouns was better than human nouns.

4.6 Verbs

Verbs were classified as Transitive verbs (n=3) and Intransitive verbs (n=12).

1. In picture naming task the mean percentage of transitive verbs (88.6%) were greater than that of intransitive verbs (98%) revealing retrieval of transitive verbs better than intransitive verbs in picture naming task.
2. In sentence completion task the mean percentage of transitive and intransitive verbs were equal (90%) hence there is no significant difference between the retrieval of transitive and intransitive verbs in sentence completion task.

Summary: The result of the study has shown that, the nouns were retrieved better than verbs in both the groups. In comparison of two different tasks i.e. picture naming and sentence completion task there was a group wise differences seen in the retrieval of nouns and verb. In picture naming task both the groups retrieved nouns better than verbs. In sentence completion task, Group I retrieved verbs better than nouns and in Group II nouns were retrieved better than verbs. Nouns and verbs both better retrieved in picture naming task than the sentence completion. There were also a differences observed in the retrieval of different types of nouns and verbs. Non-human nouns were better retrieved than human nouns and intransitive verbs were better retrieved than transitive verbs

4.7 Discussion

The primary aim of the study is to investigate the task variability in lexical retrieval of nouns and verbs in normal adults. The measures used to investigate the above aim were accuracy and reaction time for the retrieval of nouns and verbs in two different tasks i.e. the picture naming task and the sentence completion task. The results of this study were discussed in 3 sub headings, they are:

a) Comparison of retrieval of nouns and verbs in Group I and Group II
b) Comparison of reaction time and accuracy for retrieval of nouns and verbs for picture naming and sentence completion task
c) Comparison of accuracy for retrieval of different types of nouns and verbs under study

Overall the results obtained in this study have found that the nouns were retrieved better than verbs in both the groups. In comparison of two different tasks i.e. picture naming and sentence completion task there was a group wise differences seen in the retrieval of nouns and verb. In picture naming task both the groups retrieved nouns better than verbs. In sentence completion task, Group I retrieved verbs better than nouns and in Group II nouns were retrieved better than verbs. Nouns and verbs both better retrieved in picture naming task than the sentence completion. There were also a differences observed in the retrieval of different types of nouns and verbs. Non-human nouns were better retrieved than human nouns and intransitive verbs were better retrieved than transitive verbs

In the first objective where it has aimed at comparing retrieval of nouns and verbs in Group I and Group II, it has been found that nouns were better retrieved in both the groups and the reaction time of nouns were faster than that of the verbs. This finding is in support of few studies where they have found that nouns were retrieved better than that of verbs (Szekely et.al, 2005; Raggi et.al, 2002). This might be due to nouns being less complex than verbs in its and also the imageability of nouns in contrast to verbs also may be a factor in better retrieval of nouns than verbs as studies have suggested that noun retrieval would benefit more from imageability because, in general, nouns are more imageable than verbs (Bird et.al, 2000, 2003; Chiarello et al. 1999).

In group wise comparison, in Group I both nouns and verbs were found to be better retrieved than Group II in picture naming task and in sentence completion task nouns and verbs both retrieved better in Group II than when compared to Group I. This might be because of the presentation of the order of the task i.e. for Group I picture naming task was presented first and for Group II sentence completion task was presented first. So whichever the task that was presented first the participants have performed well in that task than the following task or the second task. But the equality of variances for between group comparison was assumed ($p>0.05$) in Leven's test of equality of variances presenting that both the groups are homogenous in nature.

In accuracy measure it has been found that all the participants in both the groups and both the tasks have performed equally and accurately and also Mann-Whitney test for comparison of groups showed no significant difference found between the groups.

Considering all the above findings and the discussion for those findings, the hypothesis made for the first objective i.e. no significant difference in retrieval of nouns and verbs, has not been accepted as the findings have suggested that nouns were better than verbs.

