NAMING DEFICITS IN BILINGUAL APHASICS

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Dedicated to my ***Parents:-*** *who /oaned me their faith, borrowed my trouble, shared good times and bad, and gave me the love and patience.*

and

to my ***VISHAL & SHIVA:*** *as time goes by and as the world keeps chaning, the more I realise that you two- are the greatest blessings in my life.*

CERTIFICATE

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DECLARATION

This dissertation entitled ***"NAMING DEFICITS IN BILINGUAL APHASICS"*** is the result of my own study under the guidance of Dr. Shymala Chengappa, Reader and Head, Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for any other Diploma or Degree.

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CHAPTER 1

INTRODUCTION

Bilingualism is a perplexing entity in any human being who possesses it. The ability to communicate in more than one language is not only exciting but also rewarding. Before any discussion on the intricacies of bilingualism and bilingual aphasia is undertaken, the current research foray into the aspects of bilingualism needs to be justified. For this, a birds eye view of the current as well as the projected demographic trends regarding the composition of world's population is essential.

According to Reich (1986), 47.3% of the world's population speaks more than one language. With USSR breaking up into several small countries probably India is the second largest bi-multilingual country. Indian constitution (8^{th} Schedule) has 18 formal languages and more than 1652 language are spoken in India (CIIL, 1973). According to 1971 Census report 13.04% of India's population is bilingual/multilingual (Mahapatra, 1990).

Inspite of these figures bi/multilingualism is least understood and least appreciated in India. Both in normal and abnormal language processing the studies focussing on bilingual aspects are few and far in between (Mohanty, 1994).

Only in the last two decades, has there been any systematic discussion in the research literature of speech/language rehabilitation for bilingual patient with aphasia (see Paradis, 1993) . Over the past decades, the main areas of research in adult bilingualism is the organisation of two languages in one brain; recovery patterns and language mixing in bilingual and polyglot aphasias.

Bilingual aphasia affords an opportunity to observe the ways in which multiple languages interact and tells us about the neuropsychological organisation of multiple languages with respect to one another.

In psycholinguistics and neurolinguistics considerable research have been done on normal aspects of adult bilinguals. Despite the frequency of bilingualism in todays world relatively few professionals and researchers are engaged in research for bilingual-multilingual aphasics (at least in India).

Perceman (1984) reports that in bilingual condition lexical mixing is the most common form of language mixing. He concluded that the lexicons of languages are more closely tied with one another than other aspects of grammar.

Thinking in the similar vien, it is effective to use lexical retrieval or naming tasks to study language performance in bilingual aphasics.

In psycholinguistic studies on lexical and conceptual representations in normal bilinguals, several experimental task are used to address these issues, for example, the measurement of reaction times in word translation compared to picture naming (Kroll and Curley, 1988; Chen and Leung, 1989), the analysis of errors in word translation (de Groot, 1993), semantic priming within and between languages (Schwanenflugel and Rey, 1986; Cheng and Ng, 1989) and interlingual word association (Taylor, 1976). In these studies, an influence has been found of variables which may differe across target languages such as word frequency, level of concreteness and context availability for concrete and abstract words. But there are hardly few studies (Perceman, 1984; Grosjean, 1985, Junque, Vendrell and Brucet, 1989; Kremin and Agostini, 1995, Stadie, Springer, Bleser and Bijrk, 1995), reporting on naming abilities of bilingual aphasics and even the existing studies focuses on confrontation naming.

Narrowing the attention, it was thought worthwhile to investigate the languages of bilingual aphasic patients by using different naming tasks. The reason for chosing a naming task is that naming deficits are almost invariably present in any kind or type of aphasia.

As mentioned earlier most studies have used only picture naming for assessing naming ability in bilingual aphasics. In the present study three types of naming tasks, ie., confrontation naming, responsive naming and generative naming; were used to assess performance in both the languages (Kannada-English). The study also had a control group of normal bilinguals (Kannada-English) for a comparision between aphasics and normals.

Thus the present investigation has been aimed to give an insight in the following aspects of naming in bilingual aphasic patient;

1) To investigate the naming difficulties in two language; i.e., Kannada (L1) and English (L2) of bilingual aphasic patients.

2) To study the naming patterns and error types in naming;

   i) Across each language in aphasic

   ii) Among different types of aphasics.

   iii) Between aphasics and normal control

3) To explore the naming patterns among different naming tasks (i.e., confrontation naming, responsive naming and generative naming) in;

   i) L1 and L2 in aphasics.

   ii) Among different aphasics

   iii) Between aphasics and normal control

4) To study the interferences of L1 in L2 task and L2 in L1 task in;

   i) Different types of aphasics

   ii) Aphasics and normal control.

5) To investigate for the effectiveness of semantic and phonemic cueing in confrontation naming among different types aphasics in the two languages.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction, definitions and types

A little more than a hundred years ago, in 1895, the French **Revue de Medicine,** in its 15th volume published a paper by **Jean-Albert Pitres,** entitled **"Etude Spur 1' aphasia de polyglots",** which became a classic in the literature on aphasia in bi-and multilinguals. Since Pitres (1895), investigators have tried to study organisation of two or more languages in one brain in general and of aphasia in bilingual and polyglots in particular (Paradis, 1995 a). Aphasia in bilinguals and polyglots is a more complex and confounding entity than we thought and have understood.

To date no universally accepted definition of bilingualism exists but the best criterion for classifying these individuals is still a pragmatic one. People who speak and understand two languages, or two dialects and who are able to avoid mixing the two linguistic systems when writing or speaking can be referred to as **"bilinguals"** (Fabbro, 1996; cited in Aglioti, Beltramello, Girardi and Fabbro, 1996). The term bilingual technically refers only to speakers of two languages, and the term polyglot to speakers of more than two languages, some authors have used the term bilingual to refer to speakers of two or more languages (Perceman, 1984).

Bilinguals differ from each other along a number of dimension; some are only relevant to the contents of their implicit linguistic competence, and others may affect the cerebral organization and processing of their languages. Ervin and Osgood (1954) hypothesied that manner of acquisition of each language influence their grammar and in particular organization of the lexicon. When two languages are acquired in different contexts, each through interaction with specific groups of native speakers, the conditions are optimal for the contents of implicit linguistic competence in both languages to be same as those of native speakers of each language *{coordinate organization).* In these bilinguals, each word and its translation equivalent has its respective meaning, without interference *(coordinate bilingualism).*

When both languages are acquired through interaction with bilingual speakers who use both languages indiscriminately and interchangeably in all contexts, chances are that some aspects of their grammar will exhibit bi-directional interference *(compound organization).* The meaning of the words in one of the languages and then translation equivalents, in the other languages is the same, i.e., an amalgam of two *(compound bilingualism),* thus exhibiting bi-directional interference.

When the second language is learned through translation in a first language environment, such as a foreign language in school, the second language will, in all likelihood, contains elements of the first *(subordinate organization).* Each word's meaning in the second language is that of the translation equivalent in the native language *(subordinate bilingualism),* thus exhibiting undirectional interference. (Weinreich, 1953;Paradis, 1995a).

The acquisition of two languages in separate contexts could be conducive to coordinate bilingualism, whereas two languages in the same context or in school through translation would result in compound bilingualism.

2.2. Viewing the Bilingualism

Bilingualism can be viewed in two ways - the monolingual or FRACTIONAL VIEW which holds that the bilingual is (or should be) two monolinguals in one person;

and the bilingual or WHOLISTIC VIEW which states that the coexistence of two languages in the bilingual has produced a unique and specific speaker-hearer (Grosjean, 1989).

The fractional view have many shortcomings and cannot explain many phenomenon observed in bilingual individuals.

The wholistic view proposes that the bilingual is integrated whole which cannot easily be decomposed into two separate parts. The bilingual is not the sum of two complete or incomplete monolinguals, rather he or she has a unique and specific linguistic configuration. The coexistence and constant interaction of the two languages in the bilingual has produced a different but complete linguistic entity (Grosjean, 1989). The bilingual uses the two languages - separately or together for different purposes, in different domains of life, with different people. Because the needs and uses of the two language are usually quite different, the bilingual is rarely equally or completely fluent in the two languages. Levels of fluency in language will depend on the need for that language and will domain specific.

2.3. Special Bilingual Behavior

In everyday lives, bilinguals find themselves at various points along a situational continum which induce a particular speech mode. At one end of the continum bilinguals are totally in monolingual speech mode: they are speaking to monolingual speakers of either language 1 (L1) or language 2 (L2) and therefore have to restrict themselves to just one language (L1 or L2).

At the other end of the continum, they are with bilinguals who share their two languages (1 and 2) and with whom they normally mix languages (code-switch or borrow); they are here in a bilingual speech mode (Thirumalai and Chengappa, 1986; Grosjean, 1989).

One phenomenon is *Code-Switching,* which invovles the complete shift to other language for a word, a phrase, a sentences or an utterance, or borrowing a word from the other language and integrating it with the base language. Valdefallis (1978) reiterates that in code-switching there is a clear recognition of each language in pronounciation and form.

It is now accepted that code-switching is an integral part of communication (Myers-Scotton, 1993) and it reflects linguistic and communicative strategies in bilingual speaking to one another.

Interference or negative transfer (Appel and Muysken, 1987) is a related language-choice phenomenon, associated with learning a second language. Interference invovles a speaker unintentionally incorporating aspects of the better known language in producing a form in the newly acquired (or not completely acquired) language. Interference can occur at all levels of language (phonological, lexical, syntactic, semantic etc) and in all modalities (spoken or written), (Grosjean, 1982).

Interference can be of two kinds: static interferences which reflect permanent traces of one language on the other (such as a foreign accent) and dynamic interferences, which are the ephemeral and accidental intrusions of the other language (Eg: accidental slip on the stress pattern of a word due to the stress rule of the other language). Weinreich (1953) divided interferences into three types; phonic, syntactic, and lexical.

Restricting the discussion to lexical interference, he said that words may be borrowed from one language to other. He further suggested that lexical borrowing may occur particularly where *"structural weak points obtained in the recipient vocabulary "*.

Even fluent bilinguals often report feeling inadequate in both their languages. This may result their awareness that certain words or idioms in one language cannot be expressed as a single word in the second language.

Vildomec (1963) (cited in Obler and Albert, 1978) discussed that if the structural distance between the two languages of the bilinguals, are near, i.e., more similar then it will lead to greater interference between the two languages. Thus cognate words might be expected to cause greater phonological problems for a bilingual speaker and to induce semantic confusion if they do not bear exactly the same meaning in both languages.

The concept of structural distance between the two languages was further elaborated by Paradis, (1993). According to this hypothesis, structurally similar languages will tend to be impaired and recovered more equally than structurally different languages which are more likely to be affected and recovered differentially.

Interference may be unidirectional between two languages or may be asymmetrical, influencing one language in one way and other language in different way.

While code switching is usually a sign of fluency in a bilingual setting, interference is a sign that the speaker is not fully proficient in the language(s) and their uses a fluent speaker avoids negative transfer.

Some theorists have suggested that there is an actual mechanism in the brain that permits the bilingual to switch appropriately from one language to another (Paradis, 1985). Few articles report that deficits with this **"switch",** but the lesion do not occur in the same area of the brain or even in overlapping areas, thus making unlikely that there is a single anatomical location for a switch-mechanism. Other have poisted that some sort of bilingual monitoring makes decisions about what language to listen in and what language to speak in (Albert and Olber, 1978).

2.4. Lateralization of Languages in Bilinguals

Research on language organization in brain with respect to bi/multilinguals has yielded controversial results.

The most controversial and most discussed issues over the past 20 years has been the notion that the languages of bilinguals, or of some well defined subsets of bilinguals, are less asymmetrically represented in the cerebral hemispheres than the languages of unilingual speakers. Much of the enthusiasm is the direct result of Albert and Obler's (1978) radical proposal that language functions are organized in the "bilingual brain" in a way qualitatively different from that of the unilingual speaker. In particular they hypothesized the effect of bilingualism on dominance variously as *"cerebral ambilaterality of language representation",* or *"greater right hemisphere participation"* in language function, specifically they contend that the right hemisphere (RH) is preferentially recruited during nonprimary language acquisition.

The above proposal has been scrutinized and researched by various researchers for the past two decades. The consensus has been varied, ranging from greater symmetry in the representation of both languages to greater right hemisphere participation only for the stronger or for the weaker language, for languages acquired early or late in a formal or on informal context, and/or at the beginning or advanced stages of acquisition/learning (Vaid and Genesse, 1980; Vaid, 1983; Mendelson,.1988, Paradis, 1990; 1992). Half the researchers in this field have reported no difference in laterality between bilinguals and unilingual controls. These discrepancies have mostly been attributed to subtle differences in method, task or stimulus characteristics (Vaid and Hall, 1991).

In the absence of a consensus on the matter, and the fact that the same techniques (Eg, dichotic listening or tachistoscopic visual half field presentation) produces contradictory results - that incidentally run against to all the available clinical evidence.

It is more likely that the experimental paradigms employed to measure language laterialization are not measuring what they purpose to measure (Paradis, 1995).

Paradis (in press) argued that the problem is exacerbated by a lack of specification of what is meant by *Language,* that is what is that the investigators suspect of being less lateralized. If they mean implicit linguistic competence, they are wrong. There is no greater incidence of crossed aphasia in bilinguals than in unilinguals (Doreen, 1989), and all the evidence from Wada testing and electrical stimulation of the brain points to both languages being represented in the language areas of the left hemisphere in the same proportion as in unilinguals.

Recently, there is PET evidence (Klein, Zatorre, Miliner, Meyer and Evans, 1995) also to show that there is no major difference in cerebral organization between unilinguals and bilinguals.

If they mean communicative competence, including pragmatics, they are probably right, but the experimental methods (dichotic presentation of digits, syllables, or tachistscopic presentation of words) supported by their very rationals, could not possibly support the issue, as these methods does not indicate the use of pragmatic strategies (Paradis, in press). Given that second language speakers are liable to compensate for the lacunae in their implicit linguistic competence in the weaker language by increasing their reliance on pragmatic inferences, it is not unlikely that they will involve their right hemisphere to a correspondingly greater extent. Increased right hemisphere involvement in these cases, however, does not reflect the representation or processing of the language system (implicit linguistic competence), but, on the contrary whatever nonlinguistic competence is substituted for it. (Paradis, in press)

So far the only qualitative difference identified to be the cerebral processing of closed class words by individuals who have learned a second language after a certain age, as demonstrated by studies of event-related-brain potentials (ERPs). Closed class words elicit identical ERPs in unilinguals and early bilinguals that are qualitatively different from those elicited in late bilinguals (Neville, Mills and Lawson, 1992; Weber - Fox and Neville, 1992; 1994).

Another question has been the LOCALIZATION of multiple languages in the cerebral cortex. Multiple languages are generally thought to be organized within the same rather than separate anatomical areas of left hemisphere. Paradis (1987a) proposed that they might be organized as an extended system, a dual system, a tripartite system, or a set of subsystems.

The *Extended System Hypothesis* holds that languages are diffusely represented in the same cortical language areas. The bilingual speaker simply has more choices among elements of nonlinguistic competence that is undifferentiated with respect to specific languages. As a second language is acquired (concurrently with, or subsequently to the first, additional phonemes (i.e., those of L2) are processed as allophones, used only in L2 environments: new syntactic rules are processed the way stylistic variations are processed within the same language. The speaker would thus have a larger stock of allophones, allomorphs and other all-elements that would be used only in the context of their respective language. The ease with which bilinguals can mix their languages intrasententially, with or without corresponding switches in phonology, is consistent with an extended system.

The ***Dual System Hypothesis*** assumes that elements of various languages are stored separately, in underlying systems that are independent of each other. Different net works of neural connections subserve each language. Each linguistic system is thus represented separately in the brain. The hypothesis, however, does not necessarily imply differential localization at the macranatomical level. Both systems might be inextricably intertwined within the same square millimeter of cortical tissues. The way bilinguals are able to speak one language at a time without interference from the other is easily accounted for by a dual system of language representation.

The ***Tripartite*** *Hypothesis* supposes that those items that are identical in the two languages of a bilingual speaker are represented in a single neural substrate common to both languages. Only those elements that are different in each language have their own separate representation. This eliminates the redundancy of representation of whatever structural elements the two languages have in common.

Ojemann and Whitaker's (1978), hypothesis that there are sites common to both languages and sites specific to each in concordant with such a tripartite system. The hypothesis that structural distance has an effect on language therapy (Paradis, 1993) is in agreement with tripartite system. Stadie et al., (1995) findings that their multilingual patient made fever interlingual errors between the two structurally dissimilar languages than between the two structurally similar languages is also congruent with such a hypothesis.

