

**CODE MIXING AND CODE SWITCHING IN HINDI- ENGLISH  
BILINGUAL APHASICS**

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A Dissertation Submitted in part fulfillment of  
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ALL INDIA INSTITUTE OF SPEECH AND HEARING  
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**MAY-2006**

*Dedicated to*

*My family for their unending love and support*

*and*

*my guide*

*who always nourished my life with the power of knowledge*

## **CERTIFICATE**

This is to certify that this dissertation entitled "**CODE MIXING AND CODE SWITCHING IN HINDI-ENGLISH BILINGUAL APHASICS**" is the bonafide work in part fulfillment for the degree of master of (Speech Language Pathology) of the student with Register No. L048001 1. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore  
May, 2006



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## **CERTIFICATE**

This is to certify that the dissertation entitled "**CODE MIXING AND CODE SWITCHING IN HINDI-ENGLISH BILINGUAL APHASICS**" has been carried out under my supervision and guidance. It is also certified that this has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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## **DECLARATION**

I here by declare that this Dissertation entitled "**CODE MIXING AND CODE SWITCHING IN HINDI-ENGLISH BILINGUAL APHASICS** " is the result of my own study and has not been submitted earlier in any other University for the award of any Diploma or Degree.

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## INTRODUCTION

Bilingualism is an integral product of globalization and social mobility. Statistics reveal an increase in this phenomenon all over the world. India has been a multilingual country right from earliest times and now English bilingualism has become an integral part of India's consciousness.

Code mixing, code switching and interlanguage borrowing are bilingual phenomena, which occur because of interaction of two or more languages. Code mixing has been described as intrasentential and code switching as intersentential mixing where as in borrowing a lexical item from one language get integrated into another language (Bhatia and Ritchie, 1996).

All bilingual aphasics show some sort of deficit in each of their languages. Some of the major deficits that can be seen in bilingual aphasics are inappropriate code switching, code mixing and borrowing.

Code mixing refers to the mixing of various linguistic units (morphemes, words, modifiers, phrases, clauses and sentences) primarily from two participating grammatical system within a sentence and code switching is seen across sentences.

Code mixing and code switching has also been reported to be present in bilingual aphasics (Albert & Obler, 1978; Krupa, 2002; Munoz, Marquardt & Copeland, 1999; Paradis, 1977; Sapna Bhat, 2004). Language mixing is a frequently observed recovery pattern among bilingual aphasics characterized by alternating

language use at the word or sentence level, spontaneous translation , unexpected language switches and /or linguistic interference at different linguistic levels (Junque, Vendrell, Vendrell-Bruet & Tobena 1989; Paradis 1995).

### **Need for the study**

In spite of being a multilingual country, only limited studies have been carried out on code mixing and switching in bilingual aphasics in India. Krupa (2002) investigated code switching in Malayalam English bilingual and Sapna Bhat (2004) investigated code mixing and code switching in Kannada English bilingual aphasics (both Malyalam and Kannada are Dravidian Bilinguals).

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Majority of studies dealing with bilingual aphasics and language mixing have been carried out in Western countries. Their findings cannot be expected to hold good for all the language communities. So there is a need to study language mixing (code mixing and code switching) in bilingual aphasics in Indian scenario. The present study attempted to explore the same among Hindi speakers.

According to Encyclopedia of Hindi, Hindi is the second most spoken language in the world after Chinese. 500 million people speak Hindi in India and abroad and total number of people who can understand the language may be 800 million.

According to 1997 survey, 66% of all Indian can speak Hindi. It is a predominant language in the states Himachal Pradesh, Hariyana, Uttar Pradesh, Rajasthan, Madhya Pradesh, Bihar, cities like Bombay , Chandigarh and Hyderabad.

## **1.2 Aims of the study**

- a) Comparison of type and extent of code mixing and code switching in normal and aphasic bilingual adults.
- b) Investigation into similarities and differences between code mixing and code switching seen in bilingual aphasics and post morbidly.
- c) To describe in detail the type and level of code mixing and code switching evidenced in bilingual aphasics using matrix language frame model (Myres-Scotton,1993) and Perelman's (Perelman, 1984) levels of code mixing and code switching.
- d) Comparison of effects of contexts (monolingual Hindi, monolingual English and bilingual) on code mixing and code switching.

## REVIEW

### 2.1. A Bilingualism: Introduction

Bilingualism is a widely prevalent phenomenon and has been defined and described in terms of categories, scales, dimension and dichotomies. These notions are generally related to such factor as proficiency, functional, psychological and social interaction etc. All the above refer to different dimensions of bilingualism and bilinguals. Thus it is indeed, very difficult to define bilingualism in a manner encompassing all the aspects.

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

- a) If language is the property of the group, bilingualism is the property of an individual.
- b) An individual's use of two languages presupposes the existence of two different language communities; it need not necessarily presuppose the existence of a bilingual community.
- c) Bilingualism is not a phenomenon of language but characteristics of its use.
- d) Bilingualism is viewed as contact between cultures and social groups. Viewed in this manner, bilingualism is defined as the ability, on the part of the individual, to express himself in a second language, adhering faithfully to concepts and structures which are appropriate to this purpose, instead of paraphrasing something expressed in his native language.

- e) Bilingualism is viewed as something relative, since the point at which the speaker of a second language becomes bilingual is entirely arbitrary or impossible to determine.

## **2.1. B Definition of bilingualism**

There are as many definitions of bilingualism as researchers in the field. Different researchers have their own theoretical and methodological perspective with specific problems, contexts and bilingual population at hand.

Webster's dictionary, (1961) defined a bilingual as having or using two languages especially as spoken with the fluency characteristics of a native speaker; a person using two language habitually; with control like that of a native speaker and bilingualism as the constant oral use of two languages. Bloomfield (1933) defined bilingualism as "native like control of two languages" where as according to Haugen (1950), the bilingualism begins when the speaker of one language can produce complete meaningful utterances in the other languages.

Diebold, (1961) however gives a minimal definition of bilingualism when he uses the term "incipient bilingualism" to characterize the initial stages of contact between the two languages. Thus any positive knowledge of the written language or any contact with a second language and the ability to use it in the environment of the native language was considered bilingualism by Diebold, On the other hand Mac Narmara, (1967) proposed that bilingual is any one who possesses a minimal



competence in any one of the four language skills: listening comprehension, speaking, reading and writing in a language other than his mother tongue.

Broadest definition of a bilingual includes any one who knows two languages. Fishman, (1972) suggested that balanced bilinguals are rarely found in language communities. That is because bilinguals rarely maintain equal competence in all language skill areas in both of their languages. A functional or holistic view of bilingualism takes into consideration those individuals who learn and use each of their languages for different purposes and in different communication contexts. From the functional perspective, then it becomes important to ask why the languages were acquired, how they were acquired, whom they were acquired with and how they were used. Thus, the level of fluency in a language depends on the need for and use of a particular language in a particular situation or context.

Hammers, (1981) defined bilinguality as the physiological state of an individual who has access to more than one linguistic code as a means of social communication, the degree of access will vary along a number of dimensions which are psychological, cognitive, psycholinguistic, social psychological, social, sociological, sociolinguistic, sociocultural and linguistic.

Some researchers describe bilinguals as individuals with native like competence in second language where as others limit it to minimal proficiency, above definition suggests that the concept of bilingualism does not seem to be as simple as one would think. Paradis (1986) like Hamers, (1981) suggested that bilinguality

should be defined on a multi dimensional continuum, considering only linguistic structure and language skills.

Reasons for becoming bilingual varies from individual to individual. Valdés, Fallis and Figuera, (1994) discussed the importance of accounting for different types of bilinguals. Elective bilinguals are typically those individuals who choose to become bilinguals and acquire a second language through course work or study abroad programs. These individuals' bilingualism is self-initiated. Often the individual does not have naturally occurring language contexts in which the second language can be used. They view bilingualism as falling on a situational continuum. They proposed that exposure to a particular language affects the development of two languages. As exposure to L2 (second language) increase, the bilingual is represented as balanced in two languages. Other set of bilinguals is forced to learn a second language due to environmental or other motivations and usually have readily available contexts for language use.

Grosjean, (1982, 1998) defined bilingual are individuals who use more than one language to communicate on a regular basis. Grosjean, (1997) defined bilingual using "complementarily principle" that emphasizes the functionality of the language. This is also termed as the holistic or functional view of bilingualism. Grosjean, (1989) delineated different ways in which bilingualism has been viewed. Two views of bilingualism are; the monolingual or functional view which holds that the bilingual is (or should be) two monolinguals in one person, and the bilingual or holistic view

which states that coexistence of two languages in the bilingual has produced a unique and specific speaker - hearer.

A bilingual (or holistic) view of bilingualism proposes that the bilingual is an integrated whole which cannot be easily decomposed into two separate parts. The coexistence and constant interaction of two languages in a bilingual has produced different but complete linguistic entity. 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 two languages are usually quite different the bilingual is rarely equally or completely fluent in his two language. Levels of fluency in a language will depend on the need for that language and will be domain specific. Thus bilingual's communicative competence cannot be evaluated through only one language; it must be studied instead through the bilinguals total language repertoire as it is used in his or her everyday life.

Another important factor to be considered is knowledge of more than two languages or multilingualism. Most of the times term bilingualism encompasses knowledge of more than two languages and most of the researchers use the two terms synonymously (Paradis, 1986). In this study also the term bilinguals is used for anyone who knows two or more than two languages. Albert and Obler, (1978) and Paradis, (1997) that there is no difference in cerebral organization of bilinguals and multilinguals.

There is no widely accepted definition or measure of bilingualism as has been evident from the above discussion. It is very difficult to arrive at a definition that

encompasses all the skills and dimensions of bilinguals. Thus, it is difficult to objectively define a standard or a level of knowledge of language in order to characterize someone as a bilingual without making the concept of bilingualism too narrow or too broad to be useful. The rich range of characteristics of bilinguals found in the research literature scales, categories and dichotomies confirm the claim that criteria for bilingual / multilingual evaluation are far more severe than these for monolinguals. This discussion about definitions is very relevant in view of any study on bilingualism as operational definitions and methodological constraints are normally based on these.

### **2.3 Prevalence of bilingualism**

From the global perspective, most of the world's speech communities use more than one language and are therefore multilingual rather than monolingual and are therefore multilingual rather than homogeneous. According to de Bot, (1992) majority of world's population is bilingual.

Bilingualism in India is different in comparison to Western countries. The gross root bilingualism in India is not to be confused with the situation generally existing in some parts of the western world. According to Ferguson, (1968) the majority of bilingualism persistent in Western world is constituted of the acculturating immigrant and his off springs, the westernizing native, the struggling foreign language student, the downtrodden but dedicated minority group patriot. Because of the fact that in Western countries researchers are primarily based on these a typical bilinguals,

it has been found that there are many delusions about bilingualism still prevalent which are not very valid in Indian context. India has been a multilingual country right from earliest times and English bilingualism has become an integral part of modern Indian consciousness and thus present a different picture. According to 1991 census, the national average of bilingualism in India is 19.44%

## **2.4 Types of bilinguals**

**All** the description of bilingualism try to point out to different types of bilinguals. Thus for each of the definition of bilingualism, a type can be suggested.

### *Compound and coordinate*

A very popular dichotomy since Weinreich's reference to this in 1953.

Compound bilinguals learn both their language in same contexts or learn the second language through translation. They attribute identical meaning to corresponding words and expressions in their two languages. Coordinates bilinguals are thought to be those who have acquired two languages in different contexts and are thus better able to keep both languages apart. They derive different or partially different meaning from words in two languages.

### *Simultaneous and successive acquisition of two languages*

This distinction is purely based on the way in which languages are acquired. An ideal bilingual is one who grows up with two languages, i.e. a child who is given all opportunities to learn two languages simultaneously in a perfectly natural way. In

a contrasting situation, one language is established first and a second language is introduced after the first has been fully or partially acquired or established which result in successive acquisition.

#### *Dominant and non - dominate bilingualism*

A dominant bilingual is one who knows one language better than the other and non-dominant bilingual knows and uses both languages equally well. An ideal bilingual is not a reality and usually bilinguals tends to be more proficient in one language than the other, the dominant language predominates most of the language functions.

#### *Second language acquisition and second language learning*

Second language acquisition refers to the acquisition of a second language in the natural environment without formal instruction. In the second language learning, a formal learning situation prevails consisting of feedback, error correction and rule learning. There is also an artificial linguistic environment specifically created. Many people have both types of experience: acquiring the language through daily contact with native speaker and learning a language through formal instructions.

### **2.5. Language Organization in normal bilingual brain**

First hypothesis advanced in past by many neurologist suggests that all languages known by a bilingual are localized in the same cerebral areas. Sigmund Freud (as cited in Paradis, 1995) claimed that languages other than the mother tongue

are obviously localized in the same areas that are known to be the centers sub serving the mother tongue. In his important study on aphasia in polyglots, Pitres (as cited in Paradis, 1995) too claimed that it is not necessary to presuppose the existence of separate centers sub serving different language sets.