The second objective aimed at retrieval of nouns and verbs for picture naming and sentence completion task. It has been found that both Nouns and verbs were better retrieved in picture naming task than the sentence completion task. Within subject effects test revealed between the conditions picture naming and sentence completion there was a significant difference ($p= 0.000$) i.e. picture naming task was better than sentence completion task. This might be due to the visual cues or imageability offered in picture naming task than the sentence completion task. In sentence completion cues only the contextual cues will be provided which might have made the participants to semantically relate the cues in retrieving the nouns and verbs. Word retrieval in picture naming task uses direct activation of visual object to phonological representations bypassing the conceptual- semantic activation (Shuren ,Geldmacher & Heilman, 1993 ; Johnson, Paivio & Clark, 1996). In a sentence context the word retrieval uses the networks of semantic and grammatical which encompasses the phonological representations helps in activation of suitable words in conveying the intended message (Thompson & Faroqi-Shah, 2002)

In group wise comparison it has been found that in picture naming task both the groups' retrieved nouns better than verbs. In sentence completion task, in Group I verbs were better than nouns (the RT of Nouns (2240.46) > Verbs (2195.5) and in Group II nouns were better than verbs (RT Nouns (2069.24) <Verbs (2164.2488). In this regard some studies have found that a greater amount of verbs were better than

nouns in out of category responses and for within category responses nouns were better than verbs in sentence completion task (Abel, Maguire, Naqvi & Kim, 2014). Also they have found that nouns were more imageable than verbs and the verbs had greater frequency than nouns, this might be the reason for differential retrieval of nouns and verbs in sentence completion task.

Accuracy measures for retrieval of nouns and verbs in picture naming and sentence completion tasks, ceiling effect has been reached i.e. all the participants in both the groups and both the tasks have performed equally and accurately. No significant difference found in nouns and verbs retrieval in both the conditions.

As per the above findings and discussion for the second objective the hypothesis made i.e. no significant difference between picture naming and sentence completion tasks for examining nouns and verbs retrieval, has not been accepted since the results indicated picture naming task was better than sentence completion task.

The third objective aimed at Comparison of accuracy for retrieval of different types of nouns and verbs under study. The findings revealed differences observed in the retrieval of different types of nouns and verbs. Non-human nouns were better retrieved than human nouns and intransitive verbs were better retrieved than transitive verbs.

The above results can be explained with respect to the frequency effect of nouns and verbs. In nouns and its type's, non-human nouns are high frequency words than human nouns which are relatively low frequency words. It has been found that High frequency nouns are named more quickly and accurately than low frequency nouns (Almeida et al. 2007; Kauschke & von Frankenberg, 2008)

The transitive verbs are high frequency verbs i.e. frequently used verbs in everyday context and intransitive verbs are relatively low frequency words. The studies have shown that high frequency verbs are named slowly and less accurately than low frequency verbs (Colombo & Burani, 2002; Székely et al. 2005).It has been studied in aphasic patients that transitive verbs are being impaired greatly in agrammatic patients and the ergative verbs being more impaired than intransitive verbs in non-fluent patients (Raggi,\ et.al, 2002). Hence there are chances of transitive verbs retrieved poorly than that of intransitive verbs.

Hence the hypothesis made with respect to the third objective i.e. no significant difference in the Reaction Time and Accuracy for retrieval of different types of nouns and verbs, has not been accepted as there is a difference in retrieval of different types of nouns and verbs.

Therefore in summary, it can be concluded that the retrieval of nouns and verbs have been affected by the type of task used. Nouns and verbs are also affected by its imageability and frequency. The picture naming task and sentence completion task together has given an idea of how these imageability and frequency might have affected the retrieval of nouns and verbs. For the retrieval of types of nouns and verbs it has been majorly contributed to frequency effect. So to conclude nouns were retrieved better than nouns and both nouns and verbs retrieved better in picture naming task than the sentence completion task.

Chapter V

SUMMARY AND CONCLUSION

The present study aimed at examining task variability in lexical retrieval of nouns and verbs. It was studied under three objectives namely; investigating the retrieval of nouns and verbs in adults, comparison between the two methods- picture naming and sentence completion task- for retrieval of nouns and verbs in adults and comparison of the reaction time and accuracy for retrieval of different types of nouns and verbs under study.