The *Subset Hypothesis* states that a bilingual's two languages are served by two subsystems of the larger system known as implicit linguistic competence. As subsystems of language, each (specific language subsystem) has a nature more similar to the other languages subsystem(s) than to any other cognitive system but can, nevertheless, be independently activated or inhibited. It is compatible with all of the patterns of recovery in bilingual aphasic patients reported so far. The activation and inhibition of different languages will be discussed later in the review after elaboration of recovery patterns in bilingual aphasic patients.

A discussion of the bilingual lexicon, entails preliminary an understanding of the naming process in monolinguals, factors affecting naming and naming in aphasics in general.

2.5. Processing in Naming

Confrontation naming is a complex process involving several stages. In the first (perceptual) stage, following the presentation of a picture or object, the pictorial image is analyzed for correct identification of the stimulus. The information is transmitted to the second (semantic) stage, where its semantic representation is activated, then to the third (label / retrieval) stage, where the phonologically representation corresponding to the semantic representation is retrieved. This is followed by the motor programming stage, where the articulatory sequence is activated leading to correct naming.

The Interactive Action (IA) Model of Lexical Retrieval

The interactive word production model put forth by Martin et al., (1994) and Dell and O'Seaghdhas (1991)'s model of lexical retrieval. This class of models generally assumes that retrieval takes place in a lexical network consisting of a semantic, word, and phonemic nodes (eg Dell, 1988).

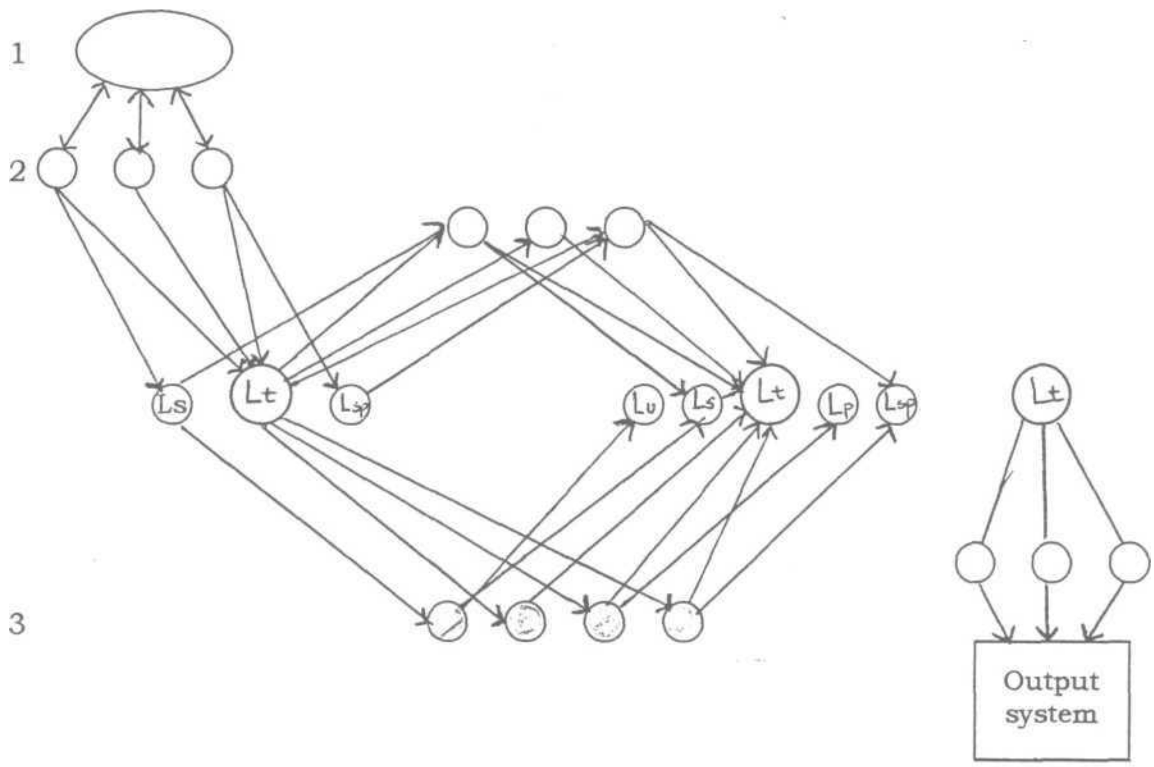


Figure 2.1: Spreading activation model for language output (Dell, 1988)

1. Conceptual system: 2. Semantic network; 3. Phonological network; Lu=untreated lexical node, Lt= Targeted lexical node, Ls= lexical nodes that share semantic features, Lp= phonologically related lexical nodes, Lsp = phonologically and semantically related lexical nodes.

Each node possesses an activation level that reflects the extent to which it is participating in the processing, and each activated node sends activation to other nodes through weighted connections. The weight or strength of a connection determines the amount of activation that is sent per unit time. The connection pattern reflects the composition of lexical nodes. Figure 2.1 shows the evolution of feedforward and feedback priming activation processes leading up to the slection of a targeted lexical node. Semantic and lexical nodes appearing more than once in the figure are actually the same nodes at different time steps.

Conceptual processes send activation to a semantic representation (first order priming). The activation from this primed semantic representation an (array of nodes or features) spreads forward through the lexical network and primes a target lexical node. Other lexical nodes that are sementically related or semantically and (by chance) phonemically related to the targeted code also receive some weak priming from this feedforward activation. Activation from the target lexical node spreads to the phonemic network and primes its corresponding phonemic nodes or features. The activation level of the lexical node is stabilized by feedback from activated phonemic nodes, which prime other lexical nodes sharing phonemic features with the target. When retrieval is enacted, the lexical node with the highest activation level receives a jolt of activation and a response is initiated. In normal circumstances, it is likely that the target lexical node will be the most activated at the moment of selection, but word substitutions that are semantically, phonemically, or multiply related to the target can occur as a consequence of a mishap. If a competitor node's activation is raised by feedforward semantic priming or feedback phonemic priming to a level higher than the target node when selection occurs, that competitor node will be slected to guide phonemic output processing.

Path ophysiology

The pathophysiology of impaired naming has been explained by Linebaugh (1990). Specific lexical entries, along with their semantic, syntactic, phonologically and orthographic representations may be viewed as being stored in the brain by means of neuronal networks. Various aspects (eg: semantic features, grammatical form class, syllabic structure) of lexical entries may be represented in networks that are common to all lexical entries sharing specific features, but no two lexical entries are represented by identical network. Retrieval of a specific lexical entry requires activation of its neuronal representation to a level which makes the entry available for further linguistic processing, selection of a specific lexical entry also may involve inhibition of other entries that share common features.

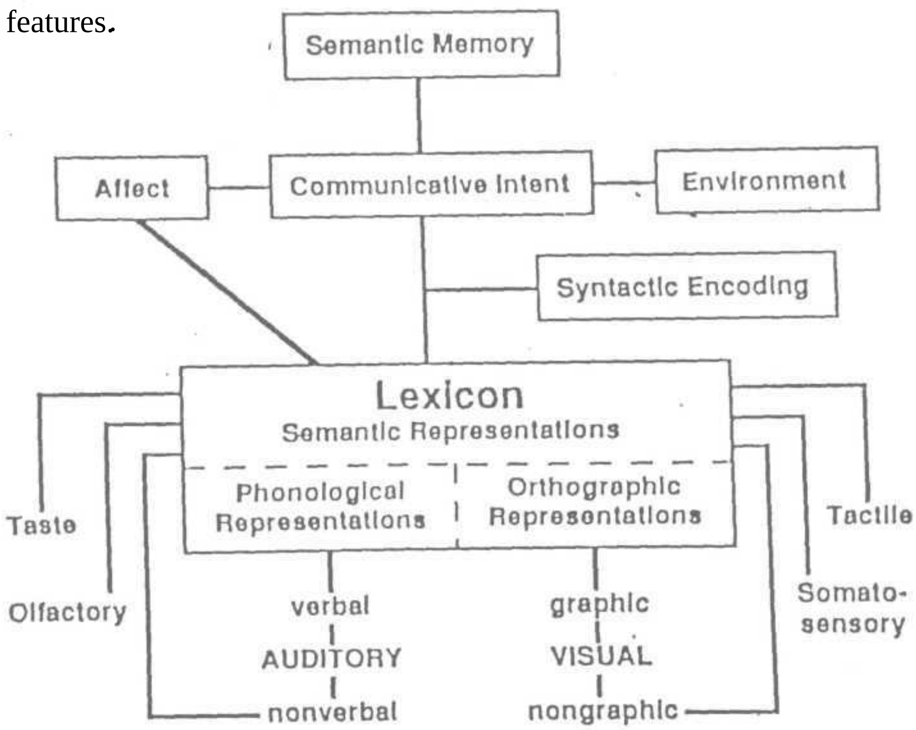


Fig. 2.2 : Access routes to the lexicon

Three mechanism may be hypothesized which account for anomia. The first involves "damage" to the neuronal representations of lexical entries. Lesion to these networks of neurons might render certain lexical entries inaccessible or at least require a higher level of activation of the residual elements of the network. This mechanism could account for several manifestations of impaired lexical retrieval, including word omissions, partial responses, semantic paraphasias and neologisms. The second mechanism involves a delay or failure in substantially intact neuronal networks reaching an adequate level of activation. This mechanism may manifest itself in a number of ways including increased response latencies, partially accurate responses, circumlocutions, word omissions, and perhaps production of unrelated words.

The third involves a failure to inhibit lexical entries which share a substantial number of common features (Luria, 1964). Occurrences of this phenomenon could result in semantic paraphasias.

Anomia has been associated with a wide range of lesion patterns, both focal and diffuse, and as a result has frequently been regarded as a nonlocalising clinical sign (Benson, 1979).

2.6. Naming in Aphasias

Disturbance of naming and wordfinding are common after insult to immature, adult and aging brain. Naming difficulties however are most intimately related to those conditions of CNS damage resulting in aphasia. Almost every individual with aphasia has some reduction in the repertoire of words available for speech and requires more time than normal to produce words in response to either pictures or questions, (Benson, 1979), regardless of clinical type or the anatomical localization of his lesion.

2.6.1 Why aphasic people cannot name

A major issue about aphasic naming - is whether aphasic people have a disturbance in the way their words are organized and stored or whether they have problems (Rosenbeck, LaPointe and Wertz, 1989).

2.6.2 Errors aphasic people make

Buckingham (1979) categorized what he called the "manifestation of blocked access to the lexicon", made by aphasic people with posterior lesion into definitions, pauses, field errors, unrelated lexical errors, indefinite anaphora, neologism and confabulation. He poisted that aphasia is a disturbance of sets rather than fields. Hierarchical relationships are preserved but close relationship are disturbed.

According to Dorze et al., (1989) anomia originates from a difficulty in accessing the formal lexical representation and not from a semantic problem.

However, some opine that anomia in aphasics are particularly impaired in the structure of their semantic fields and this breakdown leads to inability to retrieve words.

2.6.3. Naming errors in different types of aphasics

Studies have been reported showing differences in naming between anterior Vs posterior aphasia (Goodglass and Baker, 1976).

Williams and Canter (1982) found that Broca's aphasics performed significantly better when naming objects on a confrontation-naming task than when naming in the course of connected speech elicited on a picture-description task. In contrast the Wernicke's aphasics performed significantly better on the picture - description task. Anomic and conduction aphasic did not display a consistent pattern of performance differences on the two task. Correlation between scores on confrontation naming and picture description were high for the conduction and Broca's aphasics, moderately high for the Wernicke's aphasics, and the lowest for the anomic aphasics. In absolute differences between scores on the two task, the greatest difference was found for the anomic patients followed by Werincke's, Broca's and conduction aphasics.

Later, Williams and Canter (1987) undertook a study on the same lines to determine if particular error types produced during action-naming discriminate between aphasia syndromes as they did during object-naming task. Results indicated that for all aphasic groups except the anomia aphasics, correlation of performances on confrontation-naming and picture-description task were substantially lower during action naming.

The absolute percentage differences between confrontation naming and picture description scores revealed that for both action naming and object-naming, anomia aphasics displayed the largest difference, followed by the Wernicke's and Broca's patients and finally the conduction aphasics.

Results further revealed that Broca's patients performed better on the confrontation naming task, while Wernicke's performed better on the picture - description task. Analysis of the errors types that discriminate between the four aphasia group indicated that errors produced during action-naming did not discriminate as effectively among syndromes as did object-naming errors.

The question arises from the above discussion as to why do aphasics tend to perform better when naming objects than when naming actions?. The answer to this may be that the semantic or conceptual complexity of nouns versus verbs has some influence on this pattern. Clark and Clark (1977), explained that while nouns often represent a class of objects, verbs are representational of a class of objects undergoing change. Therefore, nouns may be conceptually simpler than verbs hence affecting their recall and/or production (Williams and Canter, 1987).

Verbs may also be more abstract than nouns as they express relational meanings which depend on abstract concepts and are relatively unconstrained by physical world (Genter, 1978; cited in Williams and Canter, 1987). In contrast, nouns can be viewed as pointers to objects. In addition, actions are ongoing with the precise boundaries referring to the action often difficult to identify. Nouns being static elements, may be easier to identify conceptually. These issues are further discussed in following section.

There are various factors that influence the naming performance in adults. The factors related to referent to be named are operativity, semantic category and stimulus uncertainty. Among the characteristics of the referent's name are frequency of occurrence, length of the word and difficulty context. The method of stimulus presentation and mode of response elicitation are also reported in the literature.

The most studied and discussed factor and those seems to be on

FACILITATING CUES

Specific cues facilitate word recall and word retrieval have been identified in normal adult literature and in investigation analyzing behavior of adult aphasics. Phonemic and semantic cues are used in the assessment of word finding skills in adults and children.

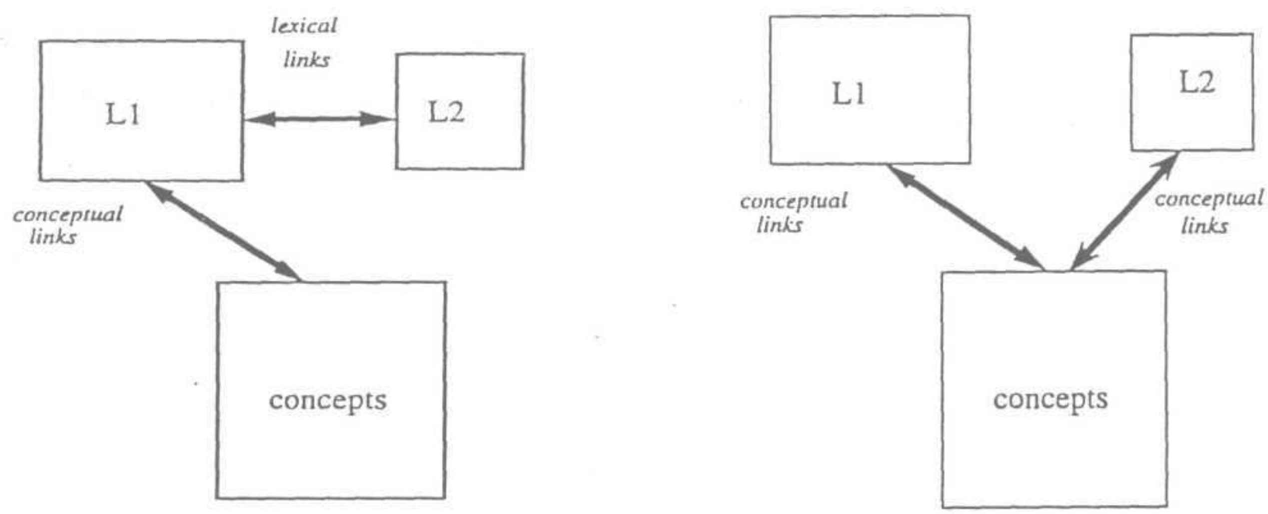
In most cueing studies, phonemic cues involved auditory presentation of information about the first sound or sounds of picture's name, and semantic cues took the form of an auditory description of some aspect of the object depicted in the picture to be named. Results of previous cueing studies have indicated that both types of cues significantly increase naming accuracy (Li and Williams 1979; Li and Canter, 1983).

Stimely and Noll, (1991) suggested that semantic cues facilitate access of phonological representation by increasing the accuracy and completeness of semantic representation used in the access process. The effects of phonemic cues, on the other hand, appear to influence only the stage of the naming process that involves phonological aspects of selecting and producing the word level response. In terms of the model, activation at the phonologically representation level by the phonemic cue facilitates subsequent activation by the semantic system of phonological word forms that share the phoneme presented in the cue. Phonemic cue is reported to be most effective (Li and William's 1989, Wingfield et al 1990).

2.7 Lexical Store in Bilingual

The question frequently addressed in literature is at what level of representation are a bilingual's two languages interconnected? This has been sought by many by analysing the structure of bilingual memory (Kroll and Stewart, 1994). Past research has debated whether the fluent bilingual possess a common memory system for both languages or idependent memory system that correspond to each language (McCormack, 1977; Snodgrass, 1984). More recent research proposed both the common and independent memory models but the bilingual's memory at two different levels of representation which are hierarchically related (Snodgrass, 1984). Words in each of bilingual's two languages are thought to be stored in separate lexical memory systems, whereas concepts are stored in an abstract memory system common to both languages.