Scoresby, Jackson (as cited in Paradis, 1977) put forth a very different view. In their opinion if Broca's area was responsible for the acquisition of the mother tongue, each newly acquired language implies the formation of a new center that develops in the anterior portions of Broca's area. Potzl (as cited in Albert and Obler, 1978) however proposed that bilinguals develop specialized neuroanatomical centers. He argued that bilinguals have specific linguistic behavior patterns such as capacity to select a language, the capacity to switch from language to language, the capacity of translate etc.

According to their opinion, left supramarginal gyrus, an area of parietal lobe, controls these verbal behavior patterns in particular selection and switching, Paradis (2000) in his review of work done in bilingualism suggested that there is no substantial difference between monolinguals and polyglots at a linguistic level. The mechanisms sub serving the use of different linguistic registers and the switching from register to register in monolinguals is similar to the mechanism sub serving the use of different languages and the switching from language to language in polyglots thus concluded that there is no need to specify different systems to account for language switching in bilinguals.

Adler (as cited in Paradis, 1995) claimed that distinct cerebral cells sub serve different languages that can also be called as distinct neural circuit hypothesis. Finally, a fifth hypothesis (Fabbro, 1999) has been put forward whereby language is organized partly in common areas and partly in specific and separate areas of the brain. Numerous scholars support this hypothesis.

One major controversy is whether bilinguals possess neural mechanisms of a nature different from those possessed by unilinguals. Some authors assume language organization to be qualitatively different in bilinguals whereas others assume that no mechanism exist in a bilingual that is not already operative in unilinguals and that cerebral organization in bilinguals does not qualitatively differ from that in unilinguals. Bilinguals are thus viewed as making use of the same cerebral mechanism available to unilinguals, but to different extents in order to compensate for gaps in their linguistic competence by relying more heavily on the other available system like pragmatics (Paradis, 2001 b).

## **2.6 Bilingual phenomenon of code switching and code mixing**

Code switching is the alternative use by bilinguals or two or more languages in the same conversation (Milroy and Muysken, 1995). Code switching is a linguistic practice constrained by grammatical principles and shaped by environmental, social and personal influences including age, length of time in a country, educational background, and social networks (Milroy and Wei, 1995). According to Bhatia and Ritchie, (1996) code switching refers to mixing of various linguistic units (words



phrases, clauses and sentences) primarily from two participating grammatical system across sentence boundaries within a speech event. In other words, code switching is intersentential and may be subject to some discourse principles. It is motivated by social and psychological motivations.

Cod mixing on the other hand refers to the mixing of various linguistic units (morphemes, words, modifiers, phrases, clauses and sentences) primarily from two participating, grammatical system within a sentences) primarily from two participating, grammatical system within a sentence. In other words, code mixing is intrasentential, constrained by grammatical principles and may be motivated by socio psychological motivations (Bhatia and Ritchie 1996).

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Kachru (as cited in Hammers and Blanc, 2000) re fers to code mixing as use of one or more language for consistent transfer of linguistic units from one language into another, and by such a language mixture developing a restricted or not so restricted code of linguistic interactions. He does not make a distinction between code mixing and code switching but goes on to explain that code mixing differs from borrowing in terms of degree and motivation. Usually borrowing occurs at the lexical level is typically unidirectional. Code mixing is possible at various grammatical levels and may produce hybridized constructions because of bi -directional mixing.

The distinction between code mixing and code switching is controversial with some schools doubting the usefulness of the distinction, and others finding it important and useful. In an actual discourse, the interaction between code mixing and

code switching often becomes so complex and fused that it is quite difficult to draw a clear line between them (Bhatia and Ritchie, 1996).

## **2.7 Code mixing and code switching in normal bilingualism**

Although the phenomenon of code mixing and code switching is probably as old as bilingualism, its significance has tended to be undermined in traditional research on bilingualism. The earlier view was that an ideal bilingual would be able to keep two of his languages separate and distinct. However, as language contact is inevitable there has been considerable interest over the years into this topic to assess real-life proficiencies of bilingual speakers.

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One of the earliest and the fundamental study was by Weinreich, (1953). He introduced the concept of "interference" and discussed the phenomenon of interference, switching and transfer in the second language acquisition and use. He classified bilinguals in type A, B and C based on the way in which two languages are learnt and processed and these are similar to classification of compound, coordinate and subordinate bilinguals. Alexander, (1976) investigated Serbo -Croatian language speakers in San Pedro and distinguished two kinds of switching.

- a. "Clean" switching where there is an alternate use of two codes with no adaptation of the terms of one to the other system, it was often marked by pauses, introductory or transfer words and is often restricted to contexts such as citation.

- b. "Ragged" switching where there is adoption of one code to the other in which English lexemes or entire phrases are introduced into a Serbo-Croatian discourse in their original English form. These unassimilated loans were usually marked by a pause or some physical gesture.

Bloom and Gumperz, (1982), discussed the switching between the standard Bokmal and the dialect Ranmal that is seen to take place in relatively isolated towns in Northern Norway. Ranmal enjoys greater prestige in the community and in general native dialects of Norway are regarded as an integral part of one's family background and sign of one's social identity. In their everyday interaction, speakers select one or the other as the situation demands but they are never mixed. Since the speakers control both the varieties, the authors hypothesize that two dialects are not mixed as they communicate different social values and ideas. In conclusion, author defines a "situational" switching where alteration between varieties is dependent on the situation it involves change in the participants and/or strategies. On the other hand is, "metaphorical switching" where alternation enriches the situation and allows for a relaxing of social relationships of the participants.

Some other studies went into further details of factors that can affect the code mixing and code switching. Clyne, (1967) claimed that switching may be conditioned by internal (or linguistic) factors or by external ones such as the environment, the presence of a speech partner with whom the informant prefers to converse in the other language, or the topic. He explained that code switching is a variety of triggering which is preceded by hesitation, pause or a trigger-word that indicates triggering. According to him, triggering can be conditioned due to personal emotive factors and

even phonological factors such as when there are instances of phonemic similarity in the two languages. Recently this view has been discontinued as switching takes place with relative smoothness in normal bilinguals.

Code mixing and code switching was thought to convey speaker's inability to access information in the base language. Valdes-Fallis, (1976) found that code switching did not occur because the informant lacked equivalent expression in the base language chosen. Her study put forth two conclusions:

- a. The bilingual has a double stock of rhetorical devices of which he takes full advantage to emphasize and dramatize his speech.
- b. The regularity of the patterns of switching shows to what degree two languages are welded into a kind of super-system, with a bilingual vocabulary, a composite stock of structures and a phonic system not identical with that of either of the two languages. Thus, switching patterns seem to be influenced by the particular proficiency of the speakers and their preference for one or the other of the two languages or for a blend of the two codes.

Gumperz, (1964) collected code switching data from three linguistically and socially distinct situations: Slovenian/German, Hindi/ English and Spanish/English. He came to an opposite view about relation between code switching and conversational situation. He argued that in many cases it is the choice of code itself in a particular context that determines the situation. The syntactic constraints affecting code switching, according to him are:

- a. The length of the phrase, the shorter the phrase the less likely the switch,

- b. Sequential unity, discontinued sequences cannot be switched.
- c. Semantic and pragmatic unity, idiomatic units cannot be broken as conjunctions with the phrases, they conjoin.
- d. The total number of switches within any message subunit cannot be more than one.

In all the above language pairs, it has been found that pronoun -verb sequences are more unitary and cannot be switched when compared with noun-verb sequences. In addition, the study agrees with previous studies in the conclusion that switching does not necessarily indicate an imperfect knowledge of grammatical system in question.

Kolers, (1968) took a different view and hypothesized that what is stored in short-term memory is not a word in a particular language but a concept or meaning. His hypothesis was based on results of the experiment in which bilingual French /English subjects were tested in reading and talking tasks. Passages were prepared in unilingual, alternating and mixed-language forms. The subjects were tested for comprehension, to read aloud, to make precis, and to speak freely in these forms. Comprehension was found to be unaffected by the linguistic form of a message, but other tasks decreased by 20-40% when a mixed test was articulated. He suggested that encoding and decoding of two languages are not symmetrical operations and one could get contradictory results in these.

Discussing the theoretical aspects of code switching, Lipski, (1977) separates interference between languages into three general categories, the substratum,

superstratum and adstratum modes. The first involves lexical interferences, i.e., borrowings of entire words or phrases. The second includes phonological interference such as the transfer of sounds or sound patterns. The third covers syntactic interference involving the formation of words and phrases, the transference of patterns of word formation from the language to another, and the shift in meaning of partial and false cognate forms.

Discussing bilingualism from a psycholinguistic point of view, MacNamara, (1967) stated that switching takes an observable time and that differences in switching time do not appear to be related to the degree of bilingualism. It was observed that in normal discourse, bilinguals switched without pausing to have to recourse to their other language for a word or a phrase etc. he suggests that such a bilingual has the capacity to reallocate the L2 system, carry out the semantic encoding, the selection of words and the syntactic organization more or less mechanically producing in L1 material that has already been prepared for production.

In a paper titled "towards a linguistic analysis of registeral features", Verma, (1969) made an assumption that everyone controls a number of roles and that one is able to switch automatically from a "restricted" to an "elaborated" code and vice-versa depending on the situation. He claimed that language varieties are constrained by the mode of discourse that is situationally conditioned with register and style providing a two-dimensional matrix within which it is possible to operate in a bilingual situation. He discussed these aspects with respect to Hindi-English bilinguals where he points out that Hindi speakers use phonological and grammatical patterns of Hindi with lexical

borrowing from English. He also concluded that intra and interlanguage switching are sociolinguistic universals and the switchers use English words and expression even when equivalents exist in Hindi.

Vaid, (1980) discussed the form and functions of code mixing evident in Indian firms with reference to mixing of Hindi and English. She elaborated on the role of English in India and its fast growing impact. In pragmatic terms, English provides the expansion of roles, a hierarchy of roles and the mobility to perform the roles at the state level as well as at national level. In attitudinal terms, it has prestige function and provides in-group membership and thus, use of Indian English has resulted in linguistic elitism and super-linguistic caste. She gave examples of different types of code mixing in Hindi English from seven Hindi films she described examples of unit insertions, idiom and collocation insertion, inflection attachment and re duplication. An examination of her data revealed that English is "mixed" with Hindi most commonly by the young, the westernized, the powerful and the educated and user, context of usage determines code mixing. There are typical contexts like greetings, office setting, educational setting and social gatherings where English is mixed more frequently.

i

Pathak, (1982) studied code mixing in Hindi-English bilinguals and suggested that it follows certain well-defined processes and strategies. Certain structural types were seen to occur frequently in the conversation like unit insertion, unit hybridization, clause insertion, idioms and collocations insertion, inflectional attachment and reduplication. The phonological and semantic aspects of code switching have also been discussed with clear examples. The phonological

modifications affecting English lexical items go even beyond and are seen to operate at suprasegmental level. Thus code-mixing occurs at all levels ranging from single lexical items to entire clauses.

Bhat and Changappa, (2002, 2003,) looked into aspects of code mixing and code switching in normal Hindi-English and Kannada-English bilinguals. A conversational analysis was carried out using Matrix-language frame (MLF, Myers-Scotton, 1993). All the four constituents of MLF were found in the samples of all subjects. However, the frequency of these changed depending on the context. Instances of code switching were maximum in the bilingual context and least in the monolingual English context that could be attributed to language mode of the speakers. Morphological mixing considered as a deficit earlier was evident in both the sets of normal bilingual subjects suggesting that morphological mixing is common across English and Indian languages. MLF appeared as valid tool to categorize as all the instances of code mixing and code switching in Hindi -English as well as Kannada-English bilinguals could be explained using this framework. They concluded that code mixing and code switching serve important functions and are a part of bilingual repertoire of these two speech communities.

Earlier code switching was considered as a random phenomenon but the view point has changed now as search is on for universal constraints, which can explain code switching and code mixing.



## **2.8 Constraints on code mixing and code switching.**

The cursory look at data containing code mixing and code switching might tempt one to think that almost any kind of constituent or grammatical category can be mixed with a sentence: bound morphemes, lexical items, phrases, clauses, idioms and so on. The view of the grammar of code mixing and code switching as strange and random because outmoded, when in the late 1970's and early 1980's attempts were made to capture grammatical constraints on code mixing and code switching.

Competing theoretical framework attempt to establish universal rules to explain grammatical constraints for allowable intrasentential and intersentential code switching. Following is an account of general syntactic constraints on code mixing and code switching and they are among the most widely cited in the literature.

### *The equivalence constraint*

According to Poplack, (1980) code switches tend to occur at points in discourse where the juxtapositioning of LI and L2 elements does not violate syntactic rules of either language (i.e., at points around which the surface structures of two language map on to each other).

The equivalence constraint (EC) implies that code mixing and code switching can take place only at positions common to both languages and dissimilar points will not yield mixing. For instance, Spanish and English differ from each other in terms of the placement of adjectives within a noun phrase (i.e., in Spanish the adjective is

positioned after the noun). However, they share similar behavior with reference to the noun and determiner (i.e., the determiner precedes the noun). The equivalence constraint predicts that mixing will be permissible between noun and determiner, whereas it will be blocked between noun and adjective.

Consider the example of Hindi-English mixing the phrase structure rule of the noun phrase (NP) of English and Hindi are identical (i.e., NP (Det) (Adg.) N). This will predict mixing between Hindi and English at the NP level should be free.