Looking into the literature for the lexical retrieval of nouns and verbs, there is no consensus about retrieval of nouns and verbs. While a few studies indicate that e nouns are retrieved better than verbs (for example, Raggi et.al, 2002) a few others suggest that verbs are retrieved better than nouns (Zingeser & Berndt, 1988). The retrieval of nouns and verbs also has found aging effects that is the older individuals retrieve nouns and verbs poorly than compared to younger individuals (Earles & Kersten, 2000). There have been many tasks employed in the lexical retrieval of nouns and verbs. Some of studies have used picture naming tasks (Raggi et.al, 2002; Szekely et.al, 2005) and some have used the sentence completion task (Abel, Maguire, Naqvi & Kim, 2014). Each of the tasks has its own advantage for the retrieval of nouns and words based on the degree of imageability and the frequency of usage of the nouns and verbs in an everyday context.

Hence there was a need to study the retrieval of nouns and verbs in Indian languages to understand the type of word classes i.e. nouns or verbs, that might be easy to retrieve in normal adults and that knowledge can be implemented on patients

who have difficulty retrieving nouns or verbs. Also there was need to study in which of the two methods i.e. picture naming task and the sentence completion task yield better retrieval of nouns and verbs and the category of nouns or verbs that is either easy or difficult to retrieve was also measured and compared.

The methodology which was employed in this study included 30 Participants who were Kannada speaking adults in the age range of 25-30. Comparative group design with counter balanced paradigm was employed. The Independent variables considered were nouns and verbs and Dependent variables were reaction time and accuracy that was compared across groups and within group individuals. Two tasks were considered i.e. picture naming task and sentence completion task for the retrieval of nouns and verbs in the present study. For picture naming task line drawings were used for both nouns and verbs and for sentence completion task sentences were with the blank provided at the end of the sentence to name. In both the tasks participants were instructed to name the picture and complete the sentences with appropriate nouns and verbs as fast as possible and the verbal responses were recorded and analysed for the reaction time and accuracy.

The measure of the study i.e. the reaction time and accuracy was analysed using suitable statistical tests in SPSS software. The results revealed that, the nouns were retrieved better than verbs in both the groups. In comparison of two different tasks i.e. picture naming and sentence completion task there was a group wise differences seen in the retrieval of nouns and verb. In picture naming task both the groups retrieved nouns better than verbs. In sentence completion task, Group I retrieved verbs better than nouns and in Group II nouns were retrieved better than verbs. Nouns and verbs both better retrieved in picture naming task than the sentence

completion. There were also a differences observed in the retrieval of different types of nouns and verbs. Non-human nouns were better retrieved than human nouns and intransitive verbs were better retrieved than transitive verbs.

Hypothesis that was stated in the study i.e. no significant difference in retrieval of nouns and verbs, no significant difference between picture naming and sentence completion tasks for examining nouns and verbs retrieval and no significant difference in the reaction time and accuracy for retrieval of different types of nouns and verbs was not accepted and it is in support of few studies (Almeida et al. 2007; Kauschke & von Frankenberg, 2008; Székely et al. 2005; Thompson & Faroqi-Shah, 2002).

5.2 Conclusion

By considering all the above findings the present study can be concluded that the retrieval of nouns and verbs has been affected by the type of task used. Nouns and verbs are also affected by its imageability and frequency. The picture naming task and sentence completion task together has given an idea of how these imageability and frequency might have affected the retrieval of nouns and verbs. For the retrieval of types of nouns and verbs it has been majorly contributed to frequency effect. So to conclude nouns were retrieved better than nouns and both nouns and verbs retrieved better in picture naming task than the sentence completion task.

5.3 Implications

1. This study will provide understanding of lexical retrieval in adults who are native speakers of Kannada language
2. The results of the study can be used for the therapy and it will be useful for the clinicians to know which word classes to be worked upon for better retrieval in persons with communication disorders.
3. It will also yield an idea of which task would be better in retrieval of nouns and verbs and also the different types of nouns and verbs in treating persons with communication disorder.

5.4 Limitations

1. The number of participants taken was less.
2. The number of different types of nouns and verbs was not equal in number.

5.5 Future Implications

1. More number of subjects and nouns and verbs can be taken for the study
2. Equal number of different types of nouns can be taken for the study
3. This study can also be done by comparing the performance of the tasks in aphasic patients along with the control group.