If we conceptualize the structure of bilingual memory in hierarchial terms then in explaining the connection between bilingual's two languages becomes complex. Potter, So, Von, Eckhardt, and Feldman (1984) addressed this issue by contrasting two models of interlanguage connection - *Word Association* and *Concept Mediation.* The models are shown in Fig 2.3. The word association model assumes that second language words are associated to first language words and that only through first language mediation can second language words gain access to concepts. In contrsst, the concept mediation model assumes that the second language words directly access concepts.



Word Association

Concept Mediation

Fig.2.3. Two models of language interconnection in which second language (L2) words are associated to first language (L1) words (Word Association) or directly linked to concepts (Concept Mediation).

Table 2.1
Two hypotheses about the processing sequence leading to production of a second-. language word in response to a picture or first-language word

Word Association Model				Concept Mediation Model			
(a)		(b)		(c)		(d)	
Picture naming		*Translation*		*Picture naming*		*Translation*	
1.	Recognise image	1.	Recognise L1 word	1.	Recognise image	1	Recognise L1 Word
2.	Retrieve concept			2.	Retrieve concept	2	Retrieve concept
3.	Retrieve L1 word						
4.	Retrieve L2 word	2	Retrieve L2 word	3.	Retrieve L2 word	3.	Retrieve L2 word
5.	Say L2 word	3.	Say L2 word	4.	Say L2 word	4	Says L2 word.

In summary, the word association model predicts that translating into L2 from L1 will take substantially less time than picture naming in L2, for essentially the same reason, that naming (reading a loud) a word in L1 takes less time than naming a picture in L1. The concept mediation model predicts little or no difference between pictures and L1 words when the task is to produce L2.

Kroll and Stewart (1994) proposed a revised version of the hierarchical model (Fig. 2.4)

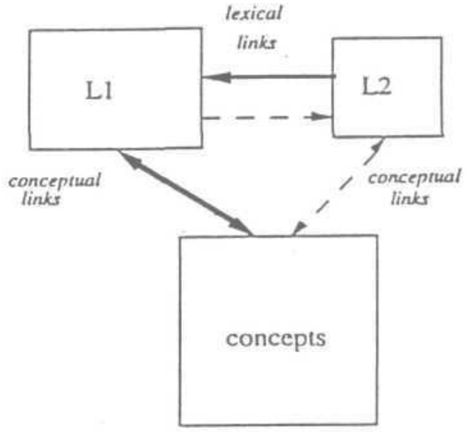


Fig.2.4: Revised hierarchial model of lexical and conceptual representation in bilingual memory.

According to this model, both lexical and conceptual links are active in bilingual memory, but the strengths of the links differe as a function of fluency in L2 and relative dominance of L1 to L2. In Fig. 2.4 L1 is represented as larger than L2 because for most bilinguals, even those who are relatively fluent, more words are known in the native than in the second language. Lexical associations from L2 and L1 are assumed to be stronger than those from L1 to L2 because L2 to L1 the direction in which second language learners acquire the translation of new L2 words. The links between words and concepts, however, are assumed to be stronger for L1 than for L2.

According to this model when a person acquires a second language beyond a stage of very early childhood, there is already a strong link between the first language lexicon and conceptual memory. During early stages of second language learning, second language words are attached to this system by lexical links with the first language. As the individual becomes more proficient in the second language direct conceptual links are also established. However, the lexical connections do not disappear when the conceptual links are established and these links are bidirectional but differ in strength.

Thus from the above discussion it could be concluded that modelling of bilingual memory distinguishes between two levels of representation of each language, *one lexical,* storing word forms, and other *conceptual,* storing meanings (Potter et al., 1984; Kroll, 1993; Kroll and Stewart 1994). The three store hypothesis (Paradis, 1985) word meanings as well as word form (phonological form and syntactic properties) to be part of the lexical representation, along with a third, conceptual, level of representation, independent of language and, hence, of languages.

There are several studies on normal bilingual lexicon, translational capacity and picture naming in normal bilinguals (Kirsner et al., 1984; Kroll and Stewart, 1994; deGroot etal.,1994).

Study by Vitkovitch and Humphreys (1991) examined errors made in speeded picture naming task in normal bilinguals, and concluded that the locus of interference is in a stage of retrieving the target picture's name.

Regarding lexical storage and processing in aphasics different observations have been made.

Paradis (in press), suggested that lexical meaning of words, which is a part of speakers linguistic competence is vulnerable to aphasia whereas conceptual representations which are outside implicit linguistic competence are not vulnerable to aphasic (although they are vulnerable to other forms of mental deterioration).

The response to free association tests, lexical decision tasks, word recognition tasks, similarity judgements, and the like, will depend in a part on the degree of semantic overlap between the lexical items of the two languages: the greater the number of shared features, the more a word and its translation equivalent will tend to evoke the same response.

A bilingual subject may thus have his semantic networks organised in at least three basic ways; to the extent that his two langauges are native-like and suffer no interference, his systems are said to be coordinate; to the extent that the units of the two languages are identical and interference is bidirectional, the systems are said to be compound; to the extent that the system of the second language is subordinate to the first, the units of the second language will be those of the first, thus exhibiting unidirectional interference (Weinreich 1953; Paradis, 1978).

Therefore, results of experiments will be influenced by the extent to which parts of the two linguistic systems overlap, either because of semantic, cultural, or of other identity relations inhering between them, as well as by the type of organisation of the semantic net work of individual subjects.

2.8. Aphasia in Bilinguals and Polyglots

When aphasic impairments in bilingual or polyglots occur, virtually all aphasics show some sorts of deficits in each languages. Languages have been shown to behave differently or equally, with equal or unequal extent of interferences and substitution.

Paradis (1977) developed a taxonomy of language recovery in polyglot aphasic. The types include:

1. Parallel recovery: When all the languages known by the patient are similarly impaired and are restorted at the same rate. This recovery pattern appears to be by far the most common. (Charlton, 1964; Whitaker, 1978; April and Man, 1980).

2. Differential recovery: When the patient doesnot recover all previously spoken languages to the same extent or when one or more languages are recovered more slowly than another one or others.

3. Successive recovery: When restoration of one language does not begin before another one has been recovered (at least partially).

4. Selective recovery*:* When one or more patients languager is not restored.

5. *Antagonistic recovery:* When one language regresses as recovery of another one progresses during evolution.

6. Alternate antagonism*:* When patients have access to only one of their language at a time, but this language shifts from L1 to L2, and back to L1 again.

7. Mixed Recovery: When patients inappropriately mix sounds, words, morphemes, or syntactic structures from two or more languages (a very rare condition).

In addition, a decade later (1987) Paradis and Goldblum added two more types:

- *Differential aphasia* - in which two or more languages show different aphasia syndromes,
- *Selective aphasia* - the patient is aphasic in one language but not in other.

The parallel recovery and blending of an aphasic's language can be explained by extended system hypothesis. Successive and antagonists recovery patterns, as well as selective loss, whether temporary or permanent, of one of a patient's language can be explained by dual system hypothesis. The subset hypothesis is compatible with all of the patterns of recovery in bilingual aphasic patients (Paradis, 1995).

Selective impairment of different languages and various recovery patterns can be explained in terms of differential inhibition in other words *activation threshold hypothesis* (Paradis, 1984; Green, 1986) for cerebral processing.

The ACTIVATION THRESHOLD HYPOTHESIS holds that comprehension and production are subserved, in part, by the same neural substrate, but that more impulses are required to voluntarily self activate a trace than to activate with similar external stimuli. External stimuli that impinge on the senses automatically activate the relevant perceptual networks that, in turn activate the traces left by previous similar experiences. The activation threshold of any given trace is a function of frequency of activation and time elapsed since its last activation (Green, 1986).

In simple words, the more frequently a given trace is used, the easier is its activation-threshold, and hence, the easier it is to activate again and the lower the amount of stimulation necessary to activate it; and viceversa. In pathological condition this normal pattern of activation thresholds may be disrupted.

A word (or any other linguistic items) must reach a certain activation threshold in order to become available during the microgenesis of our utterance (evocation, self-activation, retrieval). The internal representations of words can vary in their level of activation (i.e., in their current activation threshold or the number of impulses it takes to activate their substitute) (Paradis, in press).

When a bilingual speaker elects to speak one language, the activation threshold of the nonselected language is raised. Although, the language not being used in never totally deactivated (Soares and Grosjean, 1984) In the case of aphasia, it sometimes becomes impossible to discinhibit one of the languages either permanently (selective recovery), temporarily (successive recovery), or alternatingly (antagonistic recovery). The activation threshold may be higher for one language than for the other (differential recovery). Deactivation of one language may be difficult, resulting in abundant involuntary mixing (Paradis, 1989; Berg and Schade, 1992).

2.9 Language Mixing in Polyglot Aphasia

In this section an attempt has been made to have a closer look on language mixing in bilingual and polyglot aphasics with special emphasis on studies of naming task in bilingual aphasics.

Language mixing in spontaneous speech and naming were observed by many early researchers, Poetize, (1925); Kanders, (1929) (cited in Perceman, 1984).

Stengel and Zelmanowitz (1933) (cited in Perceman, 1984) reported a 57 year old motor aphasia patient began to mix languages on naming task. They observed that the patients produced the correct name in the appropriate language and then spontaneously translate the name into the other language, language mixing was observed to be most pronounced when the patient was not instructed to speak a specific language. Language mixing on naming tasks were also observed by Weisenberg and McBride (1935) (cited in Perceman, 1984). L'Hermite (1966) reported the patient used English syntax with French vocabulary and produced English names on a French naming task, even though it was not possible for him to name in English upon request.

Aphasic polyglots have been observed to combine languages in a variety of ways. They may use words from several languages together in the same utterance or produce the correct name of an object in an unsolicited language, even when it is impossible for the same patient to produce the correct object name in that language upon request (Perceman, 1984)

Bilinguals have a special pragmatic ability to be aware of what languages their conversational partners speak. The ability may break down in aphasia. Curiously, it is rare that it breaks down in aphasia due to frank lesion (see Nilipouri and Ashayeri, 1989); rather one sees it sometimes (although not invariably) in the aphasia resulting from Alzheimer's dementia. Some patients produce words which are themselves combinations of morphemes from more than one language (Perceman, 1984).

The ability to code switch appropriately (i.e., only with speakers who will understand the code switched language) and the ability to inhibit interference breakdown extremely rarely in aphasia, (Obler, Eng and Centeno, 1995), when the interference is looked at from L1 to L2 in aphasia speech, it is in speakers from whom L1 was dominant over L2 premorbidly, and can infer that similar interference would likely have occurred then, too. In the rare case one sees mixing of languages in bilingual aphasia, it appears to be the result of anomia, that is, the patient is searching hard for a word in one language and comes up with the corresponding term in the other language (De Santi et al. ,1989)

One additional curious behavior reported in bilingual aphasia is SPONTANEOUS TRANSLATION. Spontaneous translation appeared as a predominant feature of the language behavior of polyglot aphasics whose symptoms included language mixing at various linguistic level (Paradis et al., 1982; Perceman, 1984).

In this the patient switches to the other language to say what has just been said in the first language. Although there are several cases in literature, no one has a firm idea what brings about this behavior and if it is always transitory.

Language mixing can occur at any level. It may be at the level of word as a blending of syllables from different languages (Gloing and Gloing, 1965) (cited in Perceman, 1984); or the substitution of a phonetically similar word from an unsolicited language. Language mixing at syntactic level have been reported by Perceman (1984). In both aphasics and normals the most common form of language mixing is lexical borrowing (Weinreich, 1967). The predominance of lexical borrowing is attributed to the fact that the **LEXICON is MORE LOOSELY STRUCTURED** than other aspects of grammar. The more tightly organized phonemic and syntactic systems are less susceptible to inter language mixing. This structural property of the lexicon might also account why lexical problems of varying degree are common across aphasia types in monolinguals as well as polyglots. Paradis (1977) and Albert and Obler (1978) claimed that impaired switching mechanism effects the- selection of an item (both intra and interlinguistically). The dynamic quality of aphasia, as reflected in multi-language mixing and spontaneous translation favors a functional rather than a structural approach to the problem of language switching.

There are enormous literature on normal bilingual lexicon but in bilingual aphasia the research has been scanty as far as naming task is considered.

Researchers have reported differential naming performance in their polyglot aphasics,. (Paradis, Goldblum and Abidi, 1982; Paradis and Goldblum 1989). Currently, Stadie et al.,(1995) have investigated oral and written naming in a highly educated German-English- French multilingual patient. For oral naming investigators used confrontation naming. Results indicated that there was no difference between oral and written picture naming in any of the languages, but German (native) naming was generally much preserved. Naming in the non native languages was characterized by a large amount of omissions. Furthermore, there was a large proportion of interference errors in English and French. Such interlingual errors hardly occurred in German naming.

Kremin and DeAgostini (1995), reports picture naming in two bilingual patients. One patient who suffered from anomia showed differential impairment in her three languages picture naming in her mother tongue was best preserved and the language which she learnt in school and used in professional life were severely impaired. The patient's naming impairment reflects the order of acquisition; language learned first being best preserved. The second patient (who suffered from a degenerative brain disease) showed equally preserved picture naming in Italian and French, in spite of a severe disturbance at the level of semantic analysis. This adds to the evidence of unusual pattern of normal naming without comprehension.

2.10. Assessment of Lexicon

Tasks assessing naming should ideally include the following tasks:

1. Visual confrontation naming.
2. Word naming.
3. Responsive naming.
4. Picture-to-word matching.
5. Written confrontation matching.
6. Verbal fluency.
7. Generative naming.
8. Picture description.
9. Story retelling.
10. Story composition.
11. Referential communication.
12. Conversational speech sample.

Of the above mentioned tasks confrontation naming, responsive naming, generative naming, verbal fluency, conversational speech are used for assessing an aphasic patient. In assessing bilingual aphasic mostly picture confrontation naming is used.

1. Confrontation naming

The most frequently used task with aphasic patients is that of confrontation naming; that is, showing the patient an object or picture and asking "What is this"?

Patients with severe forms of aphasia may have difficulty producing correct names for common objects such as shoes, while patients with mild aphasia may have difficulty only with uncommon objects, such as abacus using a variety of stimuli. This technique has been used with both adults and children in a variety of clinical and research studies. Stimuli like common object line drawings, symbols or symbol materials like color's could be used.

Confrontation naming is imperative subtest for most aphasia tests like BDAE, WAB etc. Boston Naming Test by Goodglass and Kaplan (1983) is a test of naming which uses only confrontation naming.

2. Responsive Naming

Responsive naming refers to a task wherein the patient provides a substantive word in response to a contexually related question (eg: What is the color of snow). If the patient has sufficient auditory comprehension for this task, then results can be compared with those elicited by confrontation naming task.

3. Generative Naming

Free recall of items in a specific semantic category such as animals is the most difficult form of naming for aphasic patients. The average non aphasic individual can produce in excess of 20 animal names in one minute of free recall. Even mildly aphasic patients may have difficulty in achieving this level of performance. For severely aphasic categorical naming may be too difficult and therefore not informative. Other semantic category that might be tested in a similar may are makes of automobiles, fruits vegetables and articles of clothing.

Although naming difficulty is exhibited by aphasics in a variety of speech tasks, picture naming has often been used to examined naming behavior. It is because of the advantage of being able to test a predetermined set of words (unlike spontaneous speech) without providing the subject with phonological information about those words (unlike repetition and reading) (Kohn and Goodglass, 1985).

All the major aphasia examination have at least one subtlest of naming usually confrontation naming, requiring that the patient provide specific names for specific objects. Some, like the Boston Diagnostic Aphasia Examination (BDAE) (Goodglass and Kaplan, 1983), sample naming of objects from a variety of categories body parts, colors and objects for example. Western Aphasia Battery (WAB) (Kertez, 1982) also sample naming, which includes object naming, word fluency, sentence completion, responsive naming.

The Boston Naming Test (Kaplan, et al., 1983) tests the aphasic's persons ability to name on confrontation naming task. It is a 60 item confrontation naming test which uses black-and-white drawn stimuli which are arranged in order of difficulty. The test provides an overall score which is compared to cut-off scores provided by the test developers. Information on the effectiveness of semantic and phonemic cues when an error is elicited, as well as a record of the latency of response. An error analysis may also help to detect mild naming deficits in aphasia, brain injury and dementia.