## I

- a) The old man
- b) The bu:ra:man
- c) The bu:ra:a:dmi:

## II

- a) Vobu:ra:a:dmi:
- b) Vo old a:dmi:
- c) Vo old man

"That old man"

The comparison of I (a-c) and II (a-c) shows that although IIb and IIc allow mixing with English in the adjectival and nominal positions, the English translational equivalent of II do not permit Hindi mixing in these two positions. The underlying source of ungrammaticality of Ib and Ic is apparently the Hindi lacks articles. To fill

the gap created by the absence of English articles in Hindi, the Hindi speaking bilingual will employ one of the two strategies either the demonstrative pronoun "vo" that is used instead of the article or the definite article is dropped as in the code mixed phrase "old a:dmi:" The result thus produced is totally well formed and seems to obey equivalence constraint.

But there have been several counter examples cited in the literature where equivalence constraint has not been able to predict the kind of code switching produced in several language pairs (Myers-Scoton, 1993; Romaine, 1989) pointed out that one of the shortcomings of the equivalence constraint was that it overlooked the absence of a neat mapping of grammatical categories cross-linguistically. This mismatch of categories is responsible for the ungrammaticality of mixed utterances and thus there are many violations of equivalence constraint. Bhatia and Ritchie, (1996) further argued that even if equivalence constraint is met in a language pair, the positions of numerals, function words and negative markers in either language are usually not among the potential sites of mixing. Nautey, (1982) gave numerous counter-examples to this constraint between English and Adanme, a western Kwa language spoken in southern Ghana.

#### *The free morpheme constraint (FMC)*

According to this constraint, a switch may occur between a bound morpheme and a lexical form unless the latter has been phonologically integrated into the language of the bound morpheme (Sankoff & Poplack, 1981).

The free morpheme constraint states that a speaker may switch codes after any constituent that is not a bound morpheme. This constraint has some parallels with the size of constituent constraint. It is intended to account for the ill-formedness of expressions such as "run-eando". The Spanish-bound morpheme-eando violates the restriction against the mixing of a bound morpheme from two different languages.

This constraint is also violated in some code switching examples, especially in languages with agglutinative elements (such as Bantu and Arabic) and non-agglutinative languages (such as Hind). Backus (as cited in Myers-Scotton & Jake, 2000) found violation of this constraint in Turkish-Dutch code switching where Turkish affixes were attached to Dutch stems. Bhat and Chengappa, (2003) reported violations of FMC in code switching data collected from Kannada-English and Hindi-English bilinguals in terms of frequent morphological mixing.

#### *The clitic pronoun constraint*

Clitic pronoun objects are realized in the same language as the verb to which they are cliticized and the position required by the syntactic rule of that language (Pfaff, 1979). Some of the utterances, which would be judged as grammatically correct using other constraints, may be ruled out according to this principle.

Bhatia and Ritchie, (1996) discussed one such example. As both English and Spanish are SVO, one would predict by equivalence constraint that mixing would be possible in verb and object position and even in the subject position. The clitic pronoun constraint rules out sentences such as the following.

English-Spanish

She sees lo him

"She sees him"

*The Dual Structure Principle*

Sridhar and Sridhar, (1980) proposed this principle to account for some code switched utterances produced in Kannada-English. It states that the internal structure of the guest (embedded constituent) need not conform to the constituent structure rules of host (matrix) language, so long as its placement in the host language obeys the rules of host language.

Ex: Kannada-English:

a. "nanna abhiprayadalli his visiting her at home sariyalla"

My opinion in his visiting her at home appropriate not.

In my opinion, his visiting her at home is not appropriate.

b. "avanu aval annu mancyalli noduvedu"

He her home in visiting his visiting her at home

English and Kannada differ in case markers, English follow OV order and Kannada VO, locative is preposition in English and post position in Kannada, and the adverbial phrase (at home) follows object in English but it precedes in Kannada. But the fact that position of the English phrase in the matrix Kannada sentence (a)

corresponds to that of (b) in an unmixed version of Kannada sentence (a) is sufficient to make (a) well formed.

Dual structure principle incorrectly predicts the grammaticality of the sentences that result from substituting the English verb phrase in matrix language as in Punjabi-English code switching (Pandharipande, 1990).

#### *The closed class constraint*

This is a very simple constraint by proposed by Joshi (1985), which stated that closed class items (e.g., determiners, quantifiers, prepositions, possessive markers, auxiliaries, tense, helping verb etc.) could not be switched. Although it is observationally accurate for a wide class of cases, the closed class constraint carries less explanatory power than previous constraints. Myers-Scotton and Jake (2000) questioned the basic predictions about how word or lexical categories are distributed in open and closed class categories.

#### *The government constraint*

Disciullo, Muysken and Singh, (1986) attempted to capture the constraints on code mixing in terms of Government constraint formulated in terms of government binding (GB) theory. The Government constraint is noteworthy on two grounds. First the assignment of language indices results from the process of lexical insertion and not from the phrase structure (PS) rules and second the phenomenon of syntactic integration is explained by an underlying principle that is valid not just for code mixing or for a single language but for linguistic structure in general and for all

languages. It predicts that because a verb governs its complement clauses, direct and indirect objects and complement pre and postpositional phrases, they must be in the same language as the verb and similarly for the other major categories.

Government theory has been able to predict a lot of code switched constructions but has also failed to explain some of English -Hindi complex formations (Bhatia, 1989).

#### *Matrix language frame model (MLF)*

Myers-Scotton, (1993) proposed a comprehensive hypothesis about code mixing and code switching. Unlike the proposals considered until this point, this model is grounded in research on linguistic performance research on sentence production. This is an alternate model to predict acceptable intersentential code switching based on the linguistic function served by each language in a bilingual interaction. This model identifies grammatical relationships and constraints related to the dominant and subordinate role of each language, rather than specific rules. As is specifically discussed by Myers-Scotton and Jake, (1995) code switching depends on cognitively based operations of an abstract nature and this model tries to appreciate the role of the mental lexicon as connecting a theory of grammar with language production and processing.

The first distinction, ML (matrix language) Vs EL (embedded language), determines the structural outcomes in bilingual production. The ML or matrix language supplies the morphosyntactic frame for the bilingual interactions and EL or

embedded language can provide singly occurring content elements or full constituents called EL Islands.

The MLF model consists of four major hypotheses. First, the ML hypothesis is concerned with the form of ML + EL constituents. The MLH has two general implications: The morpheme-order principle and the system morpheme principle.

i) Matrix language hypothesis (MLH)

As an early step in constructing ML + EL constituents, the ML provides the morphosyntactic frame of ML +EL constituents.

ii) The morpheme-order principle (MOP)

Morpheme order (in ML + EL constituents) must not violate ML morpheme order of the ML.

iii) The system morpheme principle (SMP)

All syntactically relevant system morphemes must come from the ML.

A part from this, Myers-Scotton provides three additional hypotheses: one (the blocking hypothesis) is designed to strengthen the SMP and the other two (the EL Island trigger hypothesis and the EL implicational hierarchy hypothesis) to account for the occurrence of EL Islands.

iv) The Blocking Hypothesis

In ML + EL constituents, a blocking filter blocks any EL content morpheme that is not congruent with the ML. According to this model, there are three types of



system morphemes. They are described using the principle of activation at higher cognitive level.

v) The EL Island trigger Hypothesis

Whenever EL lexemes appear which are not permitted under either the ML hypothesis or the blocking hypothesis, the constituent containing it must be an obligatory EL Island.

vi) The EL implicational hierarchy analysis

Optional EL Islands occur, generally, they are only those constituents that are either formulaic or idiomatic or peripheral to the main grammatical arguments of the sentence. With respect to the blocking hypothesis, an EL content morpheme is not congruent with the ML when 1) It represents a given grammatical category that is realized by a system morpheme in the ML. 2) It differs from an ML content morpheme counterpart in terms of thematic role assignment; or 3) It differs from its counterpart with respect to discourse or pragmatic functions.

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The ML hypothesis claims that it is the grammar of the ML that functions in the calculation of the frame for an utterance. The EL may or may not contribute to lexical retrieval; if it does the result is a code-mixed utterance.

The distinction of content Vs system morphemes is very different as considered by the proponents of MLF. Content morphemes are specified as (+ thematic role assigners / receivers). Content morphemes either assign or receive;

thematic roles, whereas system morphemes do not. Verbs are prototypical content morphemes that assign thematic roles and nouns are prototypical receivers of thematic roles. Adjectives are content morphemes. The question of thematic role assignment is language specific as the mapping of thematic roles onto surface morphemes varies across languages and the above data is true for English.

The original constituents of MLF model include four categories having their basis in the hierarchical relationship between the matrix and embedded language. The first category, ML Islands, consists of utterances or clauses containing only ML lexemes structured around the morpho syntax of the ML. The second category, ML shifts identifies changes in ML between utterances or clauses. The EL is inserted into the ML to form the constituents of EL Islands and ML + EL. The constituents in the third category, EL Islands, are multiword EL elements (comprised of at least two words exhibiting a hierarchical structure) that follow the syntactic structure of the EL. The fourth category consists of ML + EL constituents, which are comprised of single EL elements inserted within the syntactic rules of the ML. Identification of ML + EL utterances, requires that a distinction be made between lexical insertion and lexical borrowing. A "lexical borrowing" is the incorporation of lexical elements from one language in lexicon of the other language. The distinction between lexical insertion and borrowings is based on the frequency of use among speakers. Borrowed forms are more widely used by the frequency limits for each category are somewhat arbitrary.

**TableZ.1** Definition of Matrix Language Frame constituents.

<b>Constituent</b>	<b>Definition</b>
ML Islands	Well-formed constituents entirely of ML morphemes demonstrating syntactic structure of ML.
ML shift	Change in ML in consecutive utterances or clausal structures.
EL Islands	Well-formed constituents consisting of at least two EL morphemes showing syntactic structure of EL which has been inserted into ML
ML + EL	A single EL lexeme (not a borrowed form) inserted into the syntactic frame for any number of ML morphemes

MLF predicts where code switches can occur within single utterances. ML + EL constituents follow the morphosyntactic structure of the ML. Thus, only EL constituents that match the semantic and syntactic requirement of ML can be inserted. When a target EL insertion violates the ML structure, and EL Island following syntactic structure of EL, can be predicted at this point in an utterance to maintain ML syntactic integrity. Code switches that violate morphosyntactic rules of the ML would not be expected to occur (Myers-Scotton & Jake, 2001).

In order to account for the kind of language mixing noted in bilingual aphasics, Munoz et al. (1999) suggested additions to the constituents in the MLF model. They added three more categories as are given below in the table2.2

**Table 2.2** Additional constituents of MLF proposed by Munoz et al. (1999)

<b>Constituent</b>	<b>Definition</b>
Borrowed form	A lexeme from one language incorporated into the morpho - syntactic structure of the second language and is widely accepted by the monolingual speakers of that language
EL Insertions	Multiple EL Lexemes demonstrating no syntactic structure inserted into the syntactic frame of any number of ML morphemes.
Revisions	Lexical insertions that do not contribute to the meaning of the utterance including speech errors, restatements circumlocutions and are indicators of word finding problems.

Although effectiveness of the model in predicting code switching across speech communities has not yet been fully established, it provides a useful coding scheme to organize a comparison and discussion of code switching patterns. Myers - Scotton and Jake, (2000) put forth the claim that MLF model can offer explanation for observed data in classic code switching and other language contact phenomenon and ha been successfully used in 11 language pairs to explain these.

Wei, (2002) also addressed the similar concept while describing bilingual mental lexicon. The lexicon is organized in terms of lemmas that are bundles of semantic and pragmatic features, which encode the lexical-conceptual structures representing the speaker's preverbal message/ intention. Thus, bilingual mak es choices at the conceptual level about lemmas depending on what he/she wishes to convey (i.e., intention before the choice). A bilingual' mental lexicon includes lemmas from both languages known, but these lemmas are tagged for their specific language (i.e.,

lemmas are language specific). Even though the bilingual's languages are "on" all the time during the discourse, they are never equally activated at the same time.

The ML is more activated than the EL in terms of morphosyntactic frame building and frequency of occurrence of types of morphemes. The bilingual can access lemmas from whichever language is the EL during a discourse involving intrasentential code switching. The ML is more activated than the EL in terms of morphosyntactic frame building and the frequency of occurrence of types of morphemes. All the lemmas must be congruent with the ML counterparts in various ways otherwise radical compromise strategies must be taken in order for the EL material to be accessed and realized. Wei's (2002) notions are also in accordance with the principles of MLF. Bhat and Changappa, (2003) used MLF to code language mixing in normal Hindi-English and Kannada-English bilinguals and reported that MLF proved to be useful in describing and comparing these phenomena.

After discussion on different constraints, it appears that none of these could explain language mixing adequately but MLF promises to be a good tool.

## **2.9 Code mixing and code switching in bilingual aphasics**

Language mixing is a part of bilingual communicative repertoire and has been studied at length in bilingual aphasics. Researchers have been interested in knowing what happens to the bilingual aphasics. Researchers have been interested in knowing what happens to the bilingual specific behaviors like code mixing, code switching and translation after a brain damage. Albert and Obler, (1978) stated that language mixing

is found in only 7% of polyglot aphasics and most of these are sensory aphasics. These authors cite the work of Bastian (as cited in Albert & Obler, 1978), where it is reported that a native German speaker living in England developed a right hemiplegia with aphasia and began to mix English and German in his speech.