Reference

Abel, A. D., Maguire, M. J., Naqvi, F. M., & Kim, A. Y. (2015).Lexical retrieval of nouns and verbs in a sentence completion task. *Journal of psycholinguistic research*, *44*(5), 545-553.

Abel, D.A., Maguire, J.M., Naqvi,M.F., &Kim,Y.A. (2014). Lexical retrieval of nouns and verbs in a sentence completion task.*Journal of Psycholinguist Research*, 14, 9304/8

Almeida, J., Knobel, M., Finkbeiner,M., &Caramazza, A. (2007). The locus of the frequency effect in picture naming: When recognizing is not enough. *Psychonomic Bulletin & Review*, *14*(6), 1177–1182.

Behrend D.A. (1988). Constraints and development: a reply to Nelson. *Cognitive Development*, 5, 313–330.

Berndt, R. S., Haendiges, A. N., Mitchum, C. C., &Sandson, J. (1997).Verb retrieval in aphasia. 2. Relationship to sentence processing. *Brain and Language*, *56*(1), 107-137.

Berndt, R. S., Haendiges, A., Burton, M., &Mitchum, C. (2002). Grammatical class and imageability in aphasic word production: Their effects are independent. *Journal of Neurolinguistics*, *15*, 353–371.

Bird, H., Howard, D., & Franklin, S. (2000). Why is a verb like an inanimate object? Grammatical category and semantic category deficits.*Brain and Language*, *72*, 246–309.

Bird, H., Howard, D., & Franklin, S. (2003). Verbs and nouns: The importance of being imageable. *JournalofNeurolinguistics*, *16*, 113–149.

Bird, H., Howard, D., & Franklin, S. (2003). Verbs and nouns: The importance of being imageable. *Journal of Neurolinguistics*, *16*(2), 113-149.

Braine, M. D. (1987). What is learned in acquiring word classes: A step toward an acquisition theory.*Mechanisms of language acquisition*, 65, 87.

Bybee, J. (1998). The emergent lexicon.In *Chicago Linguistic Society* (Vol. 34, No. 2, pp. 421-35).

Chiarello, C., Shears, C., & Lund, K. (1999). Imageability and distributional typicality measures of nouns andverbs in contemporary English. *Behavior Research Methods, Instruments & Computers*, *31*(4), 603–637.

Clark, H. H. (1966). The prediction of recall patterns in simple active sentences. *Journal of Verbal Learning and Verbal Behavior*, *5*(2), 99-106.

Colombo, L., &Burani, C. (2002).The influence of age of acquisition, root frequency, and context availabilityin processing nouns and verbs.*Brain and Language*, *81*, 398–411.

Crepaldi, D., Che, W.C., Su, I.F., &Luzzatti, C. (2012). Lexical-semantic variables affecting picture and word naming in Chinese: a mixed logit model study in aphasia. *Behavioural Neurology*, *25*, 165–184.

Earles, J. L., &Kersten, A. W. (2000).Adult age differences in memory for verbs and nouns. *Aging, Neuropsychology, and Cognition*, *7*(2), 130-139.

Earles, J. L., Kersten, A. W., Turner, J. M., & McMullen, J. (1999).Influences of age, performance, and item relatedness on verbatim and gist recall of verb-noun pairs. *The Journal of general psychology*, *126*(1), 97-110.

Elman, J. L. (1990). Finding structure in time.Cognitive science, 14(2), 179-211.

Gentner D. (1981).Some interesting differences between verbs andnouns.*Cognition and Brain Theory*, 4, 161–177.

Gentner, D. (1981). Some interesting differences between verbs and nouns.*Cognition and brain theory*, *4*(2), 161-178.

Goodglass H and Geschwind N. (1976). Language disorders (aphasia). InCarterette EC and Friedmann MP (Eds), *Handbook of Perception*. New York: Academic Press.

Hoff, E. (2013). *Language development*.Cengage Learning.

Horowitz, L. M., &Prytulak, L. S. (1969).Redintegrativememory.*Psychological Review*, *76*(6), 519.

Johnson, C. J., Paivio, A., & Clark, J. M. (1996).Cognitive components of picture naming. *Psychological Bulletin*, *120*(1), 113.