Testing bilingual clients presents special problem. Aphasia can be manifested in each language differently, Grosjean (1989) suggested that detailed history about premorbid language usage, proficiency, transitional abilities about code switching, age and mode of L2 acquisition, should be obtained either from the patient or reliable informant. When evaluating aphasia in each language, examination in each interactional mode should be made, remembering that the abilities of a bilingual person in each language are not the same as the abilities of two monolingual person. While testing each language care should be taken that other language is deactivated (Paradis and Goldblum, 1989). This could be achieved either by using the examiner who does not know the other language or instructing and conversing with the patient only in the language being tested.

2.11 Need for the study

There has been an increasing awareness of research in bilingualism and adult aphasia, especially in the Western countries. In retrospection it can be unequivocally stated that at the present time the current literature and ongoing research are trying to investigate the impairments of specific linguistic components (eg: semantics or lexicon or syntax, etc) in bilinguals. There are abundant literature on studies showing various types and patterns of language impairment (as a whole) in bilingual aphasics.

Specific tasks like naming, repetition, etc., are still a rarity in the literature of bilingual aphasics. The existing studies on naming have focused mainly on confrontation naming. There is scanty evidence on the performance of bilingual aphasics across different nominal tasks in either of the languages. Further, the existing studies have been done mainly on the Western population considering languages like English-Spanish, French-German etc. However, studies on combinations like on a Dravidian language and an European (Germanic) language (as considered for this study, Kannada and English) are practically nil in the literature.

Thus the present study attempted to investigate the naming deficits in bilingual aphasic individuals across, various naming tasks; viz., confrontation naming responsive naming and generative naming in either of their languages. This study not only tried to investigate the naming performances but also attempted to focus attention on the efficiency of different types of cueing in word retrieval. Further, it also compared the performance of the aphasics to normal bilingual adults. Specifically the study aimed;

1) To investigate the naming difficulties in two language; i.e., Kannada (L1) and English (L2) of bilingual aphasic patients.
2) To study the naming patterns and error types in naming;
    i) Across each language in aphasic
    ii) Among different types of aphasics.
    iii) Between aphasics and normal control
3) To explore the naming patterns among different naming tasks (i.e., confrontation naming, responsive naming and generative naming) in;
    i) L1 and L2 in aphasics.
    ii) Among different aphasics
    iii) Between aphasics and normal control
4) To study the interferences of L1 in L2 task and L2 in L1 task in;
    i) Different types of aphasics
    ii) Aphasics and normal control.
5) To investigate for the effectiveness of semantic and phonemic cueing in confrontation naming among different types aphasics in the two languages.

Besides the above, this investigation also aims to direct valid research attention to the area of bilingualism and aphasia, which is existing and dynamic, yet has been largely ignored in India.

CHAPTER 3

METHODOLOGY

AIM

The aim of the present study was to assess, compare and contrast the naming disturbances in the two languages of bilingual aphasic individuals. A secondary aim was also to compare the performance of normal adult bilinguals with the aphasics.

SUBJECTS

The present study had two groups of subjects, namely the experimental group and the control group. The experimental group consisted of seven aphasic (N = 7) patients above 18 years of age. They were in the age range of 28 years to 63 years, with a mean age of 50.5 years. All the seven aphasics were male.

All the subjects were Kannada-English bilingual except one who was Kannada-Konkani-English multilingual. Kannada is a Dravidian language spoken mainly in the State of Karnataka.

Classification, diagnosis and selection of patients (Experimental group)

The patients were diagnosed on the basis of neurological findings obtained from neurologists as well as on the speech and language symptoms. For the sake of anonymity, the patients names are abbreviated as BR, JP, CS, NA, MJ, DS and BA. Among them BR and JP were Broca's Aphasic; CS, NA and MJ were Anomic Aphasics; DS and BA were conduction Aphasics diagnosed on the basis of Western Aphasia Battery (WAB, Kertez, 1982).

The following variables, were taken into consideration, while selecting the patients.

1. All subjects were diagnosed as aphasics by speech and language pathologists or neurologists.

2. All subjects were above 18 years of age.

3. Those patients alone were included in the study who suffered a cerebrovascular accident (CVA). Testing was done between one to three month post onset when the patient had attained neurological stability.

4. All the patients were bilingual speakers with Kannada as their mother tongue or most used language and English as their second language.

5. All subjects in the study had minimum education till secondary school. They could read and write both the languages.

6. Only those who had no known defects of hearing and vision and other impairments of higher functions such as spatial orientation were selected in the study.

The demographic data of the experimental group is given in Table3.1.

Table 3.1

Demographic details (Patient name, age, sex, education, occupational), Etiology, and type of Aphasia for the experimental group.

Sl. No.	Patient	Age	Sex	Education	Occupation	Etiology	Type of Aphasia
1.	BR	28 vrs	Male	BA	Drama Artist	C.V.A.	Broca's
2.	JP	63 yrs	Male	BA	Retired School Teacher	C.V.A.	Broca's
3.	CS	53 yrs.	Male	S.S.L.C.	Agriculturist	C.V.A.	Anomic
4.	NA	63 yrs.	Male	BA,LLB	MLA	C.V.A.	Anomic
5.	MJ	32 yrs	Male	B.Com	Accountant	C.V.A.	Anomic
6.	DS	53 yrs.	Male	ME, Ph.D	Professor	C.V.A.	Conduct -ion
7.	BA	61 yrs	Male	B.Sc.	Retired Tahsildar	C.V.A.	Conduct -ion

Detailed language testing was done before taking the patients for the study. Table 3.2 gives the Western Aphasia Battery (WAB) test scores for each patient. The WAB was performed in Kannada (ICMR, 1990).

Table 3.2
Shows the WAB Scores of the Patients.

Sl No.	Patient	Age/ Sex	Post Onset (Time of testing)	Fluency	Compre hension	Repeti tion	Naming	Reading	Writing	Proxis	AQ	Type of Aphasia
1.	BR	28/M	4½ weeks	0	4.85	0	0	0.3	–	4.2	9.7	Broca's
2.	JP	63/M	6 weeks	1	8.80	0	0.1	5.8	3.2	5.9	19.8	Broca's
3.	CS	53/M	8 weeks	16	9.55	8.4	8.4	8.9	5.6	5.7	84.7	Anomic
4.	NA	63/M	6 weeks	16	10.00	9.8	9.5	9.1	7.5	6.0	90.6	Anomic
5.	MJ	32/M	8 weeks	12	9.85	8.8	7.2			6.0	75.7	Anomic
6.	DS	53/M	4 weeks	16	6.65	8	7.1		-		–	Conduction
7.	BA	61/M	10 weeks	7	8.90	0	0.2	4.9	5.5	7.8	32.2	Conduction

The control group consisted of 7 non brain damaged adults. The control and experimental were matched for age, sex, education language background usage. The demographic data of the control group is given in Table. 3.3.

Table 3.3

Demographic details for the control subjects

Sl. No.	Age & Sex	Educa-tion	Mother tongue L1	Second Language L2	Other Language known	L2 acquisition Age and Mode
1.	28yrs/M	B.Com	Kannada*	English	Hindi (Rudimentary)	10 yrs, formal in school
2.	63yrs/M	B.A.	Kannada*	English	-	10 yrs, formal in school
3.	53 yrs/M	B.A.	Kannada*	English	-	10 yrs, formal in school
4.	63yrs/M	BA	Kannada*	English	Hindi (Rudimentary)	10 yrs, formal in school
5.	32 yrs/M	MA	Kannada*	English	-	10 yrs, formal in school
6.	53 yrs/M.	Ph.D	Kannada*	English*	Hindi, Bengali, Assamees	12 yrs, formal in school
7.	61 yrs/M	Diploma	Kannada*	English	-	11 yrs, formal in school

* Most frequently used language

TASKS AND TOOLS

For the study, the following tools were used:

1. A **QUESTIONNAIRE** for assessing the premorbid language usage and performance.

2. A CONFRONTATION NAMING TASK, on similar line to Boston Naming Test; with non standardised version; adapted to necessary modifications to suit Kannada-English situation.

3. A GENERATIVE NAMING TASK.

4 A RESPONSIVE NAMING TASK

They are described in detail below.

1. QUESTIONNAIRE

A questionnaire was developed to assess the patients premorbid language usage and performance. The questionnaire included history of bilingual language acquisition, usage pattern of the languages, premorbid efficiency in speaking reading and writing, frequency and type of code switching. Please refer to Appendix A for the actual questionnaire.

The information is the questionnaire was obtained from the patient if possible, or otherwise the nearest relative/informant.

Table 3.4 shows the details about the language usage and performance by the patients premorbidly.

Table 3.4

Language usage proflle of the patients

Sl. No.	Case Name	Age/Sex	Mother Tongue (L:l)	Second Language (L2)	Other Languages Known	Age of learning L2	Mode of learning L2	No. of Years of educa-tion in L2	Premorbid Proficiency of L1&L2	Most frequently used Langauge	Reading ability		Writing ability		Most prefered lang. by tlie Patient.
											L1	L2	L1	L2	
I	BR	28/M	Kannada	English	None	10 yrs	School (formal)	12 yrs.	L1>L2	Kannada					Kannada
II	JP	63/M	Kannada	English	None	11 yrs	School (formal)	10 yrs	L1 =L2	Kannada					Kannada
III	CS	53/M	Kannada	English	Urdu (rudimentary)	10 yrs	School (formal)	7 yrs.	L1 > L2	Kannada					Kannada
IV	NA	63/M	Kannada	English	None	10 yrs.	School (formal)	12 yrs.	L1>L2	Kaimada					Kannada
V	MJ	32/M	Kannada	English	None	10 yrs.	School (formal)	12 yrs	L1 >L2	Kannada					Kannada
VI	DS	53/M	Kannada	English	Tulu Hindi Konkani	12 yrs	School (formal)	20 yrs	L1 =L2	English					English Kannada
vII	BA	61/M	Kannada	English	Hindi (Rudimen-tary)	11 yrs	School (formal)	11 yrs	L1 =L2	Kannada					Kannada English

2. CONFRONTATION NAMING TASK

The original Boston Naming Test, developed by Goodglass and Kaplan, 1983 has 60 black-white line drawings. For each of these pictures an "incorrect" or "no response" is followed by a semantic cueing. If here too, an incorrect response is elicited, then a phonemic cue is given.

To overcome the cultural bias and suit the Kannada-English situation, the test material was adopted.

Selection of Target words

Here a set of 57 picturable words based on the familiarity of the words in the language were selected. Pictures were displayed on a 4" x 6" card. The pictures were unambiguous culture free black and white line drawings representing noun words.

57 words for the present test were selected from a list of 80 words which were administered to a normal population (5 individuals) to check for word familiarity. The pictures rated as ambiguous and too unfamiliar were eliminated from the test material. **Thus** the above material was used for the confrontation naming task. Please refer Appendix B for test stimuli.

Test administration

The following procedure was adopted for administration:

a) The patients were seated in a comfortable position and tested in a clinical setting.

b) They were shown the picture, one at a time and were asked to name them.

c) If a 'no response' was elicited in the first twenty seconds, a semantic cue was given. Eg: Target word: book, semantic cue - It is used for reading.

d) A "no response" or "incorrect response" following semantic cue was followed by a phonemic cue (first phonemie of the word). Eg: Target word : book, phonemic cue |b|

e) Instructions given to the patients were "I will show you a apicture and you have to name it".

Response and Scoring

The response were scored as either a correct response or an incorrect response. The correct responses were given a score of one and incorrect, a score of zero, correct response elicited with semantic cueing were given a score of one. A response elicited following phonemic cueing was not taken for scoring. (Please refer to Appendix B for scoring and Appendix C for response). The incorrect responses were categorised as any one of the following:

ERROR TYPE	DESCRIPTION
1. Phonemic errors	Responses which were approximations of the target words, with one or more of the phonemes in error. Eg: Smail for snail.
2. Extended circumlocution	Responses which were extended utterances related to the target words ("you use it to write.... It is straight....)" (Pen).
3. Semantic errors	Responses which were semantically related to the target word Eg: Chair for steel.
4. Neologism	Responses which were neither real words nor phonemic approximation of the target words. Eg: Stoploggist for boat.
5. Grammatical errors	Responses which deviated from normal only by alteration of the grammatical forms Eg: (girls for girl)
6. Half words	Responses that were half words or part word representation of the target. Eg: flo for flower.
7. Perseveration	Responses that were inappropriate repetitions of previous whole word utterance.

8.	Unrelated response	Responses which showed no obvious phonological or semantic resemblance to the target words. Eg: clothes for bus.
9.	Interference	Response in which the target word was named in some other language other than the tested language. Eg: for flower.
10.	No response	Responses wherein the patients failed to respond or stated their inability to respond.
11.	Gestures	Responses wherein gestures were used to describe the target word.

For the above task (confrontation naming), the mean latency and latency range were also measured.

Summary of Scores

1 Number of spontaneously given correct responses ____________________

2 Number of stimulus cues given ____________________________________

3 Number of correct responses following a stimulus cue ________________

4 Number of phonemic cues ____

5 Number of correct responses following the phonemic cue ___________

6 Total number correct (1 +3). ______________________________________

3. RESPONSIVE NAMING

Selection of items

20 single sentence questions were taken as stimuli, out of which five items were adapted from the WAB. The questions (or test items) were simple and unambigious question, eliciting a specific response (Please refer to Appendix D for stimuli).

Test administration

The procedure followed for test administration was,

a) The patients were seated comfortably in a clinical setting.

b) The patients were asked a question, and were given 30 seconds to answer. Following a correct response, or no response by 30 seconds, the next question was asked.

c) The instruction given was, "I want you to give one word responses for the questions I am going to ask". For example: "What do you drink milk from ?(glass/cup)"

Response and Scoring

The responses were scored as either correct responses or as in-correct responses. Correct responses were given a score of one, and incorrect/no response were given a score of zero. (Please refer to Appendix E for the responses)

The incorrect responses were categorised under the following errors namely;

1. Semantic errors
2. Phonemic errors
3. Neologisms
4. Grammatical and half word responses
5. Perseverations.
6. Gestural response.,
7. Interference.
8. No response.

Summary of scores

1. Number of spantaneously given correct responses____________

2. Total number of errors made __________________

4. GENERATIVE NAMING

Also otherwise referred to as category specific naming, was used to assess the difference in divergent semantic retrieval across 4 common semantic categories. The four categories taken for the study were: ANIMALS, FRUITS, VEGETABLES and VEHICLES.

Test Administration

The patients were seated comfortably and tested in a clinical setting. Subjects were given a time constraint of 1 minute (60 secs) to respond with as many members of a specific category as they could recall within the given time.

The instruction given to the patient was for animals want you to name as many different animals as you can within one minute. Any animal will do, they can be from the farm, the jungle, house, pets etc - 'Tor eg: dog, lion, cat etc."

Similar instructions with example were given for the other three categories namely; fruits, vehicles and vegetables.

Response and scoring

1. The number of items named under each category were taken down.
2. A score of one was given for every correct item named after elimianting repetition and perseveration errors as well as incorrect responses.
3. Incorrect responses were categorised under any one of the error types namely,
    - Perseveration
    - Category interference
    - Phonemic errors
    - Semantic errors
    - Neologism

- Half word response
- Unrelated word
- Interference

General Comments

Initially each subject (control and experimental) were asked a few routine questions before begining the test. Subjects were seated comfortably, in quite room. The experimental group were tested in a clinical setting and the control group was tested in the home enviornment. The tasks (confrontation naming, responsive naming and generative naming) were tested in both the languages i.e., Kannada and English.

First the testing was done in Kannada and then in English. The two languages were tested on two different days within a time interval of not more than 3 days.

While testing in Kannada all conversations and instructions were given only in Kannada and similarly in English for testing in English. It was strictly followed that only the language which was tested was used during testing.

The results were analysed and discussed in the next chapter.

CHAPTER 4

RESULTS AND DISCUSSION

The aim of the present study was to access the naming deficits in bilingual aphasics patients, using the profile of normal bilingual adults to compare them. Following the design of the test stimuli, it was administered to the two subject groups, i.e, normal and aphasics. The scores obtained on the three naming tasks in both languages (Kannada - English) were compiled and analysed. Qualitatively the results were analysed and statistically analysed to determine the difference in performance between normal and aphasics among naming task and between the two languages (Kannada and English)

RESULTS

The results of the study have been presented under the following sections:

I) History of Bilingualism,

II) Performance of the control group on the three naming tasks,

HI) Results of statistical analysis,

IV) a) Comparision of aphasic group versus the control group on the three naming tasks on Kannada and English,

b) Comparison of performance among different naming tasks in Kannada and English for the control and the aphasic,

c) Comparison of interferences,

V) Comparison of the aphasics performance between the three naming tasks in Kannada and English.

VI) A qualitative analysis of the three different aphasic groups for the three different naming tasks in Kannada and English.

Throughout this chapter Kannada will be referred to as LI or K and English as L2 or E. The results will be presented first and discussion will be in the latter part of the chapter.