Herschmann and Potzl (as cited in Albert & Obler, 1978) reported mixing of Czech and German in a Czech "Pseudomotor aphasic" who spoke German as his primary language from the age of 14 years. Although subsequent to the aphasia Czech dominated the patient's utterances, both Czech and German words appeared together in spontaneous speech as well as naming. The authors also note that German words were produced with Czech affixes and were sometimes erroneously produced as their phonetically similar Czech counterparts. In a similar fashion, Pick (as cited in Paradis, 1977) also refers to two cases of sensory aphasia associated with left posterior damage that presented language mixing in their speech. As the patients deteriorated, they began to answer Czech questions in German and German questions in Czech.

Potzl (as cited in Paradis, 1977) reported that a 52-year-old German who had recently studied Czech, began to produce Czech words and expressions involuntarily in the midst of his German utterances following left inferior parietal trauma, Kauders (as cited in Albert & Obler, 1978) described a German aphasic who had learnt French and English perfectly at the age of 16. Following a stroke, the patient began to speak in unintelligible strings of syllables resembling palilalia. As he improved, his spontaneous speech became more recognizable as German but was noted to include French words, English word fragments, word blends of German and English, English

affixes on German words and English phrases. The patient seemed to produce more French in formal test situations than in normal conversation, although French and English were both present in the context of German conversational speech.

Stengel and Zelmanowitz (as cited in Paradis, 1977) described as 57-year old motor aphasic whose native language was Czech and who learned German fluently at the age of 35. Following a traumatic cerebral hemorrhage the patient began to mix languages on naming tasks. On a naming task in German or Czech, she produced the correct name in the appropriate language and then spontaneously would translate that name into the other language. The authors note that mixing of words from two languages was noticed. The production of German words with Czech plural affixes e.g., "schiffy" and the use of vocabulary from one language with the intonation of another. Language mixing was observed to be more pronounced when the patient was not instructed to speak in a specific language.

Other studies have also reported such instances of language mixing as by Weisenberg and McBride; Gloning and Gloning (as cited in Paradis, 1977). L'Hermitte et al. (as cited in Perecman, 1984) described a 46-year-old English-German-French polyglot right-hander who developed a sensory aphasia subsequent to left temporal lesion. The patient, a native English speaker, had served in the military in Italy and then lived in Egypt and Germany before settling in Paris. Then he began to speak French quite fluently. Authors report that this subject 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. Schulze (as cited in

Perecman, 1984) reported of a sensory and idiokinetic motor aphasia associated with a left parieto-temporal abscess in a 55 year old right handed Bulgarian man who knew German, Bulgarian, Russian and French, English and Latin. The patient produced Bulgarian as well as Russian words with Bulgarian suffixes.

Mossner and Pilsch (as cited in Perecman, 1984) report the use of English words in predominantly German sentences in a German-English motor aphasic, who had been operated for removal of a tumor in the left temporal lobe. The patient was born in Germany and immigrated to Australia at the age of 20 years and returned to Germany at 32, Albert and Obler, (1978) briefly mention the 'linear mixing of elements from each language' in two cases of senile dementia in elderly bilinguals. The German word "Gelt" appeared with an English suffix "ing" in the English jargon of a neologistic jargonaphasic described in Perecman (cited in Perecman, 1984). This patient's aphasia was associated with a left posterior subdural hematoma.

Perecman, (1984) reported an 80-year-old male born in West Africa, of German parents. He learned German as native language, French as a second language and English when he settled in the United States and spoke only English then on. Language mixing occurred at the phonological, morphological, syntactic and lexical levels, language mixing also marked the patient's reading aloud at both syntactic and phonological levels. Authors attributed language mixing at different levels to disruptions at those levels of language processing i.e. language mixing at phonological level reveals deficits at phonological level, syntactic level reveals deficits at syntactic level and so on.



Grosjean, (1985) commented on Perecman's views and argued that language mixing is seen in a normal polyglot also and thus does not reflect any linguistic deficit as such. He argued that only good knowledge of patient's language and speech before the injury and careful testing after the impairment will show if language mixing does indeed reflect these deficits. He also stressed the importance of controlling an important factors designated as "language mode" in any study on bilingual behavior along with the constraints of the test situations and knowledge about, pre-morbid language skills. In Perecman's study, the investigator seemed to be a polyglot who was herself switching language and this could have put the patient in the bilingual mode and thus triggered code switching as a natural communicative strategy.

An exhaustive and a well-controlled study was carried out by Munoz et al., (1999) to compare code switching patterns of aphasic and neurologically normal bilingual speakers of English and Spanish. They carried out conversational analysis with different conversational partners in two monolingual conditions and one bilingual condition. The responses were analyzed using Myers-Scotton's (1993) matrix language frame model. The results indicated that similar kind of code switching was seen in both normal and aphasic bilinguals. Aphasics used code switching more frequently and showed communication difficulties resulting from code switching with monolinguals and ungrammatical switches. They concluded that language mixing might not be an inappropriate behavior in itself but an atypical and disruptive increase in the frequency of the use of normally occurring code switching patterns could be.

In spite of being a multilingual country, only few studies has been carried out on code mixing and code switching in bilingual aphasics in India. Krupa , (2002) investigated code switching in Malayalam-English bilingual aphasics and evidenced disruptive increase in this behavior in terms of increased revisions, embedded language insertions and deficits in lexical retrieval. However her subjects were not completely balanced bilinguals, some of her subjects had very little knowledge of English, and the language mixing noted in these subjects in English could be a reflection of their deficient pre morbidly inadequate knowledge of English. Where as, Sapna Bhat, (2004) investigated in Kannada - English bilinguals. It is thus important to have studies on language mixing in bilingual aphasics to comment on the nature of language mixing in this population.

There have been varieties of hypothesis about organization of different language in brain as summarized by Paradis, (2000). These are detailed below:

- a. Each language is represented in a different locus in the brain and thus a circumscribed lesion may affect one and not the other, or may not affect the other language to the same extent.
- b. There is an area in the brain that acts as a switch mechanism and allows the bilingual to switch from one language to another. A lesion in this area either jams the switch in one position, so that patient can speak only one language or causes the switch to become loose so that the patient keeps switching from one language to other.
- c. The unrecovered language is not destroyed but inhibited. (Paradis, 2001 b)

The first hypothesis has been attributed to Scoresby-Jackson (as cited in Paradis, 2001 b) who suggested differential localization along the third frontal convolution as one of at least three possibilities. The second hypothesis was proposed by Potzl (as cited in Albert & Obler, 1978) and the switch mechanism was believed by researchers from Potzl (as cited in Albert & Obler, 1978) to Leischner (as cited in Paradis, 2001 a) to be located in the supramarginal gyrus. The third hypothesis dates back as far as Pitres (as cited in Paradis, 1977) who proposed it in one of the three concluding remarks from his famous monograph.

Some authors feel that there are numerous reasons to believe that cerebral representation of language is not entirely the same in polyglots as in unilinguals Lecours, Brauchereau and Joannette (as cited in Paradis, 2001 a). According to them, it would be surprising if bilingualism had no effect on brain organization (Segalowitz, 1983). Some authors propose that the two languages of a bilingual are represented in partly different anatomical areas in the dominant hemisphere, with some overlap (Ojemann & Whitaker, 1978; Rapport et al. 1983). Another possible hypothesis is that languages are subserved by different circuits intricately interwoven in the same language areas, so that both are represented in the same area at the gross anatomical level, while still being independently subserved by different neural circuits at micro anatomical level (Paradis, 1977). Second hypothesis faced different counter evidences specifically in terms of selective and mixed recovery with no damage to the temporoparietal area.

Paradis, (2001 a) suggested that it is not important to postulate an anatomically localized mechanism at all. The capacity to mix or switch is similar to a decision to speak or remain silent in a unilingual. So switching language is similar to mixing or switching response modes in a unilingual and thus does not require any extra explanation

### **2.10 Spontaneous translation in bilingual aphasics**

One of the more unusual ways in which languages may be inappropriately combined is in "spontaneous translation" or the immediate or unsolicited translation of one's own utterances (and possibly others) into a second language. Spontaneous translation has not been mentioned as extensively in the literature as code mixing and code switching. Both uncontrolled, compulsive translation (Weisenburg & McBride, as cited in Paradis, 1977; Perecman, 1984) and an inability to translate (Paradis et al. 1982) have been reported. Some patients have been observed to be unable to speak a language other than through translating into it from other language (Charcot, as cited in Paradis, 2001; Paradis et al. 1982). When this ability to translate into a language inaccessible for spontaneous use is accompanied by an inability to translate into, it was dubbed as paradoxical (Paradis et al. 1982).

The patient described in Kauders (as cited in Perecman, 1984) produced the correct French and/or English name for an object on a naming task and then produced the German translation of that name spontaneously. Veyrac (as cited in Paradis, 1977) described an echolalic patient who, on two occasions, automatically translated short sentences with an obvious lack of understanding for what she had said. Perecman,

(1984) discussed a polyglot aphasic whose predominant feature was spontaneous translation accompanied by language mixing at various levels. This patient translated entire phrases spontaneously. Fabbro and Paradis, (1995 b) report of a bilingual aphasic who showed unidirectional impairment in translation into the mother tongue (L1) while retaining the ability to translate into the L2.

Paradis, (2001 a) attempted to explain paradoxical translation behavior by assuming that the skill of translation is independent of and different from skill in the use of two language systems and that translation like any other function is subject to inhibition and disinhibition. Green, (1986) in his model emphasizes the control component of such a model and postulates two inhibiting systems; internal (self-inhibition of the language currently selected i.e., within language inhibition) and external (inhibition of the other language). Translation into the language of spontaneous use would be precluded when the other language could not suppress its own activity sufficiently.

Some authors have reported and explained translation with comprehension deficits (Veyrac as cited in Paradis, 1977). Three hypotheses were put forward:

- a. The phenomenon might be explained as an automatic process. Aphasics lose the capacity to control their voluntary activities, but can still perform automatic activities.
- b. Translation without comprehension might be considered as an aspect of articulatory preservation. Patients affected by a aphasia correctly repeat words without understanding them and produce correct spontaneous, yet incoherent

speech. These patients can correctly speak without being able to decide and control what they are saying.

c. Lastely, he proposed to interpret this phenomenon as an aspect of the habit of oilinguals to translate before understanding. Paradis (as cited in Fabbro, 1999) analyzed the paradoxical translation phenomenon and the translation without comprehension deficit phenomenon and presupposed the ex istance of a series of functionally separate and independent components:

1. A system of accounting for comprehension in L1 and L2.
2. A system accounting for expression in L1 and L2
3. A system accounting for translation from L1 and L2
4. A system accounting for translation from L2 and Li

Therefore, a cerebral lesion in a bilingual subject may for a certain period of time selectively inhibit only a component of the translation process whereas the other component that is functionally independent may continue to perform translation without difficulty.

Price, Green and Von Studnitz's (1999) study revealed that activation of the anterior cingulated structures and bilaterally the Putamen and the head of the caudate, the supplementary motor area and the left insular ventral area occurred while translating. On the other hand, in alternating LI and L2 word reading tasks, the left posterior inferior frontal cortex and the bilateral supramarginal gyrus were activated showing that alternating languages requires more systematic studies on translation behavior in bilingual aphasics across language to authenticate these findings.

## 2.11 Assessment of bilingual aphasia

There has been considerable research effort directed towards organization of several languages in the same brain and effect of brain lesion on them but the literature is lagging regarding assessment of bilingual aphasics. Most of the earlier research reports are not very transparent due to insufficient details on respective degree of pre morbid fluency and type of deviance in each language as well as contexts of language acquisition and use. Assessment being essential for purposes of diagnosis, research and prescription for treatment should be more elaborate as well as informative. Assessment of bilingual aphasics has lacked specificity and homogeneity. Some basic issues need to be looked while assessing different languages of bilingual aphasics.

Grosjean, (1985) indicated that to better understand the language deficits of bilingual aphasics, one needs a clear, unambiguous description of their language knowledge and use both before and after injury. Thus while describing language knowledge and language use before injury, it is important to keep in mind that a bilingual is not the sum of two (or more) monolinguals but is a competent speaker-hearer who has developed competencies in his / her languages (and possibly in some mixed system) to that extent required by internal and external needs. Some of the questions are basic to understand the language competence of the patient such as: which languages did the patient know before injury? How well did he or she know them (as a function of skills, styles etc)? What were the languages used for, with whom, for what? What kind of interferences occurred in the patient's two languages

when in the monolingual speech mode? How much mixing took place in the bilingual speech mode? A clear-cut assessment needs to be made with regard to pre and post morbid language abilities. These questions form a baseline about the bilingual's skills in both the languages and help in comparing the deficits across languages.

Another important factor, which needs to be known, is the language modes in which a patient is involved prior to injury and to control these speech modes while testing. In the sessions examining the monolingual speech modes, it will be important to deactivate the language not being tested.