Kauschke, C., & von Frankenberg, J. (2008).The differential influence of lexical parameters on naming latencies in German. A study on noun and verb picture naming. *Journal of psycholinguistic research*, *37*, 243–257.

Kersten, A. W. (1998). A division of labor between nouns and verbs in the representation of motion. *Journal of Experimental Psychology: General*,*127*(1), 34.

Luzzatti, C., Raggi, R., Zonca, G., Pistarini, C., Contardi, A., & Pinna, G. D. (2002). Verb–noun double dissociation in aphasic lexical impairments: The role of word frequency and imageability. *Brain and language*, *81*(1), 432-444.

MacDonald, M. C. (1997). Lexical representations and sentence processing: An introduction. *Language and cognitive processes*, *12*(2-3), 121-136.

Maratsos, M. (1982). The child's construction of grammatical categories.*Language acquisition: The state of the art*, 240-266. Cambridge: Cambridge University Press.

Martin, A., Haxby, J. V., Lalonde, F. M., Wiggs, C. L., &Ungerleider, L. G. (1995). Discrete cortical regions associated with knowledge of color and knowledge of action. *Science*, *270*(5233), 102-105.

Masterson, J., Druks, J., &Gallienne, D. (2008). Object and action picture naming in three-and five-year-old children. *Journal of Child Language*, *35*, 373–402.

Mätzig, S., Druks, J., Masterson, J., &Vigliocco, G. (2009). Noun and verb differences in picture naming: Past studies and new evidence. *Cortex*, *45*(6), 738-758.

Mätzig, S., Druks, J., Masterson, J., &Vigliocco, G. (2009). Noun and verb differences in picture naming: Past studies and new evidence. *Cortex*, *45*(6), 738–758.

McCarthy, R., & Warrington, E. K. (1985). Category specificity in an agrammatic patient: The relative impairment of verb retrieval and comprehension. *Neuropsychologia*, *23*(6), 709-727.

McRae, K., Spivey-Knowlton, M. J., &Tanenhaus, M. K. (1998).Modeling the influence of thematic fit (and other constraints) in on-line sentence comprehension. *Journal of Memory and Language*, *38*(3), 283-312.

Miceli, G., Silveri, M. C., Villa, G., &Caramazza, A. (1984).On the basis for the agrammatic's difficulty in producing main verbs. *Cortex*, *20*(2), 207-220.

Nelson, K. (1973).Structure and strategy in learning to talk.*Monographs of the Society for Research in Child Development*, 38, 149.

Perani, D., Cappa, S. F., Schnur, T., Tettamanti, M., Collina, S., Rosa, M. M., & Fazio, F. (1999). The neural correlates of verb and noun processing.*Brain*, *122*(12), 2337-2344

Price, C. J. (2000). The anatomy of language: contributions from functional neuroimaging. *Journal of anatomy*, *197*(03), 335-359.

Rangamani, G.N.,&Prema, K.S. (2011).Effects of semantic and syntactic treatment in bilingual stroke survivors.*AIISH Research Fund*. All India Institute Of Speech and Hearing, Mysore

Raymer, A., &Kohen, F. (2006). Word-retrieval treatment in aphasia: Effects of sentence context. *Journal of Rehabilitation Research and Development*,*43*(3), 367.

Reyna, V. F. (1987). Understanding verbs: Easy extension, hard comprehension. *Progressinthepsychologyoflanguage*, *3*, 301-315.

Saffran, E.M. (1982). Neuropsychological approaches to the study oflanguage. *British Journal of Psychology*, 73, 337.

Saffran, E.M., Schwartz,MF.,& Marin, OSM. (1980). The word orderproblem in agrammatism: II. Production.*Brain and Language*, 10, 263–280.

Schachter, P., &Shopen, T. (1985).1 *Parts-of-speech systems*.Vol. 1 (pp. 3–61) Cambridge: Cambridge University Press.

Shapiro, K .,&Caramazza, A. (2003a). Grammatical processing of nounsand verbs in left frontal cortex? *Neuropsychologia*, 41, 1189–1198.

Shapiro, K. A., Moo, L. R., &Caramazza, A. (2006).Cortical signatures of noun and verb production. *Proceedings of the National Academy of Sciences*, *103*(5), 1644-1649.