(I) HISTORY OF BILINGUALISM

Before administering the test all subjects were interviewed using a questionnaire (see Appendix A) about their bilingualism. The details are presented in Table 3.4 for the aphasic subjects and Table 3.3 for the normal subjects.

(i) **BR:** He is a native speaker of Kannada.. He spoke Kannada at home and with friends. He learnt English in school at the age of ten years and had 12 years of formal education in English. He was a dramatist and used English only for formal official purposes. He rated better premorbid proficiency in Kannada. Though he could speak English, he reported to be more comfortable in Kannada.(See Table 3.4 for details)

(ii) **JP**: He is a native speaker of Kannada. He learnt English at the age of 11 years in school. He had ten years of formal education in English and was a retired school teacher. He used Kannada at home and with friends. He used to teach in English for primary school. He rated equal premorbid proficiency in both the languages (See Table 3.4 for details).

(iii) **CS:** He is a native speaker of Kannada. He learnt English in school at the age of ten years and had seven years of formal education in English. He used Kannada with friends and family members. He also had rudimentary knowledge in Urdu. He rated Kannada to be more proficient than English premoribidly, (See Table 3.4 for details).

(iv) **NA:** He is a native speaker of Kannada. He learnt English in school at the age of ten years and had 17 years of formal education in English. He was a social celebritiy and had a big social circle. He used Kannada and English with family members, friends and in official work. He used Kannada and English equally in social interaction but rated better premorbid proficiency in Kannada, (See Table 3.4 for details).

(v) MJ: He is a native speaker of Kannada. He learnt English in school at the age often years. He had 12 years of formal education in English. He was working as a clerk in a hospital. He used Kannada at home and with friends. He used English and Kannada at office. He rated Kannada to be more proficient premoribidly, (see Table 3.4 for details).

(vi) DS : He is a native speaker of Kannada and Tulu. He learnt English in school at 12 years of age. He had 20 years of formal education. He was a Professor in Engineering and used English exclusively in his workplace. He spoke English and Kannada with friends and family members. He also had knowledge of Konkani, Tulu and Hindi but hardly used them. He rated equal premorbid proficiency in Kannada and English, (see Table 3.4 for details).

(vii) **BA:** He is a native speaker of Kannada. He learnt English at school at age of 12 years and had 11 years of formal education in English. He also had little knowledge of Hindi.. He was working as a Tahsiidar and used English and Kannada for official purposes. He used Kannada at home and with friends, he rated equal premorbid proficiency in English and Kannada, (see Table 3.4 for details).

Comments : As could be seen from the discussion and Table 3.4, all the subjects were native speakers of Kannada. They learnt English as their second language in school around 10 to 12 years of age. All subjects could read write understand and speak both the languages. All the subjects rated Kannada to be more proficient premorbidly than English except JP, DS and BA, who rated equal proficiency in Kannada and English.

The control group were matched for age, sex, language usage, history of biliguaism and education.

//. PERFORMANCE OF THE CONTROL GROUP

The scores obtained by normal bilinguals on 3 naming tasks are presented in Table 4.1.

Table 4.1

Summary of Scores for the Control Group on Confrontation Naming (CN); Responsive Naming (RN) and Generative Naming (GN).

Sl. No.	Age/ Sex	Langu-age	Confrontation Naming			RN	Generative Naming			
			CR	I	NR		Animal	Veg.	Vehi.	Fruit
I	28/M	K E	57 50	0 5	0 2	20 20	25 16	13 6	12 13	10 4
II	63/M	K E	55 50	0 4	2 3	20 20	15 11	11 7	10 11	10 5

SI. No.	Age/ Sex	Langu-age	Confrontation Naming			RN	Generative Naming			
			CR	I	NR		Animal	Veg.	Vehi.	Fruit
III	53/M	K	55	0	2	20	18	15	13	9
		E	50	4	3	20	13	7	10	6
IV	63/M	K	52	4	1	20	16	11	8	10
		E	51	4	2	20	8	9	12	6
V	32/M	K	57	0	0	20	22	17	19	13
		E	57	0	0	20	15	12	25	5
VI	53/M	K	56	0	1	20	22	28	15	14
		E	57	0	0	20	20	12	18	14
VII	61/M	K	56	0	1	20	14	12	11	9
		E	48	3	6	20	14	6	11	5

CR:Correct response;I:Interference; NR:No response.

The control group was matched for age, sex, education, language usage and history for bilingualism. The performance of the group are presented below.

***Confrontation Naming Task*:**

The maximum number of correct responses was 57 (100%) in both the languages. The performance for all the subjects were better in L1 except subject VI whose L2 performance was better. The lowest score in L1 was 52 were as for L2 was 48. The errors were no responses or interferences. Except V and VI, all subject had interference in L2 from L1. This could be due to the proficient use of L2 by V and VI. Only IV had interference in L1 from L2 which could be due to greater use of L2. The error responses were more in L2.(See Table 4.1 for details).

Responsive Naming Task

All the subjects obtained a score of 20/20 (100%) in both the languages.

Generative Naming Task :

The maximum items were named in the category of animals in Kannada, followed by vegeTables, then vehicles and least were named in the category of fruits. For all subjects except VI, performance was better in L1 than L2. The performance for VI was comparable in both the languages (See Table 4.1 for details).

///. *RESULTS OF STATISTICAL ANALYSIS*

a) After the calculation of mean and standard deviations for correct responses on three naming tasks in two languages, the unpaired t-test was applied to find out if there was any significant difference between the normal and aphasics in Kannada and English (See Table 4.2)

For finding significant difference between the two language, the paired t-test was performed. The results for unpaired t-test are presented in Table 4.2 and 4.3 and paired t-test are present in Table 4.3.

Table 4.2

Comparison of performance for Normals and Aphasics.

Naming task	Lang.	Normal		Aphasic		Significant value obtained for test.
		$\bar{X}$	**SD**	$\bar{X}$	**SD**	
Confrontation Naming	K E	55.4 51.8	1.1 3.62	26.7 19	16.36 10.32	6.72* 4.78*
Responsive Naming	K E	20 20	0 0	11.4 *6.6*	5.6 3.3	5.62* 4.96*
Generative Naming	K E	14.4 10.7	3.3 3.8	1.3 1.8	1.81 0.88	5.14* 4.41*

' * ': Significant at 99 % level.

Expected value at 12 df was 2.18 at 0.05 level

3.08 at 0.01 level

$\bar{X}$:Mean

SD: Standard deviation.

Table 4.3

Results of T-test

Naming Task	Unpaired t-test		Pairec t-test	
	Normal Vs Aphasics in LI	Normal vs Aphasics inL2	LI VsL2 in Normals	LI Vs L2 in Aphasics
Confrontation Naming	6.72*	4.78*	2.66**	2.36**
Responsive Naming	5.62*	4.96*	0	1.94
Generative Naming	5.14*	4.41*	2.04	2.16

** Significant at 95% 1evel; * Significant at 99% level

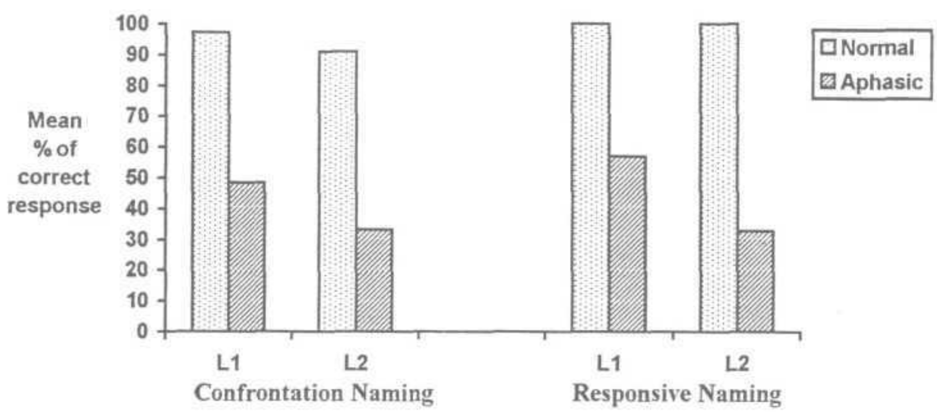


Fig: 4.1 Shows the mean percentage of correct responses for the normal control and aphasics for confrontation and resopnsive naming tasks in L1 and L2

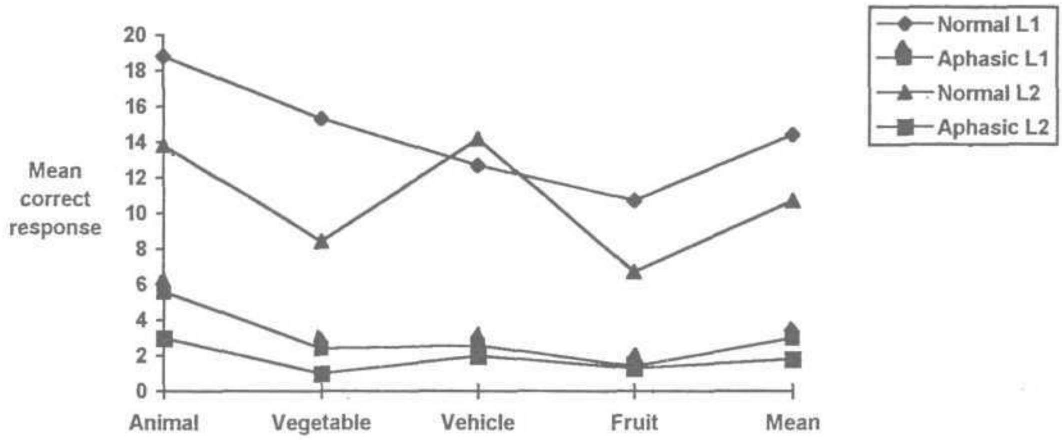


Fig : 4.2 Shows the mean correct responses on generative naming for the normals and the aphasic

The results of the unpaired t-test indicated that there was a significant difference in performance between the control and the aphasic in all the naming tasks, i.e., confrontation naming, responsive naming and generative naming across both the languages i.e., Kannada and English.

The results of the paird t-test indicated that there was a significant difference in performance between Kannada and English only for the confrontation naming. There was no significant difference in performance in the two languages for responsive naming and generative naming. The above results were true for the control as well as the aphasics.

b) For finding significant difference in performance among different naming task, the raw scores were converted to Z-scores for comparison. Following conversion to Z-score, t-test was performed and the results are presented in Table 4.4.

Table 4.4
Results of t-test among different naming tasks

GROUP \ TASK		CNvsRN	RNvsGN	GN vs CN
Normal	L1	0	0	1.52
	L2	0	0	0.02
Aphasic	L1	2.46*	1.72	1.15
	L2	1.78	0.03	0.18

* : Significant at 95% level, CN : Confrontation naming;
RN : Responsive naming; GN : Generative naming.

The results of the t-test indicated that, unlike the control group , in the aphasic group there was a significant difference between the performance on confrontation naming and responsive naming only in L1. There was no significant difference between performance on the confrontation naming and generative naming; and responsive naming and generative naming in L1. Further, there was no significant difference for the control and the aphasic between different naming task in L2.

c) Comparison of Interferences

The mean percentage of interlingual interferences, i.e., L1—>L2 and L2—>L1 for the subjects are presented in Table 4.5.

Table 4.5

Mean percentage of Interferences.

Task \ Group	NORMAL		APHASIC	
	L1-->L2	L2-->L1	L1-->L2	L2-->L1
Confrontation naming	4.9%	0%	19.5%	7.2%
Responsive naming	0%	0%	13.5%	2.8%

Bidirectional interferences (L1 —>L2 and L2—>L1) were observed among aphasics. The percentage of LI—>L2 interferences were more than L2—>L2 interferences. But for the normals only LI—>L2 interferences were observed in confrontation naming.

For finding significant difference among interferences in the two groups the Chi^2 test was performed. The results indicated no significant difference between LI—>L2 and L2—>L1 interferences in confrontation and responsive naming between normal and aphasics. The results are presented in table 4.6.

Table 4.6

Results of Chi^2 test for the percentage of interlingual interferences in confrontation naming and responsive naming between normal and aphasics.

Task	Interferences Normal Vs Aphasic
CN	1.69 NS
RN	0 NS

NS: Not significant.

IV PERFORMANCE OF DIFFERENT GROUPS OF APHASICS

The performance of different groups of aphasics; i.e., Broca's, anomic and conduction for different naming tasks are presented in Table 4.5.

Table 4.6'

Mean correct and percentage correct responses for different naming task among aphasic groups.

Task	L	BROCA'S	ANOMIC	CONDUCTION
CN	K	11.5(20.2%)	39.6 (69.5%)	14.5(25.4%)
	E	11.5(20.2%)	27.0(47.4%)	12(21.0%)
RN	K	10 (50%)	16.6(83.3%)	5 (25%)
	E	3(15%)	8.66(43.3%)	7(35.5%)
GN	K	1.25	5.1	1
	E	1.0.	4.4	0.37

CN: Confrontation naming: RN: Responsive naming;
GN : Generative naming

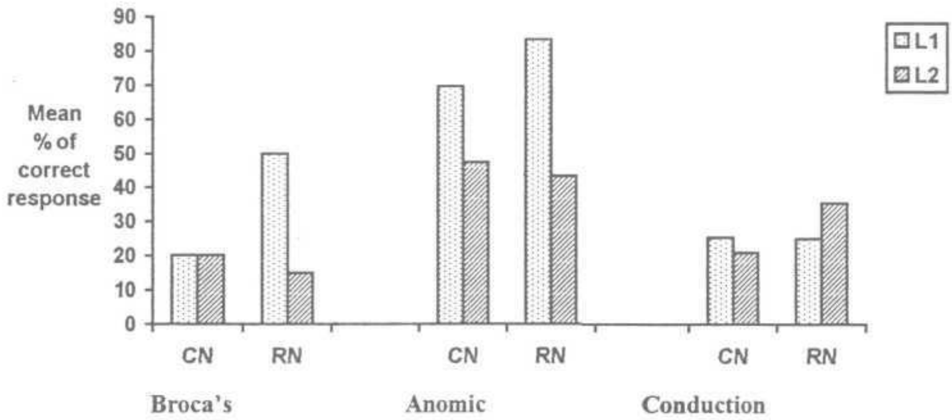


Fig: 4.3 a) Shows the mean percentage of correct response in two languages among confrontation naming(CN) and responsive naming (RN) for Broca's, Anomic and Conduction.

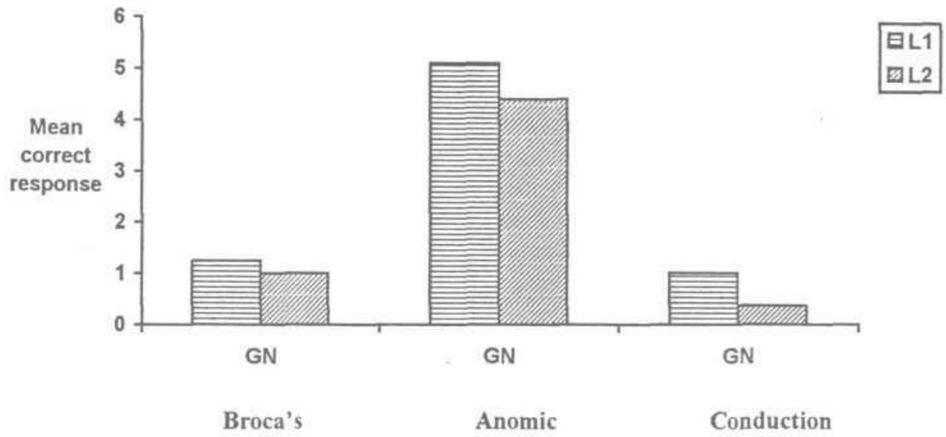


Fig.4.3 b) Shows the mean correct response for generative naming (GN) in two languages for Brocas, Anomic and conduction.

The performance of anomic aphasics were superior to that of the Broca's and conduction aphasics in all the three naming task across L1 and L2. This was followed by Broca's aphasic performing better in responsive naming in L1 and generative naming in L1 and L2. The performance of conduction aphasic was better than Broca's on confrontation naming for L1 and L2 and for responsive naming in L2 (See Fig. 4.3a and 4.3b).

V. QUALITATIVE ANALYSIS OF PERFORMANCE OF THREE APHASIC GROUPS

The performance of each aphasic susbject on the three naming tasks in Kannada & English are presented in the following tables.

The confrontation naming (CN) for the aphasic group are presented in following tables;

Table 4.7: Summary of scores for aphasics

Table 4.8 : Analysis of error responses

Table 4.9 : Analysis of response latencies.

The responsive naming (RN) for the aphasics has been analysed for correct responses and errors, which are presented in the following tables,

Table 4.10 : Number of correct and incorrect responses

Table 4.11 : Categorisation of error responses.

The results of generative naming (GN) are presented in the following tables;

Table 4.12 : Comparison with normal on different categories

Table 4.13 : Number of items named correctly by the aphasics

Table 4.14: Categorisation of errors.