Grosjean, (1985) suggested that the patient would have to be tested in each of the languages at different times and by different examiners. In this way, the patient will clearly understand that, in each case, he or she is facing a monolingual interlocutor and can use only one language. Thus keeping in mind the knowledge, use and the function of languages prior to injury, it will be possible to assess the impact of injury on each of the languages when used monolingually. If the patient also operated in the bilingual speech mode before injury, he or she will need to be examined in that particular mode. To do this, a testing situation will need to be set up that the patient feels comfortable while code mixing and code switching during the examination. According to him one way of doing so would be to have a third, a polyglot examiner (the first two were monolingual in languages A and B), some members of the patient's family or close friends with whom the patient code switched and borrowed before injury in assessment sessions. The ability to translate from one language to the other



will also need to be determined as translation is one of the most important skills of a bilingual.

Dronkers, Yamasaki, Ross and White, (1995) discuss the relevance of social and cultural issues while assessing a bilingual aphasic. They contended that the assumption that the patient was true bilingual premorbidly would be dangerous to research as the entity called "true" or "ideal" is non-existent. The examiner in the process of investigating may assume that he / she and patient speak the same language and the same dialects of the languages that may not always be true. Sato (1989) has discussed the consequences of such a problem with particular regard to the situation in Hawaii in which Hawaiian Creole English is often spoken in place of standard English. Paradis and Libben, (1987) warned against trivializing these issues in the assessment of bilingual aphasia and called for detailed interviews and standardized testing to compensate for these potential problems.

Dronkers et al. (1995), found that the linguistic and social issues surrounding the assessment of bilingual aphasia in their Hawana patient group proved to be exceedingly complex. The issue of bilinguality in these subjects was complicated by the widespread use of Hawaiian Creole English in Hawaii, making the assessment of standard English somewhat difficult. Those two subjects made errors in standard English, but those would be considered correct in Hawaiian Creole that would give an erroneous picture of differential impairment in two languages (English and the native language). They conclude, that the degree of bilinguality must be qualified by the level of pre morbid proficiency for all previously learned languages, especially those which

bear some resemblance to each other and are susceptible to frequent switching. They also caution against doing a static assessment of languages that usually reflects proficiency in childhood but not throughout adulthood.

Structure of different languages being compared in a bilingual also affects the assessment. ALOJOUANINE (as cited in Fabbro, 2001), citing an example stated that if inflectional morphology of one language is vulnerable, a language with the feature would show outstanding signs of agrammatism. This may lead to a clinical picture of differential aphasia across languages, which is not true as there is basic difference between structures of different languages.

A systematic and comparable assessment across bilingual aphasics' two / more languages is necessary. This is one of the reasons why over ten years ago, Paradis started an international project on bilingual aphasia in Canada, which is still operative and sees the participation of numerous researchers from all over the world (Fabbro, 2001). A test battery has been developed over the past 12 years and now available in over 60 languages and 150 specific language pairs (Paradis, 2001 b). Bilingual aphasia test (BAT) uses a quadrimodal, linguistically multidimensional approach. It is quadrimodal in that it examines language performance in all four modalities - hearing, speaking, reading and writing. It is linguistically multidimensional in that, for each modality, language performance is investigated along three dimensions - linguistic level (phonological, morphological, syntactic, lexical and semantic), linguistic task (comprehensions, repetition, judgment of acceptability, lexical access, prepositionizing) and linguistic unit (word, sentence, paragraph). This approach allows

one to detect task-specific or task independent deficits of any aspect of linguistic structure, as well as task or modality-specific (or independent) deficits at the levels of the paragraph, the sentence, or the word, in each of the patient's languages.

BAT consists of three parts. In Part A, information about the patient's bilingual background (contexts of acquisition and use, relative degree of mastery and frequency of use) is collected. This part contains 50 items, and information can be obtained from the patients themselves, or from relatives or friends. Patients considered "bilinguals" do not form a homogenous population but are situated at different points on a multidimensional continuum that allows for differences in the type of organization of their grammars as well as degree of proficiency at each level of linguistic structure and in each language skill. It is only in the light of such information the post-morbid relative deficits can be interpreted.

Part B of BAT is to be administered on successive days, under identical circumstances, in each of the patient's languages, by a native speaker. This test comprises of 32 subtests (each with its individual score) that can be grouped to obtain a number of measures of specific abilities by skill, by modality or by linguistic level. Part C examines the patient's ability to recognize translation equivalents, translate words and sentences, and make grammaticality judgments about sentences which incorporate morphological and/or syntactic features of the other language (Paradis, 2001 b).

The different versions of BAT in the various languages are not mere translations of each other, but are of equivalent linguistic complexity for each task. For

example, when adapting BAT verbal auditory discrimination test into Frulian, English items were not simply translated. In fact, for each item the authors had to find four Frulian words that differed from each other by only one initial phoneme and could be easily represented by a picture.

The test administration takes one and a half to two hours per language. To reduce the time involved a short version of BAT was evolved which takes only 45 minutes per language. Selected items of following sections are included in short version:

- Spontaneous speech
- Pointing
- Simple and semi-complex commands
- Verbal auditory discrimination
- Syntactic comprehension
- Synonyms
- Antonyms
- Repetition of words
- Repetition of sentences
- Series
- Naming
- Sentence construction
- Semantic opposites
- Listening comprehension

Though less comprehensive, results obtained with the short version can be compared across languages in the same patient

The persons administering this test are not required to make any judgements. They simply write down the answers given by the patient, which then are processed by means of a computerized program. Because the scoring procedure is highly objective, the examiner need not be a trained professional. Before the BAT, bilingual aphasia was studied using different test instruments, for this reason it was very hard to compare results of different studies (Paradis, 1993).

Any evaluation of bilingual aphasic would not be through unless all the above factors are considered and controlled.

## **2.12 Rehabilitation of bilingual aphasics**

There is still no consensus on how to approach the rehabilitation of bilingual aphasics (Paradis, 1993). Paradis, (2001 b) suggests methodological monitoring of the effects of various types of therapy applied in different circumstances which will eventually make it clear which type of therapy is best (and in which language) under specific circumstances.

Fabbro, (1999) and Paradis, (2001 a) raised a few questions on rehabilitation programs for bilingual aphasics, which need to be answered, namely.

- a. Is it enough to rehabilitate one language in bilingual aphasics or do all languages known by the patient have to be treated?

- b. If the decision is taken to rehabilitate one language only, what are the criteria behind this choice?
- c. Does rehabilitation in one language also have beneficial effects on the untreated languages?
- d. Do potentially beneficial effects transfer to structurally similar languages only or also to structurally distant languages?

Speech-language therapy for bilingual aphasics has generally been in the language of the environment rather than the one patient might choose for his or her own pragmatic reasons. Although the earliest article (Fredman, 1975) on the topic suggested that aphasics' recovery in the language of therapy was no greater than that in which therapy was not given, more recent articles have suggested that the language of therapy is crucial, especially for more productive language (Junque, Vendrell, Vendrell-Brucet & Tobena, 1989; Watamori & Sasanuma, 1978).

Paradis, (2001 a) and Fabbro, (1999) after reviewing the literature available on therapy in bilingual aphasia concluded that there is a lack of well-controlled and systematic studies. At present, it is not known whether recovery significantly differs following therapy in one or in both languages. Even the influence of factors such as etiology, initial severity and type of aphasia, structural distance between the language, patient's age, pre morbid intelligence, educational level or type of therapy is not determined. Therapy may have differential effects on the premorbidly dominant (vs. weaker) language and /or on the best (vs. least well) recovered language as suggested by Paradis, (2001 a). Therapeutic effects on one language may transfer to another in

proportion to the structural similarity between the languages, or they may possibly transfer irrespective of structural distance. The effects of therapy may transfer in the context of some aphasic syndromes, have no effect in others and have negative effects still in others. These opinions of Paradis, (2001 a) may have some reality in them that needs to be clinically verified.

Weiner, Opler and Sarao, (1995) reviewed the reports of ASHA council over past nine years and concluded that the bilingual patients have been under-treated in United States. There were a lot of issues raised in this paper in terms of the lesser time devoted to bilingual clients and the non availability of bilingual translator to assist in the rehabilitation.

Fabbro, (1999) stated that usually only one language is generally rehabilitated, especially if the patient shows mixing or switching phenomenon, so as not to confuse the patient and waste time on selecting one language. With regard to the selection criteria, no clear cut answers are provided, some claim the mother tongue is preferable, other claim that the least impaired language should be treated, others, still claim that language that is worst impaired should be targeted. Fabbro observes that selection of the language to rehabilitated should be based on two parameters: I) A - systematic assessment of the patient's linguistic disorders through BAT and ii) An interview with the patient and his / her relatives during which neurolinguistic and sociolinguistic issues (which language is preferred both for affective and business reason) concerning the patient and the family should be discussed.

He further suggests that except for highly complex neurolinguistic situations for instance, aphasia with paradoxical recovery of one language, the choice of the language to rehabilitate depends on the patient and his / her family's decision. Systematic and detailed reporting of the effects of therapy as measure by same standard instrument in large number of cases will alone, bring us closer to answer complex questions regarding rehabilitation of bilingual aphasia.

Certain conclusions can be drawn from the review which are detailed below:

- a. Bilingualism is an intriguing entity and has been defined in various ways by various researchers with very little consensus.
- b. There are different classifications of bilinguals that have been adopted and related to brain organization in bilinguals.
- c. Over the years there has been considerable increase in the prevalence of bilingualism in India as well as in Western countries. Researchers around the globe are accepting bilingualism as a common occurrence.
- d. It is important to realize that results from studies in Western culture cannot be adapted to Indian scenario as the bilingualism in India is at grass root level. The interaction between different languages in India is also very different and culturally varied.
- e. There have been loads of studies on lateralization of language in bilinguals and there have been contradictory results suggesting possible methodological and operational differences.



- f. The trend over the years has changed from use of behavioral oriented techniques like dichotic CV to more objective procedures like evoke potentials in assessing language organization in bilinguals.
- g. Models of bilingual brain have been proposed to account for different bilingual phenomena and the kind of deficits in bilingual aphasics.
- h. There are several opinions about the definitions of bilingual phenomena of code mixing, code switching and translation,
- i. Several grammatical constraints operating on code mixing and code switching have been proposed thus attesting the fact that these are not random and haphazard,
- j. Most of the constraints are not applicable universally, however matrix language frame appears to be the frame work of choice being quite appealing,
- k. Language mode is an important confounding variable in bilingual research and it is important to control and account for this variable.
- l. Aphasia in bilinguals has attracted a lot of attention with descriptions abundant in recovery patterns, factors affecting these, language lateralization and incidence of crossed aphasia,
- m. Parallel recovery tends to be the most common recovery pattern. There are abundant descriptions on other recovery patterns but they get more highlighted as they represent cases that are more interesting rather than the trend,
- n. Visual, psychological, acquisitional factors are among various others, which affect language recovery in bilingual aphasics. However, a multifactor theory seems to account best for all the reported recovery patterns.

- o. Language mixing in bilingual aphasics has been reported since earliest times but there is a lack of well-controlled studies.
- p. A detailed description of subjects language use before and after lesion, control of language mode, use of appropriate interlocutors, and comparison with controls of same community and consideration for the cultural relevance of language mixing are important factors in interpreting language mixing.
- q. A detailed assessment of bilinguals different languages using a comparable test instrument as Bilingual Aphasia test is vital to any study on bilingual aphasia.
- r. Rehabilitation of bilingual aphasics is still one of the least researched areas in bilingual aphasia with a lot of controversies on the selection of a particular language for rehabilitation and generalization of progress across languages.
- s. Studies on bilingualism and bilingual aphasics in India are very few in spite of the fact that India is a multilingual and multi cultural country from a long time. There is a dire need for greater research in this direction on par with Western communities where most of the studies are conducted differ a lot from Indian set ups.

## METHOD

### 3.1. Subjects

Five aphasics and 5 neurologically normal adults, matched on the basis of age, gender education level and language were taken as subjects. Subjects were bilingual and they had Hindi as their mother tongue, and learnt English as second language before the age of ten years. All the subjects were right handed which was determined using self report and information from significant others. Normal subjects were free from any history of neurological, communicative or sensory impairment. Any subject with hearing, vision or psychological problems was excluded.

All the subjects had history of left hemisphere cerebrovascular accident (CVA) confirmed by neurological examination and computerized tomography. The aphasic subjects were administered western aphasic battery (WAB, Kertesz and Poole, 1974) for the identification of aphasia type in both Hindi and English, Aphasics had attended therapy for a maximum period of one week to 4 weeks.

### 3.2. Procedure

The questionnaire from part A of bilingual aphasia test (BAT, Paradis & Libben, 1987; Paradis.M & Vaid J. 1987) and Australian second language proficiency rating scale (ASLPR, Ingram 1985) were used to get information on language history of all the subjects. ASLPR was used to match aphasics and normal controls in terms of language use. All the subjects had at least minimal vocational proficiency in

English and native proficiency in Hindi to classify as bilinguals in primary skills of speaking and understanding (premorbid proficiency was considered for aphasics).

A language usage questionnaire (Sapna Bhat 2004) was given to all subjects in order to investigate their usage and attitude toward usage of English language. The intention was to get information on amount and type of code mixing and code switching in relation to cultural context of Hindi -English bilinguals.