Shapiro, K., &Caramazza, A.(2003b). Looming a loom: evidence forindependent access to grammatical and phonologicalproperties in verb retrieval.*Journal of Neurolinguistics*, 16, 85–111.

Shuren, J., Geldmacher, D., &Heilman, K. M. (1993).Nonoptic aphasia Aphasia with preserved confrontation naming in Alzheimer's disease.*Neurology*, *43*(10), 1900-1900

Shyamala, K.C. (2010). Development and standardization of Boston naming test in bilinguals (Kannada- English and Telugu- English). *AIISH Research Fund*.All India Institute of Speech and Hearing, Mysore.

Stanford, B.S. (1998). *The Dravidian Languages* (1st ed.). London & NY: Routledge.

Szaflarski, J. P., Schmithorst, V. J., Altaye, M., Byars, A. W., Ret, J., Plante, E., & Holland, S. K. (2006). A longitudinal functional magnetic resonance imaging study of language development in children 5 to 11 years old. *Annals of neurology*, *59*(5), 796-807.

Székely, A., D'Amico, S., Devescovi, A., Federmeier, K., Herron, D.,&Iyer, G. (2005). Timed action and object naming.*Cortex*, *41*, 7–25.

Szekely, A., D'Amico, S., Devescovi, A., Federmeier, K., Herron, D., Iyer, G., ...& Bates, E. (2005). Timed action and object naming. *Cortex*, *41*(1), 7-25.

Thompson, C. K., &Faroqi-Shah, Y. (2002).Models of sentence production.*Thehandbook of adult language disorders*, 311-330.

Tyler, L. K., Russell, R., Fadili, J., & Moss, H. E. (2001). The neural representation of nouns and verbs: PET studies. *Brain*, *124*(8), 1619-1634.

Vigliocco, G., Warren, J., Siri, S., Arcuili, J., Scott, S., & Wise, R. (2006). The roleof semantics and grammatical class in the neuralrepresentation of words.*Cerebal Cortex*, 16, 1790–1796.

Vinson, D.P., &Vigliocco, G. (2002).A semantic analysis of grammaticalclass impairments: semantic representations of object nouns,action nouns and action verbs. *Journal of Neurolinguistics*, 15, 317–351.

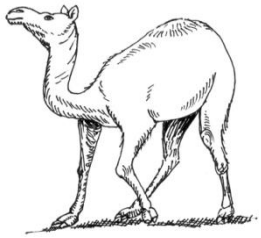
Zingeser, L. B., & Berndt, R. S. (1990).Retrieval of nouns and verbs in agrammatism and anomia. *Brain and language*, *39*(1), 14-32.

Zingeser, L. B., & Berndt, R. S. (1988). Grammatical class and context effects in a case of pure anomia: Implications for models of language production. *Cognitive Neuropsychology*, *5*(4), 473-516.

Appendix

Nouns and verbs

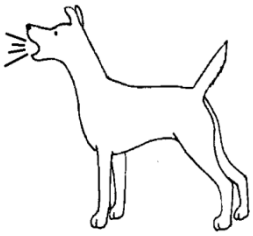
Nouns	Target	Verbs	Target
	ಮರ /mara/		ಗುಡಿಸು /gudisu/
	ಪೊರಕೆ /porake/		ಹಲ್ಲುಉಜ್ಜು /hallu/ /udʒdʒu/
	ಕತ್ತರಿ /kattari/		ಈಜು /i:dʒu/
	ಕಾಲು /ka:lu/		ಬೀಳು /bi:Lu/
	ಬದನೆಕಾಯಿ /badaneka:yi/		ಓದು /o:du/