Table 4.7
Summary of scores on confrontation naming for aphasics
(Total number of stimuli: 57 black-white line drawing)

Sl. No.	Case Name	Type of Aphasia	L	SCR (a)	SC (b)	CRSC (e)	PC (d)	CRPC (e)	TCR = (a)+(c)
I	BR	Broca's	K	10 17.5%	48 84.2%	2 4.1%	46 80.7%	12 26.1%	12 21%
			E	4 7%	53 93%	0	53	2 5.7%	4 7%
II	JP	Broca's	K	13 22.8%	44 77.1%	1 2.27%	43 75.4%	9 20.9%	14 24.5%
			E	19 33%	38 66.6%	0	38 66.6%	7 18.4%	19 55.5%
III	CS	Anomic	K	35 61.4%	22 38.6%	7 31.8%	15 26.1%	1 6.6%	42 73.6%
			E	26 45.6%	31 54.4%	2 6.4%	29 50.8%	5 77.2%	28 49.1%
IV	NA	Anomic	K	45 78.9%	12 21%	0	12 21%	1 5.5%	45 78.9%
			E	29 50.8%	28 49.1%	3 10.7%	25 43.8%	2 5%	32 56.1%
V	MJ	Anomic	K	39 68.4%	18 31.5%	4 22.2%	14 24.6%	1 7.7%	43 75.4%
			E	26 45.9%	31 54.4%	0	31 54.4%	2 6.4%	26 45.9%
VI	DS	Cond-uction	K	6 10.5%	53 92.9%	1 1.88%	52 57.2%	2 5.5%	7 12.2%
			E	9 15.8%	48 84.2%	0	48 84.2%	2 4.1%	9 45.6%
VII	BA	Cond-uction	K	23 40.3%	31 54.3%	1 5.2%	30 52.6%	2 6.6%	24 42.1%
			E	15 26.3%	42 73.6%	0	42 75.6%	2 4.76%	15 26.5%

Key to use the table
SCR: Spontaneously given correct response; SC: Semantic cues given; CRSC: Correct response following a semantic cue; PC: Phonemic cues given; CRPC: Correct response following phonemic cue; TCR: Total correct response; L: Language.

Table 4.8
Categorization of Responses on Confrontation naming

S1. No.	Name	Type of Aphasia	Langu-age	CR	ERROR RESPONSES										
					NR	PE	EC	SE	UR	NL	GE	PR	GR	CPC	I
I	BR	Broca's	K	12 *21%*	3 *5.3%*	7 *12.3%*	3 *5.3%*	5 *8.8%*	6 70.5%	8 *14%*	0	0	0	12 *21%*	1 7.7%
			E	4 *7%*	9 *15.8%*	1 *1.7%*	8 *14%*	0	1 *1.7%*	15 *26.3%*	1 7.7%	5 *8.8%*	4 *7.0%*	*2* *3.5%*	7 *12.3%*
II.	JP	Broca's	K	14 *24.6%*	4 *7%*	10 *17.5%*	0	6 70.5%	1 7.7%	*1* *12.3%*	4 *7.0%*	*2* *3.5%*	0	9 *15.8%*	0
			E	19 *33.3%*	16 *28%*	3 *5.3%*	0	3 *5.3%*	0	2 *3.5%*	4 *7.0%*	0	0	1 *1.7%*	1 *1.7%*
III	CS	Anomic	K	42 *73.7%*	3 *5.3%*	0	0	4 7.0%	1 /.7%	0	0	0	0	*5* *8.8%*	18 *31.6%*
			E	28 *49.1%*	1 *1.7%*	0	0	4 7.0%	1 7.7%	0	0	0	0	5 *8.8%*	18 *31.6%*
IV	NA	Anomic	K	45 *78.9%*	1 *1.7%*	5 *8.8%*	1 7.7%	2 1..5%	1 7.7%	1 *1.7%*	1 7.7%	0	0	0	0
			E	32 *56.1%*	0	*2* *3.5%*	0	10 77.5%	0	0	0	0	0	2 *3.5%*	9 *15.8%*
V	MJ	Anomic	K	43 *75.4%*	1 *1.7%*	0	0	4 *7%*	0	1 *1.7%*	0	0	0	8 *14%*	0
			E	26 *45.6%*	7 *12.3%*	2 *3.5%*	0	0	0	0	1 7.7%	0	0	2 *3.5%*	18 *31.6%*
VI	DS	Conduct -ion	K	6 10.5%	4 *7%*	0	4 7%	4 7%	5 *8.8%*	12 27%	0	0	0	2 *3.5%*	20 55.5%
			E	9 *15.8%*	16 *12.5%*	1 7.7%-	7 *12.3%*	6 *10.5%*	1 *1.7%*	3 *5.3%*	0	1 7.7%	4 7%	7 72.5%	2 5.5%
VII	BA	Conduct -ion	K	24 *42.1%*	1 *1.7%*	8 *14%*	0	6 70.5%	1 *1.7%*	*7* *12.3%*	0	0	1 *1.7%*	2 *3.5%*	7 72.5%
			E	15 *26.5%*	3 *5.3%*	3 5.5%	0	2 5.5%	I 7.3%	*6* *10.5%*	0	1 *1.7%*	3 5.5%	*2* *3.5%*	21 *37%*

Key to use trie tame:
CR: Correct responses; NR: No responses: PE: Phonemic errors; E: Extended circumlocution; SE: Semantic errors; UR: Unrelated errors; NT,: Neologisims; GE: dramatical errors or halfwords: PR: I'erseverations; GR: Gestural responses; I: Interference; E: English: K: Kannada.

Table 4.9

Analysis of response latencies

SI. No.	Subject	Type of Aphasia	Lang.	Latency range,(Seconds)	Mean latency (Seconds)
				Max - Min	
I	BR	Broca's	K	(6-1) =5	3
			E	(7-3) =4	5
II	JP	Broca's	K	(8-l) = 7	4.5
			E	(5-l) = 4	5
III	CS	Anomic	K	(11-2) = 9	2.8
			E	(13 -3) =10	3.5
IV	NA	Anomic	K	(15 - 1)= 14	3.5
			E	(15 - 2) =13	5
V	MJ	Anomic	K	(20 -3) =17	6.5
			E	(18 - 2)= 16	8
VI	DS	Conduction	K	(20-2) =18	17
			E	(15-3)=12	13.5
VII.	BA	Conduction	K	(10 - 3) = 7	6
			E	(15-2) =13	9

Table 4.10

Summary for Scores on Responsive Naming
(Total Number of Stimuli :20)

Sl. No.	Subject	Type of Aphasia	Lang.	Correct responses		Incorrect responses	
				N	%	N	%
I	BR	Broca's	K	8	*40*	12	*60*
			E	0	*0*	20	*100*
II	JP	Broca's	K	12	*60*	8	*40*
			E	6	*30*	14	*70*
in	CS	Anomic	K	14	*70*	7	*30*
			E	8	*40*	12	*60*
IV	NA	Anomic	K	19	*95*	1	*5*
			E	7	*35*	13	*65*
V	MJ	Anomic	K	17	*85*	3	*15*
			E	11	*55*	9	*45*
VI	DS	Conduction	K	4	*20*	16	*80*
			E	7	*35*	13	*65*
VII.	BA	Conduction	K	6	*30*	12	*70*
			E	7	*35*	13	*65*

Table 4.11
Categorisation of Responses on Responsive Naming

Sl. No	Sub-ject	Type of Aphasia	L	CR	ERROR RESPONSES							
					NR	UR	SE	PE	NL	HW	GR	I
I	BR	Broc-a's	K	8 40%	9 45%	2 10%	0	0	1 5%	2 10%	0	0
			E	0	19 95%	1 5%	0	0	0	9	0	0
II	JP	Broc-a's	K	12 60%	1 5%	2 10%	0	2 10%	1 5%	2 10%	0	0
			E	6 30%	6 30%	2 10%	0	1 5%	0	2 10%	0	15%
III	CS	Ano-mic	K	14 70%	15%	0	1 5%	0	1 5%	1 5%	9 45%	0
			E	8 40%	8 40%	0	3 15%	0	0	0	0	1 5%
IV	NA	Ano-mic	K	19 95%	1 5%	0	0	0	0	0	0	0
			E	7 35%	2 10%	0	0	0	0	0	0	11 55%
V.	MJ	Ano-mic	K	17 85%	2 10%	0	0	0	0	0	0	1 5%
			E	11 55%	7 35%	0	2 10%	0	0	0	0	0
VI	DS	Con-duc-tion	K	4 20%	4 20%	3 15%	2 10%	0	3 15%	0	4 20%	0
			E	1 35%	5 25%	1 5%	1 5%	0	0	0	6 30%	0
VII	BA	Con-duct-ion	K	6 30%	1 5%	0	1 5%	1 5%	4 20%	0	4 20%	3 15%
			E	7 35%	2 10%	1 5%	2 10%	0	3 15%	0	0	4 20%

Key to use the table:
CR: Correct response; NR: No response; UR: Unrelatred response; SE: Semantic errors; PE: Phonemic errors; NL: Neologions; HW: Half word response, GR: Gestural response, I: Interference.

Table 4.12
Comparison for the mean on generative naming in the normals and the aphasics.

GROUPS	L	Animal	Vegetable	Vehicle	Fruits	Mean (X)
NORMAL	K	18.8	15.3	12.7	10.7	14.4
	E	13.8	8.4	14.2	6.7	10.7
APHASIC	K	5.6	2.4	2.6	1.4	3
	E	3.0	1	2	1.3	1.8

Table 4.13
Number of items named correctly by the aphasics on Generative Naming

Sub	Subject	Type of Aphasia	Animal		Vegeta-ble		Vehicle		Fruit	
			K	E	K	E	K	E	K	E
I	BR	Broca's	4	0	0	0	0	0	0	0
II	P	Broca's	2	3	2	2	2	2	0	1
III	CS	Anomic	10	8	6	0	8	5	4	0
IV	NA	Anomic	11	3	8	5	8	4	5	7
V	MJ	Anomic	11	3	0	0	0	0	0	0
VI	DS	Conduction	0	1	0	0	0	0	0	0
VII	BA	Conduction	1	3	1	0	0	3	1	1

Table 4.14

Analysis of Error responses for the Generative Naming.

Sl. No.	Name	Categories	Type of Errors
1.	BR	Animal Vegetable	K: 2C, INL E:3I K: 2 NL, IVR.
2.	JP	Animal Vegetable Vehicle Fruits	K: 2PR, 1 PE E: 1PR. K: 1PE, 1 NL K: 1PR, 1PE, II K: 3UR
3.	CS:	Animal Vegetable Fruit	E: 2PR E: 31 K: 2PR E: 1PR, 1PE, 41
4.	NA:	Vehicle Fruits	E:1I K:1PR
5.	MJ:	Animal	K: 1PR
6.	DS:	Animal Vegetable Vehicle Fruit	K:3NL E:3I K:1SE, 4NL E:5I K: 4NL, II. E: 1PR, 2NL, 2NR, K: 4NL E: 1PR, 31
7.	BA:	Animal Vegetable Vehicle Fruit	K: 1SE, 21 E:1PR, INL, K: 2NL E: 1PE, INL K: 4I E: INL K: INL E: 2NL

Key to use the table:
CR: Correct response; NR: No response; UR: Unrelatred response; SE: Semantic errors; PE: Phonemic errors; NL: Neologions; IIW: Half word response, GR: Gestural response, I: Interference; CT:Category interference

A. BROCA'S APHASIC GROUP

This group included 2 Broca's aphasic, BR and JP of aged 28 years and 63 years respectively. Both exhibited aphasia following CVA.

For the three different naming tasks the following results were obtained.

I) **BR** - Tested one month post onset.

Confrontation Naming Task:

The responses are indicated in the Tables 4.7, 4.8 and 4.9. For LI number of correct responses given spontaneously was 10 (17.5%) and for L2 it was 4 (7%). With semantic cueing only 2 correct responses were elicited in L1 (i.e., 4.1%). With phonemic cueing correct responses were 26.1% of time in L1 (i.e., 12 correct responses) and 3.7% of time in L2 (i.e., 2 correct responses). Error analysis indicated that maximum errors were neologism in either languages but more in L2. In LI neologisms were followed by phonemic errors which was followed by semantic errors and unrelated errors. But in L2 neologisms were followed by no responses, then by extended circumlocution and then interferences from L1. Grammatical errors, perseverations and gestural responses were observed in L2 but not in LI. Interferences from LI—»L2 was for 12.3% of the times and for L2-»L1 was 1.7%. (see Table 4.8 for details). The mean latency of response was 3 seconds in LI and 5 seconds in L2.

Responsive Naming Task:

The scores are presented in Table 4.10. The number of correct responses in L1 was 8 (40%) while there were no correct responses in L2. Error analysis indicated maximum no responses (9 in L1 and 19 in L2) followed by unrelated errors (2 in L1 and 1 in L2). One neologism and 2 halfword errors were also observed in L1 (see Table 4.11).

Generative Naming Task:

The scores are presented in Table 4.13. Maximum correct items named were in the animal category in L1. Error analysis indicated, twice interference were observed and 1 neologism in L1. For L2, in the animal category, three items were named in LI. In the category of vegetables, 2 neologism and 1 unrelated response were observed while naming in L1. For vehicle and fruits no items were named.

ii) JP - Tested one and half months post onset.

Confrontation Naming Task:

The responses are indicated in the Table 4.7, 4.8 and 4.9. The number of correct responses given spontaneously were 13 (22.8%) in L1 and 19 (33.8%) in L2. With semantic cueing only one correct response was obtained (2.27%) only in L1. Following phonemic cueing 9 (20.9%) correct responses were obtained in L1 and 7 (18.4%) in L2. Error analysis indicated that maximum errors were phonemic errors followed by neologism and then semantic errors in L1. In L2 maximum errors were no responses followed by grammatical errors. Interferences were observed from L1—>L2 but not from L2—>L1. (See Table 4.8). The mean response latency was 4.5 seconds in L1 and 5 seconds in L2.

Responsive Naming Task:

The scores have been represented in Table 4.10. The number of correct responses were 12 (60%) and 6 (30%) in L1 and L2 respectively. Error analysis indicated that there were 2 unrelated errors, 2 phonemic errors and 2 halfwords in L1. There was only one neologism and 1 no response. In L2 maximum errors where of no responses (6) followed by 3 interference from L1 (see Table 4.11).

Generative Naming Task:

The scores are presented in Table 4.13. Except for the category of fruit 2 items were named correctly in each categories in L1. In L2 maximum items were named in animals followed by vegetable and vehicle. Error analysis indicated maximum phonemic errors (3), perseveration (3), and unrelated errors (3) in L1 followed by neologism (1) and interference (1) among different categories. In L2 only one perseveration was observed only in animals (Table 4.14).

The results of the two Broca's aphasic on the naming tasks indicated that performance was better for L1 than L2 (except for JP in confrontation naming). In confrontation naming phonemic cueing results in better performance than semantic cueing in L1 and L2. Semantic cueing only helped in L1. In L1 neologisms and phonemic errors were most common where as in L2 no responses, extended circumlocation and neologisms (for BR) were most common. Error anlysis of responsive naming indicated that unrelated words and neologisms as the most common errors in L1 where as no responses were most common in L2. The generative naming indicated that maximum items were named in animals. Category specific naming deficits were also seen in the first subject BR.

B. ANOMIC APHASIA GROUP

This group had 3 aphasics, CS ; NA and MJ aged 53 years, 63 years and 32 years respectively. All of them exhibited aphasia following stroke.

The performance of each of the anomic aphasics on different naming tasks are presented below.

I) **CS** - Tested two months post onset.

Confrontation Naming Task:

The responses are presented in the Tables, 4.7, 4.8 and 4.9. The number of spontaneously given correct responses were 35 (61.4%) in L1 and 26 (45.6%) in L2. Semantic cueing elicited 7 correct responses in L1 and 2 in L2. Phonemic cues elicited 5 correct responses in L2 where as only one in L1.

Error analysis indicated that maximum errors in L1 were semantic error (6), followed by no responses (3) and then neologism and grammatical errors (2 each). In L2 maximum errors were of interferences (18, 31.6%) from L1 followed by semantic errors (4, 7%) (Table 4.8). The mean latency of responses was 2.8 seconds in L1 and 3.5 seconds in L2.

Responsive Naming Task:

The number of correct responses were 14 (70%) in L1 and 8 (40%) in L2 (Table 4.10). Error analysis indicated maximum no responses, followed by semantic errors, neologisms and half word responses in L1. In L2 maximum errors were no responses (8, 40%) equivalent to correct responses, followed by 3 semantic errors and 1 interference (Table 4.11).