Questions 1 -6 in the questionnaire assessed the history of English acquisition and usage by the clients and question 7-15 investigated the amount of language mixing and attitude towards the response on different questions were collected converted into percentages(Appendix-A).

Part A and Part B of BAT were administered on bilingual aphasics for comparison of language skills across their two languages. Short version of bilingual aphasia test (Hindi-English version) was administered to the bilingual aphasics. This helped to compare different language skills in subjects two languages and gave a clear picture of effect of aphasia on these languages. Short version was selected because it required less administration time. These tasks are given below:

Spontaneous speech

Pointing

Simple and semi-complex commands

Verbal auditory discrimination

Syntactic comprehension

Synonyms

Antonyms

Repetition of words

Repetition of sentences

Series

Naming .

Sentence construction

Semantic opposites

Listening comprehension

All the responses on BAT were audio -recorded and scored using instruction given in the test manual.

All the subjects participated in three conversation tasks: monolingual Hindi, monolingual English and bilingual (both languages used within a single conversation). Conversations were carried out on three different days to reduce the interference from one language to another.

Topics of conversation included hobbies for English, family for Hindi, and

work for the bilingual context. These three topics were reported by Timm, (1975) to involve equal amount of code mixing and code switching. Subjects were prompted by the partners to maintain the topic during the conversation. The conversation were audio recorded in a quiet room with only the subject and partner present and later transcribed.

### **3.3. Analysis**

#### **3.3.1. Linguistic Analysis**

Each word in the transcript was coded as Hindi or English. The levels at which code mixing occurred were described using the outline of Peregman (1984), as phonological level, morphological level, lexical semantic and syntactic level. A comparison was made between controls and clinical group and across contexts, as to levels at which code mixing and code switching occurred.

The constituent of the matrix language frame model (MLF, Myers, Scotton, 1993) with modification proposed by Munoz et al, (1999) were used as systems for coding language mixing. These categories are related to either matrix or base language (ML) and embedded language (EL). Matrix language means the base language of conversation contributes most of the grammatical morphemes to the interaction and sets the morpho-syntactic structure of the sentence. The matrix language can change between utterances, or clausal boundaries in single utterances. Embedded language is the less active language inserted into the structure established by the matrix languages.

In this study, borrowed forms were distinguished from lexical insertion i.e. ML+EL by the acceptability judgment of native Hindi speakers. Any single lexical insertion that was scored as acceptable in monolingual vocabulary by two out of three judges was taken as borrowed forms, utterances containing borrowed forms were considered as ML Islands and not instances of code mixing or code switching as they were integrated into the matrix language and formed a part of monolingual lexicon.

Instances of code mixing and code switching were compared across different conversation contexts. This was done in an attempt to reveal similarities and differences in language mixing between bilingual aphasics and normal bilinguals. The extent and type of language mixing were compared with the pre-morbid language use (based on data from part A of BAT) in aphasics. This would reveal whether post morbid language mixing indicate any linguistic impairment.

### **3.3.2. Statistical analysis**

Wilcoxon Matched-Pairs Signed- Ranks test was used to see the significant difference between Hindi and English bilingual aphasia test (BAT) scores within each subset. Mean and S.D. in English and Hindi for each subset was also calculated to see the difference between English and Hindi BAT score.

## **RESULTS AND DISCUSSION**

The aims of the present study were:

- a) Comparison of the type and extent of code mixing and code switching in aphasic and normal bilinguals.
- b) Investigation into similarities and differences between code mixing and code switching seen in aphasic and normal bilingual.
- c) Describing in detail the type and level of code mixing and code switching evidenced in bilingual aphasics using matrix language frame model (Myers-Scotton, 1993) and Percman's (Percman 1984) levels of code mixing and code switching.
- d) Comparison of effect of context (monolingual Hindi, Monolingual English and bilingual) on code mixing and code switching

### **4.1 Subjects and data collection**

Five aphasics and five normal Hindi-English bilinguals were the subjects. Western aphasia battery (WAB, Kertesz and Poole, 1974) and short version of bilingual aphasia test (BAT Paradis and Vaid 1987) were administered for assessing the effect of aphasia on their two languages. Conversation samples were elicited from all the subjects in three different context (monolingual Hindi, monolingual English and bilingual) on three different topics. The samples obtained were subjected to a detailed analysis. The analysis were based on the over all guidelines of matrix language frame (MLF, Myers- Scotton 1993) and description of level of code



switching and code mixing (Perceman 1984). The results of these analyses are discussed in the following section.

**Subject Description:** Five bilingual aphasics were taken as subjects and matched with five normal adults on the basis of age/gender, handedness (self report and information from significant others) education and language usage (based on response to Australian second language proficiency rating scale, Ingram 1985 and part A of Bilingual aphasia test, Poradis and Vaid, 1987). As the clinical group of bilingual aphasic was heterogeneous in terms of age and gender one to one matching was carried out to compare with the control group. All the subjects had at least minimal vocational proficiency in English and being native speakers of Hindi (Premorbid proficiency was considered for aphasics) had native proficiency in Hindi on Australian second language proficiency rating scale (ASLPR Ingram 1985). Language usage being an important variable was matched between the different subjects based on their responses on ASLPR and part A i.e. language questionnaire of bilingual aphasia test. All the subjects were right handed without any forced change in handedness as was reported by, self, spouse and significant others. Table 4.1 and 4.2 give demographic details and description of language usage by the subjects. Efforts were made to match aphasics and normal controls on most of the factors especially language usage.

**Table 4.1:** Demographic Details of aphasic and normal bilingual subjects

<b>APHASICS</b>	A1	A2	A3	A4	A5
Age in years	45	23	65	53	40
Gender	M	M	M	M	F
Educational level	Intermediate	G	G	G	G
Occupation	GS	ST	R	GS	GS
Time post onset	3 mts	3 mts	2mts	2mts	2mts
Aphasia type in Hindi	B	B	A	A	A
Aphasia type in English	B	B	A	A	A
Handedness	Ri	Ri	Ri	Ri	Ri
<b>NORMAL</b>	N1	N2	N3	N4	N5
Age in years	45	23	65	53	40
Gender	M	M	M	M	F
Educational level	Intermediate	G		G	G
Occupation	GS	ST	R	GS	GS
Handedness	Ri	Ri	Ri	Ri	Ri

1= Intermediate

G= Graduation

B=Borca's aphasia

A= Anomia

R= Retired

GB=Govt. Service

ST=Student

**Table 4.2** Description of language usage by aphasic and normal bilinguals subjects

<b>APHASICS</b>	A1	A2	A3	A4	A5
Native language	H	H	H	H	H
Language of education	H/E	H/E	H/E	H/E	H/E
Age of learning English	6	5	7	6	6
Years of education in English	16	18	16	16	16
Language used with family	H	H/E	H	H/E	H
Language used with friends	H	H/E	H	H/E	H/E
Language used in daily work	H	H/E	H	H/E	H/E
Language Dominance (Premorbidly for aphasics)	H	H/E	H	H	H
Post morbid language dominance	H	H	H	H	H
Frequency of code mixing and code switching (Premorbidly for aphasics)	F	VF	F	F	F
<b>NORMAL</b>	N1	N2	N3	N4	N5
Native Language	H	H	H	H	H
Language of Education	H/E	H/E	H/E	H/E	H/E
Age of learning English	6	5	6	6	6
Years of education in English	16	18	15	16	16

Language used with family	H	H/E	H	H/E	H
Language used with friends	H	H/E	H	H/E	H
Language used in daily work	H	H/E	H	H/E	H/E
Other language known	P	M			
Language Dominance	H	H/E	H	H	H
Frequency of code mixing and code switching	F	F	F		F

E= English

F= Frequent

VF=very frequent

A=Aphasic

N=Normal

It is evident from table 4.2 that all the subjects had Hindi as their mother tongue and used Hindi and English frequently in their daily life. Hindi was acquired at home by all of them, English was learnt in the School by an average of 6 years of age and was used in conversation by 12 years of age by all. Most of them carried out all written official work in English. Two subjects (A1 and A3) showed lesser usage of English in their daily life and this change was more marked post morbidly as was reported in the questionnaire.

Western aphasia battery (WAB) revealed Broca's aphasia in two (A1 and A2) and Anomia (A3 to A5) in three subjects and the picture was same across two languages.

Part B from short version of BAT showed language deficit to be parallel across two languages of all aphasics with better scores in Hindi in most of the sections (graph 4.1) except for sentence construction (may be because of the sample size).The BAT score of sentence construction was better for English.

**Table 4.3:** Performance of aphasia on part B of short version of BAT in English

Serial No.	Subtest	A1	A2	A3	A4	A5
1.	Spontaneous Speech Fluency	2/5	2.5/5	5/5	5/5	5/5
2.	Accuracy	5/5	5/5	5/5	5/5	5/5
3.	Pointing	10/10	10/10	10/10	10/10	10/10
4.	Simple and Semi complex commands	10/10	10/10	10/10	10/10	10/10
5.	Auditory verbal discrimination	18/18	18/18	18/18	18/18	18/18
6.	Syntactic comprehension	30/37	30/37	37/37	37/37	37/37
7.	Synonyms	5/5	5/5	2/5	<b>1/5</b>	2/5
8.	Antonyms	5/5	5/5	2/5	3/5	2/5
9.	Word repetition	30/30	30/30	30/30	30/30	30/30
10.	Sentence repetition	5/7	5/7	7/7	7/7	7/7
11.	Series	42/44	41/44	42/44	41/44	42/44
12.	Naming	20/20	20/20	16/20	12/20	14/20
13.	Sementic opposite	10/10	10/10	6/10	6/10	7/10
14.	Sentence construction	8/10	7/10	10/10	10/10	<b>10/10</b>
15.	Listening comprehension	5/5	5/5	5/5	5/5	5/5

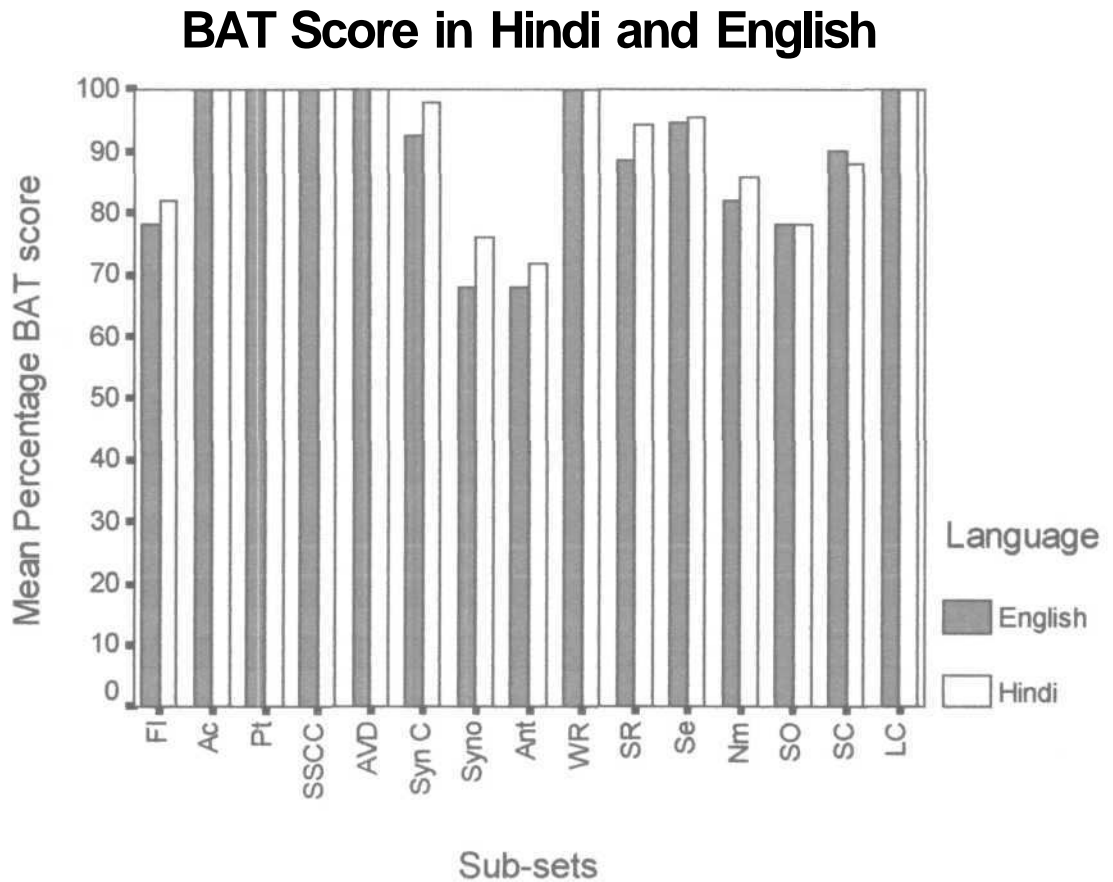
Table 4.4: Performance of aphasia on part B of Short version of BAT in Hindi