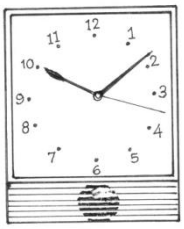
ಒಂಟೆ
/onTe/

ಮೀನು ಹಿಡಿ
/mi:nu//hiDi/

ಬ್ರಷ್
/brʌʃ/



ಬೊಗಳು
/bogaLu/

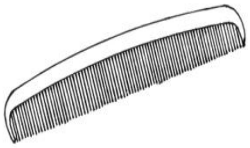


ಗಡಿಯಾರ
/gaDija:ra/

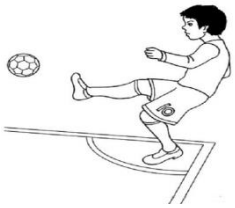
ಅಳು
/aLu/

ಆಮೆ
/a:me/

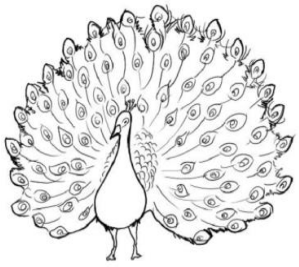
ಓದು
/o:du/



ಬಾಚಣಿಗೆ
/ba:tʃanNige/

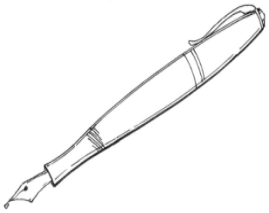


ಒದೆ
/ode/



ನವಿಲು
/navilu/

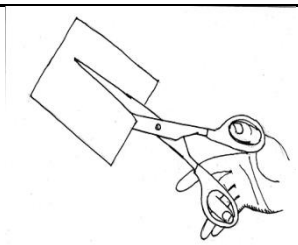
ಸಿಪ್ಪೆಸುಲಿ
/sippe//suli/



ಪೆನ್ನು
/pennu/

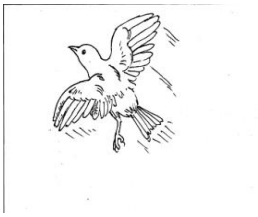
ಬಾಚು
/ba:tʃu/

ಹಾವು
/ha:vu/



ಕತ್ತರಿಸು
/kattarisu/

ಕಿವಿ
/kivi/



ಹಾರು
/ha:ru/

ವಿಮಾನ
/vima:na/

ಓಡು
/o:Du/

ನಾವು ಕೇಳಿಸಿಕೊಳ್ಳಲು ಉಪಯೋಗಿಸುವ ಅಂಗ ----

(/na:vu/ /ke:LisikoLLalu/ /upayo:gisuva/ /anga/----**)**

ಆಕಾಶದಲ್ಲಿ ಹಾರಾಡುವ ವಾಹನ ----

(/a:ka:ʃadalli/ /ha:ra:Duva/ /va:hana/----)

ಹುತ್ತದಲ್ಲಿ ವಾಸಮಾಡುವ ಪ್ರಾಣಿ ----

(/huttadalli/ /va:sama:Duva/ /pra:Ni/----**)**

ಅತಿ ಸುಂದರವಾಗಿ ನರ್ತನ ಮಾಡುವ ಪಕ್ಷಿ----

(/ati/ /sundarava:gi/ /nartana/ /ma:Duva/ /pakʃi/----)

ಬರೆಯಲು ಉಪಯೋಗಿಸುವ ವಸ್ತು---

(/bareyalu/ /upayo:gisuva/ /vastu/----)

ತಲೆಬಾಚಿಕೊಳ್ಳಲು ಉಪಯೋಗಿಸುವ ವಸ್ತು ---

(/taleba:tʃikoLLalu/ /upayo:gisuva/ /vastu/---)

ಅತಿ ನಿಧಾನವಾಗಿ ಚಲಿಸುವ ಪ್ರಾಣಿ ----

(/ati/ /nidha:nava:gi/ /tʃalisuva/ /pra:Ni/----**)**

ಸಮಯ ತೋರಿಸುವ ವಸ್ತು----

(/samaya/ /to:risuva/ /vastu/-----)

ಹಲ್ಲು ಉಜ್ಜಲು ಉಪಯೋಗಿಸುವ ವಸ್ತು ---

(/hallu/ /udʒdʒalu**/** /upayo:gisuva/ /vastu/---)

ಮರಳುಗಾಡಿನಲ್ಲಿ ವಾಸ ಮಾಡುವ ಪ್ರಾಣಿ ---

(/maraLuga:Dinalli/ /va:sa/ /ma:Duva/ /pra:Ni/----)