Generative Naming Task:

Table 4.13 presents the performance on generative naming. The maximum correct items named were in animal category for L1 and L2. Error analysis indicates types of errors in L1 were only perservations (2 in fruit). In L2 maximum errors were of inteferences (6 in vegetables, 3 in vehicles, 4 in fruits) followed by 3 perseverations and one phonemic errors. (Table 4.14)

ii) NA — Tested one and half months post onsett.

Confrontation Naming Task:

The responses are presented in Tables 4.7 ,4.8 and 4.9. The number of correct responses given spontaneously was 45 (78.9%) in L1 and 29 (50.8%) in L2. Semantic cueing did not have any effect on the responses in L1 but yielded 3 correct responses in L2. Phonemic cueing yielded 1 correct response in L1 and 2 in L2. Error analysis indicated that maximum errors in L1 were phonemic errors (5, 8.8%) followed by 2 semantic errors (3.5%). In L2 maximum errors were semantic errors (10, 17.5%) followed by 9 interferences (15.8%) from L1. (Table 4.8). The mean latency of responses was 3.5 seconds in L1and 5 seconds in L2 .

Responsivse Naming Task :

The number of correct responses were 19 (95%) in LI and 7 (35%) in L2 (Table 4.10). Error analysis indicated one no response in L1 and two in L2. In L2 maximum errors were interferences (11, 55%) from L1.

Generative Naming Task:

Table 4.13, gives the scores for the generative naming task. Maximum items were named in the animal category (11 items) in L1 where as in fruits (7 items) in L2, (see Tabale 4.14). Error analysis indicated that one perseverations in L1 in the category of fruits. In L2 there was only 1 interference in category of vehicles.

iii) MJ - Tested two months post onset.

Confrontation Naming Task:

The responses are presented in the Tables 4.7, 4.8 and 4.9. The spontaneously given correct responses in L1 were 39 (68.4%) and 26 (45.9%) in L2. Semantic cueing yielded 4 correct responses only in L1. Phonemic cueing was followed by one correct response in L1 and 2 in L2. Error analysis indicates that maximum errors were semantic errors (4.7%), followed by 1 no response and 1 neologism in L1. In L2 maximum errors were interferences (18, 31.6%) from L1, followed by 7 no responses (12.3%). The mean latency for L1 was 6.5 seconds and L2 was 8 seconds.

Responsive Naming Task:

The correct responses were 17 (85%) for L1 and 11 (55%) for L2 (Table 4.10). Error analysis indicated maximum of number of errors were no responses, 2 (10%) in L1 and 7 (35%) in L2. There was 1 interference in L1from L2. (Table 4.11).

Generative Naming Task:

The responses for generative naming indicated maximum responses in the animal category for L1 and L2 (Table 4.13). Error analysis indicated that a maximum error of one perseveration in L1.

The results of the three anomic aphasics on confrontation naming indicated a high percentage of correct responses in either languages as compared to other types of aphasics. Semantic cueing elicited correct responses in all the three aphasics (in L1and L2 for CS, in L2 for NA, in L1 for MJ). Phonemic cueing also elicited correct responses in all the three subjects in L1 and L2 but more in L2. On the responsive naming the performance were better than other aphasic groups and especially so in L1. The most frequent errors in responsive naming were no responses for L1 and L2. Interferences from L1 to L2 were also observed as a predominant error in one of the anomic. The generative naming indicated that like the Broca's aphasic group, maximum items named belonged to the animal category in L1 and L2. Category specific deficits in generataive naming were observed in MJ.

C) CONDUCTION APHASIC GROUP

This group included 2 conduction aphasics DS and BA of ageds 53 years and 61 years respectively. Both the subjects develooped aphasia following stroke.

I) DS : Tested one month post onset.

Confrontation Naming Task :

The responses for this task are presented in Tables 4.7, 4.8 and 4.9. The number of correct responses spontaneously given were 6 (10.5%) in L1 and 9 (15.8%) in L2. Semantic cueing resulted in one correct response only in L1. Phonemic cueing resulted in two correct responses in both the languages. Error analysis in L1 indicated that maximum errors were interferences (20, 35.1%) from L2, followed by 12 neologisms (21%), 6 no responses (10.5%), 5 unrelated errors (8.8%) and 4 (7%) each of phonemic errors, semantic errors and extended circumlocution. In L2 maximum errors were 16 no responses (28.1%), followed by 7 (12.3%) extended circumlocution, 6 (10.5%) semantic errors, 4 (7%) gestural responses and 2 (3.5%) interferences. One each of phonemic error, perseveration and unrelated errors were observed in L2 (see Table 4.8). The mean latency of response was 17 seconds in L1 and 13.5 seconds in L2.

Responsive Naming Task:

The number of correc t responses were 4 (20%) in L1 and 7 (35%) in L2. (Table 4.10). Error analysis (Table 4.11) indicated a maximum of 4 (20%) each of no respones and gestural response in L1, followed by 3 (15%) of unrelated and phonemic errors. In L2 maximum errors 6 (30%) were gestural responses followed by 5 (25%) no responses.

Generative Naming Task:

The scores for generative naming are presented in Table 4.13. Only one animal was named correctly in L2. Error analysis (Table 4.14) indicated that in L1 maximum types of errors were neologisms (3 in animals, 4 in vegetables, 4 in vehicles and 4 in fruits) followed by 1 interference in vehicle category. In L2 maximum errors were interferences (3 in animals, 5 in vehicles, and 3 in fruits) followed by 2 neologisms in vehicles.

ii) BA - Tested two and half months post onset. .

Confrontation Naming Task:

The scores are presented in Tables 4.7, 4.8 and 4.9. The spontaneously obtained correct responses were 23 (40.3%) in L1 and 15 (26.3%) in L2. Semantic cueing elicited two correct responses only in L1. Phonemic cueing elicited two correct responses in L1 and L2. (Table 4.7). Error analysis in L1 indicated maximum phonemic errors (8, 14%), followed by 7 (12.3%) of neologisms and interferences each. In L2 maximum errors were interferences (21, 37%) followed by 6 (10.5%) of neologisms (Table 4.8). The mean latency of responses was 6 seconds in L1 and 9 seconds in L2.

Responsivse Naming Task:

The maximum correct responses were 6 (30%) in L1 and 7 (35%) in L2 (Table 4.10). Error analysis indicated that a maximum of neologisms and gestural responses (4, 20%) each was obtained in L1, followed by 3 (15%) interferences. In L2 maximum errors were interferences 4 (20%) followed by neologisms (3. 15%) (Table 4.11).

Generative Naming Task:

The scores of this task are presented in Table 4.13. In L1, maximum of one item was named correctly in categories animal, vegetable and fruit. In L2 maximum items were named in category of animal and vehicle. Error analysis (Table 4.14) indicates that in L1 maximum errors were intereferences followed by neologisms. In L2 maximum errors were neologisms.

Thus, the conduction aphasic group performed poorer than Broca's and Anomics. However, there were a greater variability in the performance of the 2 subjects included in the conduction aphasic group. Maximum errors exhibited by both the subjects were neologisms in L1 as well as L2. Gestural responses were observed in both the aphasics which was not observed in any other aphasic (except for BR in L2). Maximum interferences were also observed in confrontation naming when compared with other aphasics.

The results described so far, indicated naming deficits in both the languages of bilingual aphasic patients across the three naming tasks,. The manifestations of these deficits were indicated in the specific error response patterns of various types.

DISCUSSION

/. *BILINGUALISM QUESTIONAIRE*

The information obtained from the bilingual questionnaire suggests that coordinate bilingualism in terms of language qcuisition is most likely for the subjects of this study. According to Lambert and Fillenbarm (1959), this would result in more neurologically separate neural structures, underlying the two languages relative to "compound" bilinguals who have acquired both languages in the same context. Accordingly the patients of the present study are likely to suffer more differential, rather than similar patterns of aphasic deficits in the two languages.

This prediction however, did not hold good for the patients of this study. Paradis (1977,1983) on careful survey of case studies argued that there is no particular relationship between the context of language acquisition and the pattern of aphasic deficits or recovery.

//. *a) COMPARISON OF PERFORMANCE BETWEEN NORMAL AND APHASICS*

The results of the statistical analysis revealed that all the aphasic patients performed significantly lower than the control group across all naming task in both the languages (Table 4.2). This is in support with literature wherein disturbance in naming have been found across aphasics (Goodglass and Baker, 1976; Williams and Canter

1982; 1987) and across all languages of bilingual/multilingual aphasics (Charlton, 1964; Nair and Virmain, 1973; Junque et al., 1989; 1995).

b) *COMPARISON OF PERFORMANCE BETWEEN THE TWO LANGUAGES*

There is no significant difference in performance between the two languages for responsive naming and generative naming in normals and aphasics (Table 4.4). Parallel deficits in the bilingual aphasics is the most commonly noted pattern of deficits (Charlton, 1964; Paradis, 1977; Whitaker, 1978;). But for the confrontation naming task there is significant difference between the two languages. This supports the fact that late bilinguals keep their two linguistic systems functionally distinct or segregated (Lambert, 1978; Vaid, 1984). Thus the differential impairment in confrontation naming and similar impairment in other two naming tasks raises the question whether the bilingual linguistic system for two languages are segregated or united especially in late bilinguals. Staide et al. (1995) and Junque et al. (1989, 1995), also reported no significant difference in oral naming tasks between the two languages for their patients.

In the above view, if we consider the structural distance hypothesis, by Paradis (1989; 1993), then it would be expected that structurally similar languages will tend to be impaired and recovered more equally; than the structurally different langauges which are more likely to be affected and recovered differentially. Kannada and English represents two structurally distant languages. But the results of the responsive naming and generative naming refute this stand. On the similar line, Minnouin (1995) reports a case of Arabic-French bilingual, where the same components in both the languages are affected though the two languages belong to two different families (Seimitic Vs Indo European). Considering the structural dissimilarity between Kannada and English it is most pronounced in syntactic rule system and much less in surface lexicon (eg: |bsu| in Kannada and |bs| in English for bus) or phonology. It is probable that brain damage has exaggrated a small difference in lexical processing competence that might have existed preonset (Sasanuma and Park, 1995) between Kannada and English.

Further, confrontation naming is a more complex task than responsive naming as more linguistic information are provided during responsive naming as the stimulus presentation are verbal questions. Despite the absence of statistical significance between the performance in two languages, the performance in Kannada (L1) is better than English (L2) for aphasics as well as normals. This better performance in the native language could be due to the strength of the language, greater numbers of years of exposure to the language and frequent usage of the native language than L2. The better performance in native language could also be explained by IA model of lexical retrieval (see Section 2.5) which supports that Kannada words will reach activation threshold more easily than English words.

The aphasic patients (DS, BA and JP) who rated their premorbid proficiency to be equal in L1 and L2 performed comparable or slightly better in L2. In L2, DS had better performance in all naming tasks, BA had better performance in generative and responsive naming and JP had better performance for confrontation and generative naming. Thus better performance in L2 for only three could be explained as dependent upon the premorbid language usage and fluency in L2.

c) COMPARISON OF DIFFERENT NAMING TASK

Between naming tasks it has been demonstrated that there is a significant difference between confrontation and responsive naming only in Kannada in aphasic group and not in the control group (Table 4.4). Except the above mentioned, there is no significant difference in performance among other naming tasks. The confrontation naming task is most complex and responsive naming least complex (i.e., order of complexity: confrontation naming > generative naming > responsive naming and hence could be the difference. This subtle difference in confrontation naming and responsive naming only in Kannada could be explained by separate lexical storage hypothesis for bilingual lexical memory (see section 2.7) or as an idiosycratic result obtained for the present study. The separate lexical store hypothesis could not be further substantiated by the results of this study as there is no significant difference in performance among other naming task in Kannada or English.

d) INTERFERENCES

Table 4.5 shows that more percentage of itnerferences in aphasic group than control and L1—>L2 interference are more frequent than L2—>L1. Absence of L2—>L1 interference in normal group suggested that normals are more efficient to deactivate the non selected language. The deactivation of non selected language is partially impaired in aphasics (Paradis 1989; Berg and Schade, 1992). Thus to deactivate one language may be extremely demanding and difficult and results in involuntary mixing (Clyne, 1980; Berg and Schade, 1992).

Further, less percentage of interferences in responsive naming suggests that the deactivation of the nonselected language is better when more linguistic input (in this case the verbal questions which are stimuliu) given in the other language i.e., the language which is been tested (Grosjean, 1989). In the confrontation naming the stimuli are line drawing as compared to responsive naming where the stimuli is the verbal stimuli. Verbal stimuli will have more linguistic information for a specific language as opposed to line drawing.

The bidirectional interferences supports the compound organisation of the bilingual lexicon (Weinreich 1953, Paradis 1978). This evidence is contradictory to the assumed coordinate organisation on the basis of history of bilingualism. In spite of bidirectional interference, L1—>L2 is more than L2 —>L1. This could be explained by Kroll and Stewart's (1994) model (see section 2.7) which proposes that the strength of lexicon to conceptual system is different for either languages. Thus fewer L2—>L1 interference indicates weaker link. This lexicon to conceptual link is also a function of fluency and age of acquisition of L2 (Kroll and Stewart, 1994). Since the aphasic subjects were moe fluent in L1, the above results are expected.

The Chi^2 test indicated no significant difference in interference between normal and aphasics. This could be explained by observation made by Nilipouri and Ashayeri (1988) stating that the pragmatic ability to be aware of what language the other partner is speaking rarely breaks down in aphasics. Obler, Eng and Canter (1995) retiterated that the ability to inhibit interference breakdown is extremely rare in apahsics. Thus interferences observed in L1->L2 or L2—>L1 must have also been observed in their normal state (as also supported by the control group). No significant difference in interlingual interferences are also supported by the study of Staide et al., (1995) and Kremin and Agostini (1995)).

More frequent interference in anomic suggests that when an anomic bilingual aphasic patient searches hard for a word in one language; he often comes up with the corresponding term in the other language. This finds support from the work of De Santi et al (1989).

III. ***a) Confrontation Naming***

The performance of anomic were superior to the performance of the Broca's and conduction apahsic group in both the languages. This could be because they tended to give correct responses for the familiar words. Further semantic cueing facilitated correct responses for anomics more thus leading to an overall improvement in total correct responses. The conduction group performed bettter than Broca's group, however much variability in the performance of the individual conduction aphasic was observed. This goes in accordance with literature, wherein Kertez (1980) reports high variability across conduction aphasics in naming task.

Cueing, both semantic and phonemic, had facilitatory effects on word retrieval abilities. This has been widely reported in literature by Podraza and Darely (1977); Pease and Goodglass (1978); Floward and Lisle (1984); Town and Banick (1989), Stimely and Noll (1991). Of the two types of cueing, phonemic cueing was more effective than semantic cueing in both L1 and L2 across all aphasics. But semantic cueing was more effective in L1 than L2. This supported the fact that common phonological assembly for both the languages as opined by Green (1986) and probably separate bilingual lexical memory as remarked by Potter et al., (1984). The above fact could also be explained by the Interactive Activation Model (see section 2.5) which support that phonemic node receives more activation. Phonemic cueing is more effective than semantic cueing was also observed by Hunter, Pindzola and Weiduer (1986).

Semantic cueing was most effective in anomic aphasic group followed by Broca's and conduction aphasic (Table 4.6). This better performance in anomic could be due to better comprehension in anomic than conduction. Thus they were able to process the semantic cue given; which is slightly impaired in Broca's and severely impaired in conduction. Phonemic cueing was most effective in Broca's aphasics followed by anomics and then conductions. Similar finding were also reported by Love and Webb (1977); Goodglass and Struss (1979), Li and Canter (1983).

Longer latency for retrieval in L2 supports the word association model by Potter et al., 1984. Accordingly L2 access is through L1, thus greater latency in L2.

If we consider Paradis (1985) three store model for bilingual lexicon storage which considers phonology and syntactic properties to be part of the lexical representation, the structurally apart languages would result in difference in performance, which was observed for this naming task but not in other types of naming in this study.

Error analysis indicates that Broca's aphasic had maximum phonemic errors followed by neologisms and semantic errors. Anomics made maximum phonemic errors and semantic errors while conduction aphasic made maximum of neologisms. These are the error patterns observed in L1. The different errors exhibited by aphasics receive support from Brown and Mc Neil (1966), Ackernat et al., (1976); Williams and Canter (1983, 1987), Staide et al, (1995).

In L2 most common errors observed among aphasics were no responses, neologisms and interferences. Staide et al, (1995) and Kremin and Agostini (1995) argued that the high percentage of no response could be explained by the patients inability to activate the L2 to elicit any kind of responses and for interference there might have been unability to deactivate the L1 completely. Since the apahsic subjects were not very fluent speaker of L2, increased no response might also indicate reduced L2 lexicon which might have been there in their premorbid level.

b) Responsive naming

On the whole, performance of the aphasics was better on responsive naming than confrontation naming in both L1 and L2. Such finding are reported by Zingesser and Berudt (1988) and Kremin et al. (1995). Improved performance could be attributed to less complexity of the task and facilitating effect of sentence (Zingesser and Berndt, 1988). Better performance in L1could be due to frequent usage and better premorbid proficiency.