Serial No.	Subtests Spontaneous Speech	A1	A2	A3	A4	A5
1.	Fluency	2.5/5	3/5	5/5	5/5	5/5
2.	2. Accuracy	5/5	5/5	5/5	5/5	5/5
3.	3. Pointing	10/10	10/10	10/10	10/10	10/10
4.	Simple and Semi complex commands	10/10	10/10	10/10	10/10	10/10
5.	Auditory verbal discrimination	18/18	18/18	18/18	18/18	18/18
6.	Syntactic comprehension	33/37	33/37	37/37	37/37	37/37
7.	Synonyms	5/5	5/5	3/5	3/5	3/5
8.	Antonyms	5/5	5/5	3/5	3/5	3/5
9.	Word repetition	30/30	30/30	30/30	30/30	30/30
10.	Sentence repetition	6/7	6/7	7/7	7/7	7/7
11.	Series	42/44	43/44	43/44	40/44	42/44J
12.	Naming	20/20	20/20	16/20	15/20	15/20
13.	Sementic opposite	10/10	10/10	6/10	6/10	7/10
14.	Sentence construction	7/10	7/10	10/10	10/10	10/10
15.	Listening comprehension	5/5	5/5	5/5	5/5	5/5

**Table4.5:** Depicts maximum scores of BAT (part B), mean and Standard Deviation(S.D). in English and Hindi for each subtest

Serial No.	Subtests	Maximum Score of BAT (PartB)	English		Hindi	
			Mean Scores	S.D.	Mean Scores	S.D.
1	Fluency(FI)	5	3.9	1.5	4.1	1.2
	Accuracy(Ac)	5	5.0	-	5.0	-
3	Pointing(Pt)	10	10.0	-	10.0	-
4	Simple & Semi-complex commands(SSCC)	10	10.0	-	10.0	-
5	Auditory Verbal Discrimination (AVD)	18	18.0	-	18.0	-
6	Syntactic Comprehension (Sync)	37	34.2	3.8	36.2	1.8
7	Synonyms (Syno)	5	3.4	1.5	3.8	1.1
8	Antonyms(Ant)	5	3.4	1.5	4.0	1.0
9	Word Repition (WR)	30	30.0	-	30.0	-
10	Sentence Repition (SR)	7	6.2	1.1	6.6	.5
11	Series (Se)	44	41.6	0.5	42.0	1.2
12	Naming (Nm)	20	16.4	3.6	17.2	2.6
13	Semantic Opposite (SO)	10	7.8	2.1	7.8	2.1
14	Sentence Construction (SC)	10	9.0	1.4	8.8	1.6
15	Listening Comprehension (LC)	5	5.0	-	5.0	-

**Graph4.1:** Depiction of Hindi and English BAT score for each subtest



The main areas affected in A1 and A2 were fluency, syntactic comprehension, sentence repetition, series and sentence construction that presents a classical profile of Broca's aphasia in two languages since supporting results of WAB. In A3-A5 synonyms antonyms, series naming and semantic opposites were affected which matches the anomic diagnosis of WAB. Although the scores were higher in Hindi, the picture was that of a parallel deficit across language.



### 4.3: Language usage and attitudes of the subjects.

A questionnaire was used (Sapna Bhat 2004) (Appendix B) to evaluate the language usage patterns and language attitudes of aphasics as wide as the normal subjects. It has been delineated by several researchers (Grosjean ,1985; Munoz et al, 1999) that code mixing and code switching can truly be interpreted only in the light of language usage and norms of particular society and this questionnaire served the same purpose,.Questions 1-6 in the questionnaire assessed the history of English acquisition and usage by the subjects and questions 7-15 investigated the amount of language mixing and attitude towards the same. The response on different questions were collected and converted into percentage.

**Table 4.6:** Frequency of English Language usage by subjects (%) responses in different environments.

Environments	Frequency			
	Never	Occasionally	Frequently	Most of the time
Home	50.62	43.12	6.25	0
Friends	0	21.8	44.7	33.3
Neighbors	50.0	47.8	2.1	0
College/work place	0	6.25	15.62	78.12

It is evident from the table 4.6 that English usage was frequent among all the subjects. However, it was used mostly with friends in college or in work place. At home and with neighbors Hindi was preferred.

Table 4.7 gives the details of language mixing in different environments and it is evident that language mixing is a frequent communication strategy prevalent across both groups of subjects in most of the situations.

**Table 4.7:** Frequency of language mixing (% responses) in different environment

Environment	Frequency			
	Never	Occasionally	Frequently	Most of the time
Home	53.00	39.50	7.50	0
Friends	21.87	28.12	40.62	9.37
Neighbors	46.87	54.12	0	0
College/work place	28.12	16.62	45.87	9.37
Formal talk	72.87	27.12	0	0

It is clear from the table 4.7 that mixing language is very common friends and at college/work place whereas home and neighbors are domains of least language mixing. Even though language mixing was reduced , it was completely absent in any of these domains of language functioning. Thus, tendency was to consider language mixing as a normal communicative behavior.

Table 4.8 which deals with the attitudes towards language mixing reveals that mixing of language was considered important by this set of Hindi , English bilingual and they reported difficulty in speaking, without using English words. Mixing was more prominent from English to Hindi and most of the people held the view that mixing does not affect purity of language

**Table4.8:** Attitudes towards language mixing (% responses)

	Attitude	NO	YES
1.	It is important to mix English in Hindi?	60	40
2.	Is it difficult to speak without mixing English and Hindi	40	60
3.	Do you mix English words while speaking in Hindi	30	70
4.	Do you mix Hindi words while speaking in English	60	40
5.	Does mixing affect purity of languages	20	80
6.	Does mixing reflect inadequate knowledge of once language	70	30

Most of the subjects reported English words to be frequent in their daily vocabulary and English is used frequently. This suggests that Hindi -English bilinguals use both languages in their daily life and language mixing is a common mode of communication among them.

#### 4.3 Comparison of MLF constituents

Matrix language frame model (MLF, Myers-Scotton, 1993) was used to analyze code mixed code switched constituents. MLF constituents are based on the hierarchical relation between matrix (host) and embedded (guest) language (Appendix C) The matrix language (ML) is the language that builds the morph syntactic frame of the utterance and contributes most of the system morphemes. Embedded language (EL) is the less active language and the elements from this are embedded into the structure established by the matrix language.

The constituents of different matrix language frame were compared in monolingual Hindi context, monolingual English context and bilingual context for both normal and aphasic groups.

### Frequency of code switching instances in aphasic and normal subjects

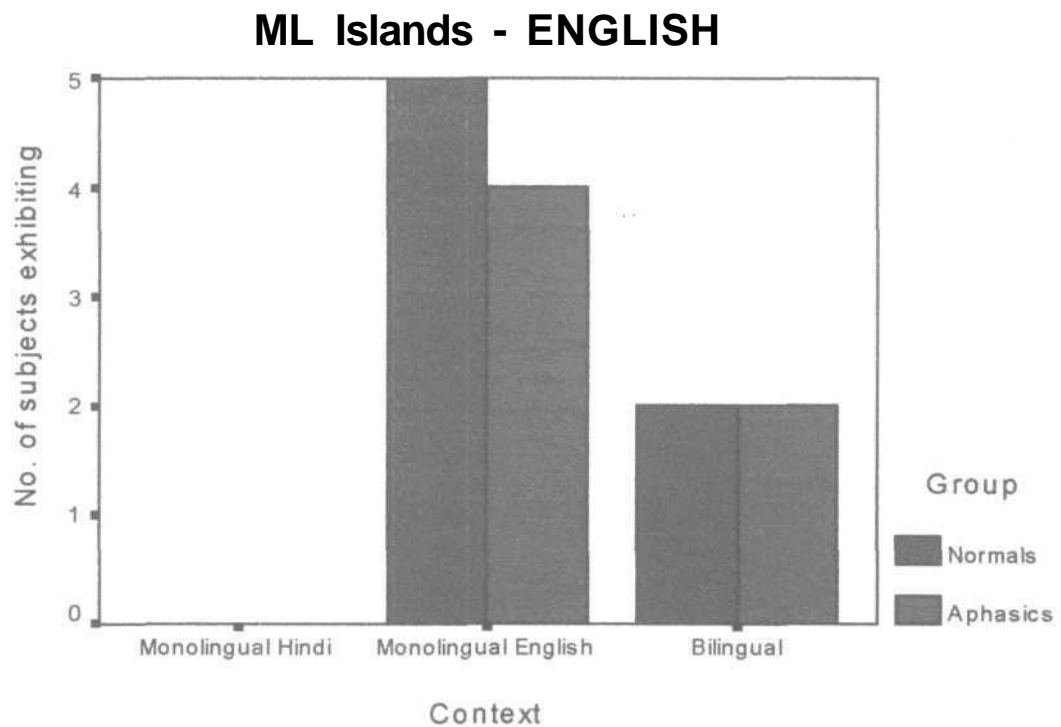
**4.9 Table** Subjects exhibiting code switching and code mixing

Code switch	Monolingual Hindi context		Monolingual English context		Bilingual context (Hindi-English)	
	Normal	Aphasic	Normal	Aphasic	Normal	Aphasic
ML Islands English			5/5	4/5	2/5	2/5
ML Islands Hindi	5/5	5/5	-	1/5	3/5	3/5
EL Islands	2/5	1/5	-	3/5	2/5	2/5
EL insertion		4/5	-	4/5	-	3/5
ML+EL constituent	3/5	4/5	3/5	4/5	3/5	3/5
ML shift and revision	5/5	5/5	5/5	5/5	5/5	5/5
Borrowed forms	<b>5/5</b>	<b>5/5</b>	5/5	5/5	5/5	5/5

### *Matrix language Islands (ML Islands)*

Matrix language islands (ML islands) are constituent consisting entirely of ML morphemes. They must follow the grammatical structure of a particular language (Myers-Scotton, 1993) that is ML islands are constituents with morphemes solely from the ML and they are well formed according to the ML grammar.

**Graph 4.2A** : No. of subjects exhibiting code switching and mixing, (ML islands- English) in different contexts

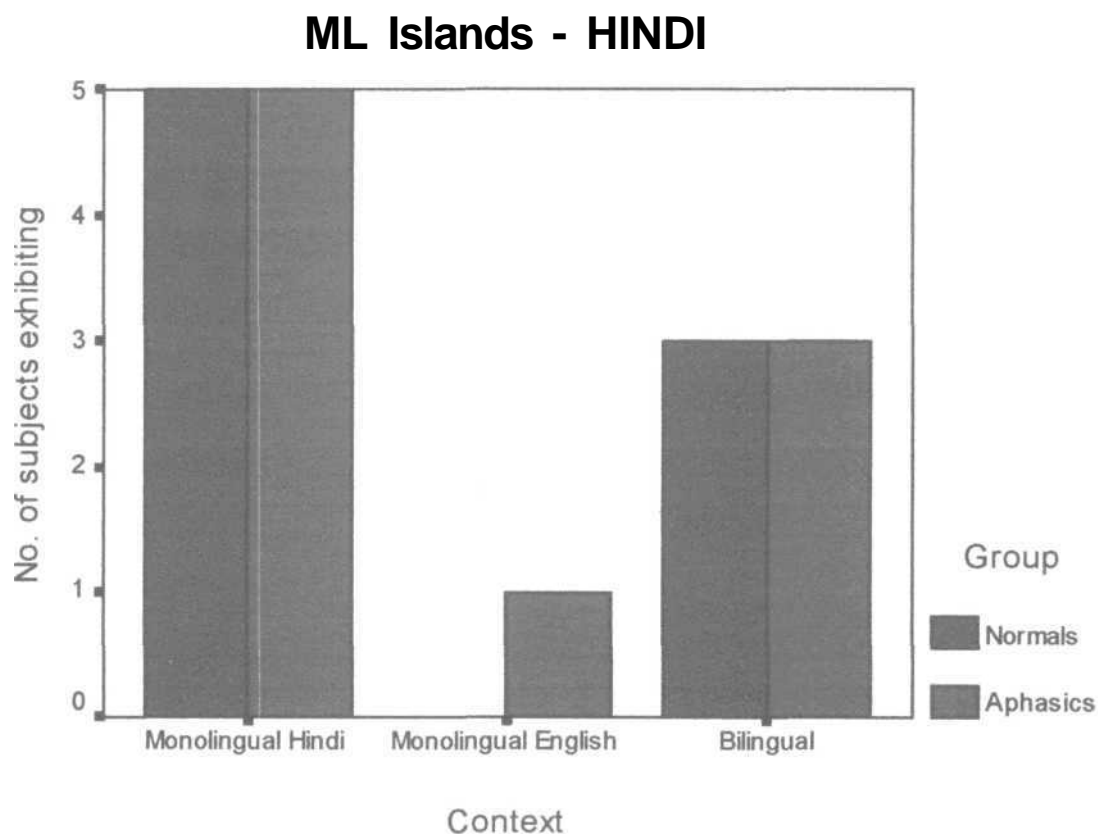


It was found that for all normal subjects, ML islands were in the language established by the interlocutor. As can be seen from table 4.9 aphasics as well normal subjects produced ML island quite frequently and more normal subjects exhibited ML islands when the context was monolingual English. Increase in frequency of this constituent in normal speaker suggests increased single language utterance in normal controls in comparison to aphasics in monolingual condition.