ನಡೆಯಲು ಉಪಯೋಗಿಸುವ ಅಂಗ ----

(/naDeyalu/ /upayo:gisuva/ /anga/----)

ವಾಂಗಿಬಾತ್ ಮಾಡಲು ಉಪಯೋಗಿಸುವ ತರಕಾರಿ----

(/va:ngiba:t/ /ma:Dalu/ /upayo:gisuva/)

ಪೇಪರ್ ಕತ್ತರಿಸಲು ಉಪಯೋಗಿಸುವ ವಸ್ತು ---

(/pe:par/ /kattarisalu/ /upayo:gisuva/ /vastu/---)

ಕಸಗುಡಿಸಲು ಉಪಯೋಗಿಸುವ ವಸ್ತು ---

(/kasaguDisalu/ /upayo:gisuva/ /vastu/---)

ಹಣ್ಣು ಬಿಡುವುದು ---- ದಲ್ಲಿ

(/haNNu/ /biDuvudu/ ----- /dalli/)

ಪೇಪರನ್ನು ಕತ್ತರಿಯಿಂದ ------

(/pe:parannu/ /kattariyinda/-----)

ಪ್ರಾಣಿಗಳು ನಡೆಯುತ್ತವೆ; ಪಕ್ಷಿಗಳು----

(/pra:NigaLu/ /naDeyuttave/; /pakʃigaLu/----)

ಬಾಳೆಹಣ್ಣನ್ನು ತಿನ್ನುವ ಮೊದಲು ಸಿಪ್ಪೆಯನ್ನು----

(/ba:LehaNNannu/ /tinnuva/ /modalu/ /sippeyannu/----)

ಫುಟ್‌ಬಾಲ್ ಆಟಗಾರರು ಬಾಲನ್ನು----

(/futba:l/ /a:Taga:raru/ /ba:lannu/----)

ನಾಯಿ ಓಡಿಸಿಕೊಂಡು ಬಂದಾಗ ಹುಡುಗ ಗಾಬರಿಯಿಂದ---

(/na:yi/ /o:DisikonDu/ /banda:ga/ /huDuga/ /ga:bariyinda/----)

ಬಾಚಣಿಗೆಯಿಂದ ತಲೆಯನ್ನು ---

(/ba:tʃaNigeyinda/ /taleyannu/----)

ಪರೀಕ್ಷೆಯ ದಿನಗಳಲ್ಲಿ ಆಟವನ್ನು ಬಿಟ್ಟು ಮಕ್ಕಳು---

(/pari:kʃeya/ /dinagaLalli/ /a:Tavannu/ /biTTu/ /makkaLu/----)

ಮರ ಹತ್ತುವಾಗ ಜಾರಿದರೆ ----

(/mara/ /hattuva:ga/ /dʒa:ridare/----)

ಮನುಷ್ಯರು ಮಾತನಾಡುತ್ತಾರೆ; ನಾಯಿಗಳು ----

(/manuʃyaru/ /ma:tana:Dutta:re/; /na:yigaLu/-----)

ಖುಷಿಯಾದಾಗ ನಗುತ್ತೇವೆ; ನೋವಾದಾಗ ---

(/khuʃiya:da:ga/ /nagutte:ve/; /no:va:da:ga/-----)

ಬಲೆಹಾಕಿ ಮೀನುಗಾರರು ಸಮುದ್ರದಲ್ಲಿ ––––––

(/baleha:ki/ /mi:nuga:raru/ /samudradalli/----)

ಮಕ್ಕಳು ಈಜುಕೊಳದಲ್ಲಿ –––––

(/makkaLu/ /i:dʒukoLadalli/----)

ಕಥೆಗಾರರು ಕಥೆಯನ್ನು––––

(/kathega:raru/ /katheyannu/-----)

ಬ್ರಷ್ ಮತ್ತು ಪೇಸ್ಟ್‌ನಿಂದ ನಾವು ಹಲ್ಲನ್ನು–––––

(/braʃ/ /mattu/ /pe:stninda/ /na:vu/ /hallannu/-----)

ಪೊರಕೆಯಿಂದ ನಾವು ಕಸವನ್ನು –––

(/porakeyinda/ /na:vu/ /kasavannu/----)