Anomic group demonstrated best performance followed by the Broca's and the conduction. Poor performance of conduction could be due to comprehension deficits as well as greater severity in both the subjects as compared to other aphasics.

Error analysis indicated maximum number of no responses as errors in Broca's and Anomic groups and especially so in L2. For conduction aphasia group maximum errors were gestural responses which could be attributed to failure to integrate perceptual and functional information to elicit a verbal response (Whitehead, 1978).

///. *c) Generative Naming*

Anomic apahasics exhibited the best performance followed by Broca's and then conduction aphasics. In all aphasics maximum responses were observed in the category of animals and vehicles. For all aphasics performance better in L1 but the difference in performance in L1 and L2 was not significant. The number of items named under the category of vegeTable s and fruits were less probably indicating towards selective impairment of these categories. Sex and culture differences might have contributed to this variation but exact nature of the deficit was not explored. Category specific deficits were also observed in all types of aphasics in both the languages. This is in support with literature by Basso, Capitani and Laiacona (1988), Goodlgass et al., (1988), Warington, etal., (1989).

Error analysis indicated maximum phonemic errors in Broca's aphasics, preseveration in anomics and neologisms in conduction. While in L2 maximum types of errors were interferences and neologisms.

The above results establish the fact that naming deficits exist in all types of aphasia and across all languages. These deficits could be parallel or differntial in the different languages of the bilingual. The pattern of errors varies across different naming tasks among different aphasics in either language of the bilingual aphasics. However, generalisation would be difficult unless large samples of different types of aphasics are tested across the two languages.

CHAPTER 5

SUMMARY and CONCLUSIONS

The present study was undertaken to investigate the naming deficits in Kannada-English bilingual aphasics for three different naming tasks namely confrontation naming, responsive naming and generative naming; in comparison with a control group of normal adult Kannada-English bilinguals matched for age, sex, education and language background.

In the present study seven bilingual aphasics (two Broca's, three Anomics and two Conduction) and seven normal control subjects were included. They had Kannada(Ll) as their native language and had learnt English(L2) in school around the age of 10 years. Their performance on the 3 naming tasks, on both the languages were studied.

The results of the study revealed many interesting aspects.

1. The naming abilities of the normals were significantly better than the aphasics in both Kannada and English across all the naming tasks.

2. Parallel deficits were observed in Kannada and English for aphasics; except for confrontation naming. A similar pattern of performance was observed for the control group. Thus two naming tasks, namely responsive naming and generative naming, had similar performance in L1I and L2 whereas in confrontation naming differential impairment was observed. Task specific deficits were observed.

3. Although there was no statistically significant difference between L1 and L2 performance; the performance in L1 was better than L2. The better performance in the

native language could be due to the strength of the language, greater number of years of exposure and frequent usage of the native language.

4. The structural distance hypothesis (Paradis 1989; 1993) is supported by the results of confrontation naming and refuted by the results of responsive and generative naming. Thus only naming task is not enough to validate structural distance hypothesis.

5. Phonemic cueing was more effective than semantic cueing in both languages again suggesting common phonological assembly and probably separate lexical-semantic store for the two languages.

6. Increased latency in L2 supported the word association model of bilingual lexicon (Potter, et al, 1984) suggesting that L2 words may be are accessed through LI.

7. Anomic aphasics performance was best among the aphasic group followed by Broca's and then the conduction aphasics. The results are consistent with past Studies,

8. Bidirectional interferences were observed but a higher occurrence of LI —> L2 interference than L2 —>L1 suggested greater strength of L1 lexicon store. No significant difference was observed between the interferences between normals and aphasics, though a higher percentage of interferences were observed among the aphasics.

9 Coordinate versus compound bilingualism distinction could not be made on the basis of history of bilingualism, bidrectional interferences and pattern of errors. Thus age of acquistion of L2, usage pattern, naming deficits etc. is not enough to make adequate distinction between subtypes of bilingual individuals.

10. Specific errors were observed in L1 and L2 among different naming tasks. Frequent no responses and interferences in L2 again suggested the difficulty in activation of L2, which was less frequently used and inadequate deactivation of L1 during L2 task.

11. Individual variations were observed in performance in the two languages depending upon the premorbid fluency and usage.

Thus the above results give an insight into the lexical storage in bilinguals, error patterns among different aphasics, error patterns in the two languages in comparison with the normals.

LIMITTATIONS OF THE STUDY

1. Limited number of subjects
2. Subjects were only males. Therefore sex differences in performance could not be investigated.
3. All subtypes of aphasics could not be included.
4. No stringent distinction was made between coordinate and compound bilinguals while choosing the aphasic subjects.
5. Response latency was measured with a stop watch. Therefore finer differences in latency could not be noted.

SUGGESTIONS FOR FUTURE RESEARCH

In the view of the conflicting results in the past and present research in bilinguals, the following suggestions can be taken up for research;

1. Systematic study for the validation of structural distance hypothesis for different language tasks. For ex: Tamil-Telugu Vs Tamil-English or Tamil-Hindi, could be compared.
2. This study could be replicated with a larger sample population with adequate distinctions between subtypes of bilinguals,
3. Further, all subtypes of aphasics could be included.
4. A study inclusive of other naming tasks like association tasks and other translation tasks may yield interesting results about the brain-damaged bilingual lexical store.
5. A better measure latency and crecording of responses would give were detailed information.
6. Other language aspects could be studied besides naming.

Considering the Indian scenario where majority of the urban population is either bi/multilingual, future research on normal and abnormal aspects of bilingulism will not only informative and interesting but also beneficial for clinical assessment as well as intervention.

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APPENDIX A

QUESTIONNAIRE TO ASSESS THE PATIENTS PREMORBID LANGUAGE USAGE AND LANGUAGE BACKGROUND

Name : . . . . Age/Sex . . . .

Informant: . . . .

1. Which languages do you speak ?
2. a) What is your mother tongue (L1)?

   b) As a child which languages did you speak most at:

   i. Home

   ii. School

   iii. With friends

   iv. Community

1. Which languages did your;

   (i) Parents, (ii) Caretaker, speak ?

4. What was your medium of instruction in school?
5. Did you have formal instruction in any other language ?
6. How many years of education have you received and in what languages ?
7. What is the age of acquisition of L2 ?
8. What is the mode of acquisition of L2 (whether it is formal in school or in natural setting in home)?
9. What is the relative degree of proficiency in each language premobidly ? Choices; L1 = L2; Ll> L2; LKL2
10. Order the rate of proficiency in different languages you know?

    Most proficient————> Least proficient

I1. What was the premorbid pattern of language usage ?

	Home	Neighbours	Office	Friends.
L1				
L2				
L3				

12. Can you estimate the frequency and type of code switching premorbidly ?

13. Premorbid abilities in each language in following modes;

	L1I	L2	L3..............
Understanding			
Speaking			
Reading			
Wrting			

14. Frequency of written communication in each language premorbidly ?

15. What is the most prefered language for use premorbidly ?

Note: In the above questions, L1 is referred to the mother tongue, L2 is referred to the second language or the most used language next to mother tongue.

APPENDIX B

SCORING SHEET FOR CONFRONTATION NAMING

Name: **Age/Sex:** **Time of Testing:**

Type of Aphasia: **Language of Testing:**

				With Semantic cue		With Phonemic cue	
S. No.	PICTURE STIMULI (Semanti Cues)	Correct with out cue	Latency Secs	Correct	Incorrect	Correct	Incorrect
I.	FLOWER (Offering to God)						
2.	PENCIL (Use for Writing)						
3.	HOUSE(Kind of building)						
4.	BED(A piece of furniture)						
5.	Book (Used for reading)						
6.	WINDOW (Seen in a room)						
7.	WHISTLE (Makes sound)						
8.	COMB (Used for fixing hair)						
9.	BUS (a vehicle)						
10.	BAT (used for plaving)						
11.	FLUTE (musical instrument)						
12.	HORSE (used for riding)						
13.	BRINJAL (Purple vegetable)						
14.	TRAIN (Runs on rail)						
15.	EAR (used for hearing)						
16.	BOAT (Used in water)						
17.	SHIRT (men's clothing)						
18.	EYES (We see with it)						
19.	FROCK (young girls wear)						
20.	TREE (gives us wood)						
21.	SCISSORS (used for cutting)						

				With Semantic cue		With Phonemic cue	
S. No.	PICTURE STIMULI (Semanti Cues)	Correct with out cue	Latency Secs	Correct	Incorrect	Correct	Incorrect
22.	CACTUS (Plant of deserts)						
23.	RANGOLI (Drawn in house)						
24.	COMPASS (For drawing)						
25.	WALL (found in building)						
26.	TORTOISE (animal with shell)						
27.	SOCKS (Worn on feet)						
28.	BICYCLE (Has two wheels)						
29.	CAMEL (a desert animal)						
30.	WHEELCHAIR (seen in hospitals)						
31.	TABLA (a musical instrument)						
32.	STETHSCOPE (used bv doctors)						
33.	SNAKE (a poisonous animal)						
34.	SAW (used by carpenters)						
35.	RHINOCEROS (a wild animal)						
36.	CROCODILE (a dangerous animal)						
37.	GARLAND (made of flower)						
38.	PEACOCK (a bird that dances)						
39.	APPLE (a fruit)						
40.	PLATE (used for keeping food)						
41.	BROOM (used for cleaning)						
42.	GRAPES (a fruit in bunches)						
43.	CLOCK (tells the time)						
44.	AEROPLANE (flies in air)						
45.	ARROW (used with a bow)						
46.	TAP(seen in bath room)						
47.	LEG (used for walking)						
48.	Pen (used for writing)						
49.	FISH						

				With Semantic cue		With Phonemic cue	
S. No.	PICTURE STIMULI (Semanti Cues)	Correct with out cue	Latency Secs	Correct	Incorrect	Correct	Incorrect
	(found in water)						
50.	PILLAR (seen in building)						
51.	LAMP (gives us light)						
52.	GARLIC (a vegetable)						
53.	GLOBE (used in geography)						
54.	PARROT (a bird)						
55.	SOAP (used while bathing)						
56.	BRUSH (used for cleaning teeth)						
57.	PROTACTOR (used for drawing angles)						

NOTE;

1. The description in the brackets in the column second are the semantic cues given.
2. The responses are transcribed in International Phonetic Alphabet (IPA) .

APPENDIX C

RESPONSE SHEET FOR CONFRONTATION NAMING

Name: **Age/Sex:**

Type of Aphasia:

S. No.	STIMULI	Target response in English	Obtained response in English	Target Response in Kannada	Obtained response in Kannada
1.	FLOWER	flavər		hu:vu	
2.	PENCIL	pɛncil		pɛncilu	
3.	HOUSE	hæu:s		manɛ	
4.	BED	bɛd		mantʃə	
5.	BOOK	buk		pustəkə	
6.	WINDOW	vindo		kitəki	
7.	WHISTLE	visil		si:ti	
8.	COMB	ko:mb		ba:tʃanige	
9.	BUS	bəs		bəsu	
10.	BAT	bɛt		bɛtu	
11.	FLUTE	flu:t		kollu	
12.	HORSE	hɔrs		kudure	
13.	BRINJAL	brɪndʒəl		badənekai	
14.	TRAIN	trən		rɛlu	
15.	EAR	ijar		kivi	
16.	BOAT	bo:t		do:ni	
17.	SHIRT	sərt		ʃərtu	
18.	EYES	ais		kənnu	
19.	FROCK	frɔk		frɔku	
20.	TREE	tri:		mərə	
21.	SCISSOR	si:dʒər		kətri	
22.	CACTUS	kæktəs		pa:pa:ʃukali	
23.	RANGOLI	rəŋgo:li		rəngo:li	
24.	COMPASS	kɔmpəs		kaimərə	
25.	BRICKWALL	brikvɔl		go:de	
26.	TORTOISE	tɔrtɔ:is		a:mɛ	
27.	SOCKS	sɔ:ks		ka:ltʃi:la	
28.	BICYCLE	bjsjkəl		sjkəlu	
29.	CAMEL	kæməl		onte	
30.	WHEEL CHAIR	vi:ltʃɛr		vi:ltʃɛru	
31.	TABLA	təblə		təblə	
32.	STETHESCOPE	stɛthɛsko:p		stɛthɛsko:pu	
33.	SNAKE	snɛk		ha:vu	
34.	SAW	sɔ		gərə:gəsə	
35.	RHINOCEROS	renosərəs		gɛndəmrigə	
36.	CROCODILE	krə:kodjl		mo:sələ	
37.	GARLAND	gə:rlɛnd		hə:rə	
38.	PEACOCK	pi:kɔk		nəvilu	
39.	APPLE	æpəl		se:bu	
40.	PLATE	plɛt		plɛtu/tatɛ	
41.	BROOM	bru:m		pərkɛ	
42.	GRAPES	grɛps		drakʃi	
43.	CLOCK	klɔk		gadija:rə	

S. No.	STIMULI	Target response in English	Obtained response in English	Target Response in Kannada	Obtained response in Kannada
44.	AEROPLANE	ɛroplɛ:n		vima:nə	
45.	ARROW	ɛro		ba:ṇə	
46.	TAP	tɛp		nʌḷḷi	
47.	LEG	lɛg		ka:ḷu	
48.	PEN	pɛn		pɛnu	
49.	FISH	fiʃ		mi:nu	
50.	PILLAR	piḷər		kəmbə	
51.	LAMP	lɛmp		di:pə	
52.	GARLIC	ga:rlik		bɛḷuḷi	
53.	GLOBE	glo:b		bʰu:məṇḍələ	
54.	PARROT	pɛrɛt		giṇi	
55.	SOAP	so:p		sa:bunu	
56.	BRUSH	brəʃ		brəʃu	
57.	PROTRACTOR	protrəktər		ko:nəmapəkə	

Note: The responses are transcribed in International Phonetic Alphabet (IPA)

KEY FOR RESPONSE ANALYSIS

1. Correct response with/without cues : :
2. No response :NR
3. Phonemic erros :PE
4. Semantic errors :SE
5. Circumlocution :C
6. Unrelated responses :UR
7. Grammatical error/Half word :G/H
8. Perseveration :PR
9. Gestural response :GE
10. Interference

APPENDIX D

STIMULI FOR RESPONSIVE NAMING

Name:. . . . . Age/Sex: . . . . . .

Type of Aphasia:. . . . . Language of Testing: . .

Sl.No.	STIMULI QUESTIONS
1.	What is color is grass ?
2.	What tells you time ?
3.	What do you hear with ?
4.	What do you write with ?
5.	What do you smell with ?
6.	What do you wear when you are feeling cold ?
7.	What color is milk ?
8.	How many days are there in a week ?
9.	Where do doctors work ?
10.	What do you do with a pencil ?
11.	What do we cut paper with ?
12.	What color is apple ?
13.	What you cut vegetables with ?
14.	Where do you sleep on ?
15.	What do you use when it rains ?
16.	Which ornament do you wear on your finger ?
17.	Where do you cook in ?
18.	Where do you eat from ?
19.	Where do cars move ?
20.	What do you wear on your foot ?

Note: The responses obtained in English and Kannada were transcribed in JPA.

APPENDIX E

RESPONSE SHEET FOR RESPONSIVE NAMING

Name: Age/Sex

Type of Aphasia

Following table is the IPA transcription of the responses.

S. No.	Target response in English	Obtained response in English	Target Response in Kannada	Obtained response in Kannada
1.	gri:n		həsiru	
2.	kʎɔk/vɔtʃ		gadijə:rə	
3.	ijər		kivi	
4.	pɛn/pɛnsiʎ		pɛnu/pɛnsilu	
5.	nɒ:s		mu:gu	
6.	svɛtər		svɛtəru	
7.	vəjt		biʎi	
8.	sɛvɛn		ɛʎu	
9.	hɔspitəl		ə:spətrɛ	
10.	rəjt/drɔ		bərəjo:du	
11.	si:dʒər/nəif		katəri/tʃə:ku	
12.	rɛd		kɛmbu	
13.	nəif		tʃə:ku	
14.	bɛd		mantʃə	
15.	əmbrellə		kodɛ	
16.	riŋg		uŋgurə	
17.	vɛsəl		pə:trə	
18.	plɛt		tətɛ/plɛtu	
19.	ro:d		rəstɛ	
20.	ʃu:		ʃu:/tʃəpəli	

Total number of correct response: ________________

KEY FOR RESPONSE ANALYSIS

1. Correct response :
2. No response :NR
3. Phonemic erros :PE
4 Semantic errors :SE
Circumlocution :C
Unrelated responses :UR
Grammatical error/Half word :G/H
Perseveration :PR
Gestural response :GE
Interference : I