Grosjean, (1985) suggested that language mixing could be considered abnormal only if it was used inappropriately with monolingual interlocutor. In present study, bilingual aphasics produced ML islands as most frequent constituents in monolingual condition. This stresses the fact that they did not inappropriately switch

languages. Trend was similar in normal bilingual as well. Similar findings were reported by Krupa, (2002), Munoz et al (1999), Perecman, (1984) and Sapna (2004).

**Graph 4.2B:** No. of subjects exhibiting code switching and mixing, (ML islands- Hindi) in different contexts.



ML islands were the most frequent constituent in bilingual context. There was no significant difference across subjects in frequency of this constituent. This is in contradiction to monolingual English context where the normal produced more frequent ML islands (graph 4.2A). In bilingual context, aphasics subjects had freedom to choose their utterance from two languages and thus communicate in any language linked which reduced the difference between normal controls and aphasics in this

context. Present study supports Sapna, (2004) findings and can not be compared with those of Krupa ,(2002) as she did not evaluate her subjects in bilingual contexts.

### ***Embedded language Islands (EL islands)***

Embedded language islands (EL islands) are formed when syntactic procedures of embedded language are activated and these of matrix language are inhibited.

EL islands were present in all context for aphasics and it was absent in case of normal monolingual English context (table 4.9,graph 4.3). It is also clear that aphasic produced more EL island in comparison to normal in monolingual English context.

Example: Hindi context by one of aphasic

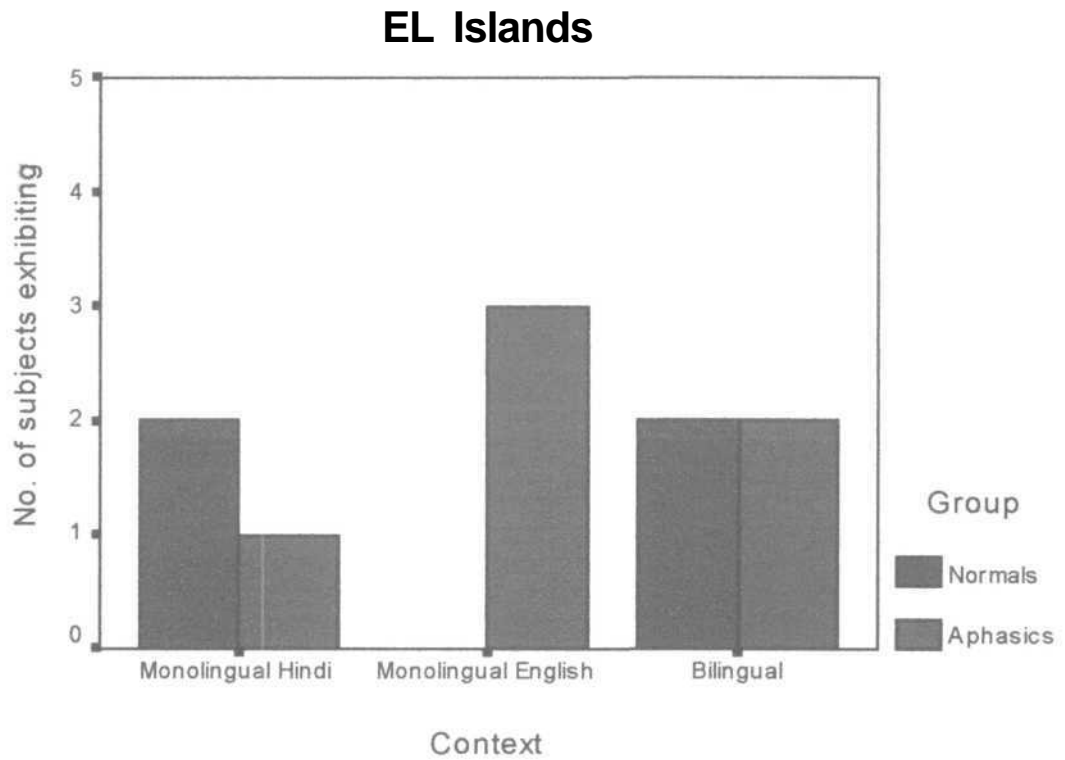
*mai TV watching like kerta hoon.*

**I like** watching TV.

The instances of EL islands in the utterances was more in monolingual English context for aphasics and supports Krupa,(2002) findings. This can be due to the lexical retrieval problem.

EL islands produced by both the aphasic and normal subjects conformed with Myers -Scotton (1992) hypothesis where code switches occurs but maintains the grammatical integrity of both languages.

**Graph 4.3:** No. of subjects exhibiting code switching and mixing, EL islands- in different contexts.



#### ***EL Insertion***

When multiple EL lexemes demonstrating no syntactic structure are inserted into the syntactic frame of any number of ML it is called EL insertion. From the graph 4.3 it is clear that such Insertions are present in case of most of the aphasics and absent in normals in each of the contexts either it is monolingual Hindi, monolingual English or Bilingual.

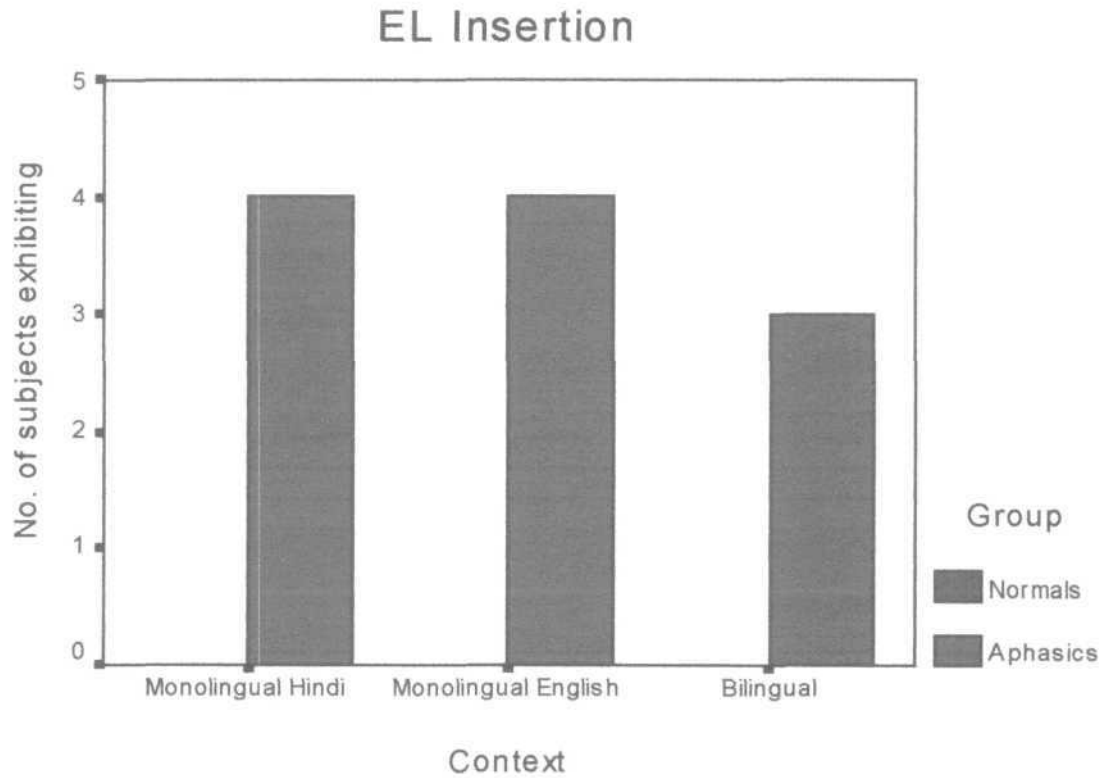
Example:(Seen in one aphasic)

*Mai work live ghar*

I work live home.



**Graph4.4** : No. of subjects exhibiting code switching and mixing, EL insertions in different contexts.

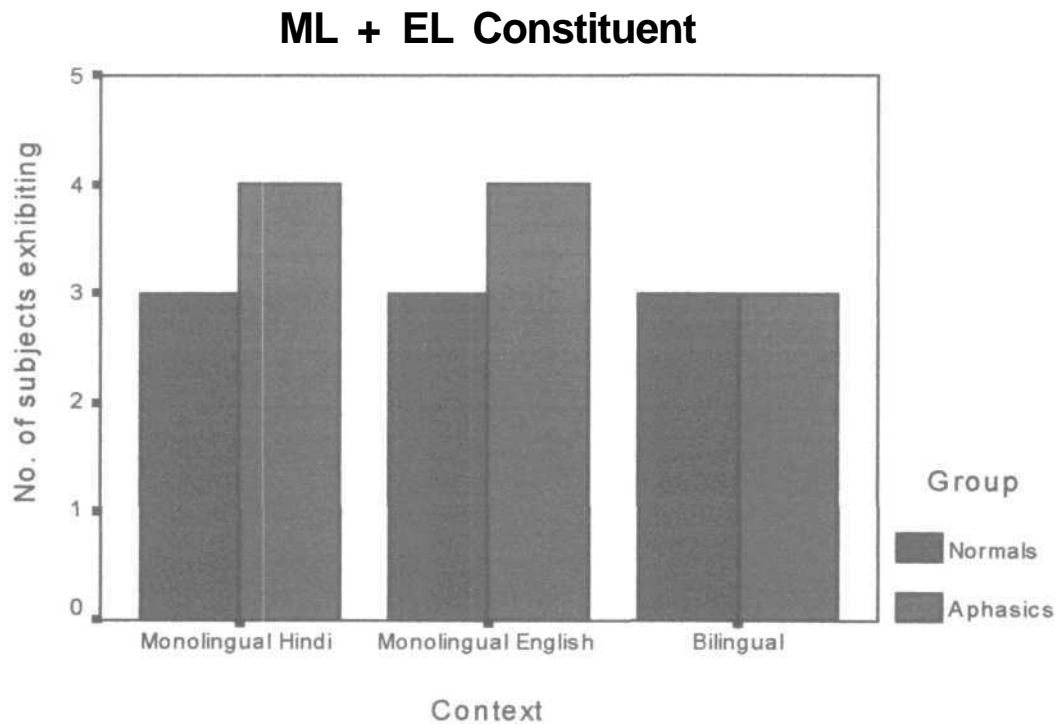


***Matrix language and Embedded language (ML+EL)***

ML+EL are constituents where embedded language lexemes are inserted into the syntactic structure of matrix language. They follow the syntactic rules of the matrix language and the content morphemes can be form the EL . ML+EL constituents were produced by 4 out of 5 subjects when the context was monolingual in case of

aphasics and three in case of normal subjects (graph 4.5). Present finding replicate the findings of Krupa ,(2002),and Sapna(2004).

**Graph 4.5 :** No. of subjects exhibiting code switching and mixing, MI + EL constituents in different contexts.



(graph4.5) explains that aphasic subjects appeared to be accessing the second language to meet the lexical demands more often than normal subjects in case of monolingual context. However it is same in bilingual context.

Example from one aphasic

*Mera dost achha run karata hai*

My friend good runs

My friend runs well.

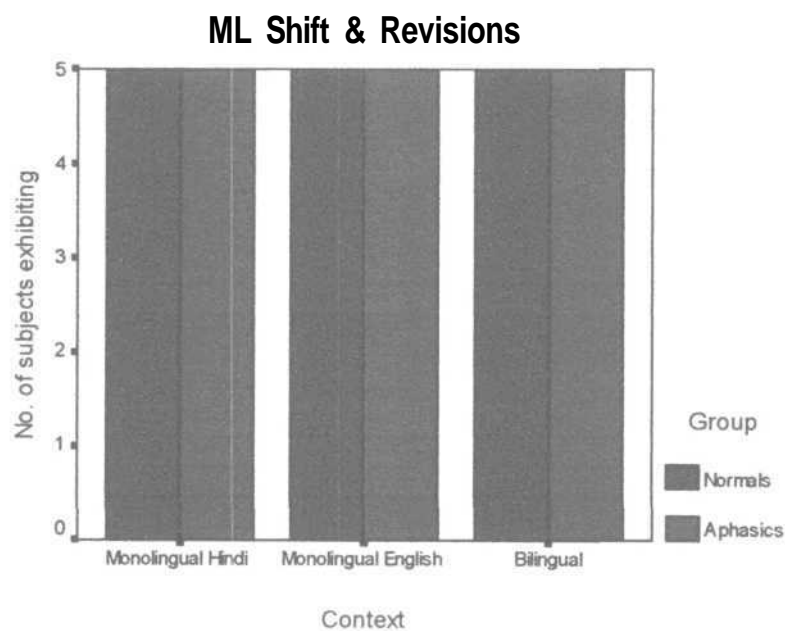
### ***Matrix language shift (ML shift) and Revisions***

Matrix language shift (ML shift) is change in the matrix language in consecutive utterances of clausal structure preceded by a pause of **two** or more second or a change in pitch. Thus it represents change from one language to another. It thus represents code switching as it is shift of languages.

Revisions, as a constituent were embedded to original constituent of MLF by Munoz et al (1999) to account for the **type** of utterances produced by bilingual aphasics.

Revisions include lexical insertion that does not contribute to the meaning of the utterance such as speech errors.

**Graph4.6:** No. of subjects exhibiting code switching and mixing, ML shift and revision in different contexts.



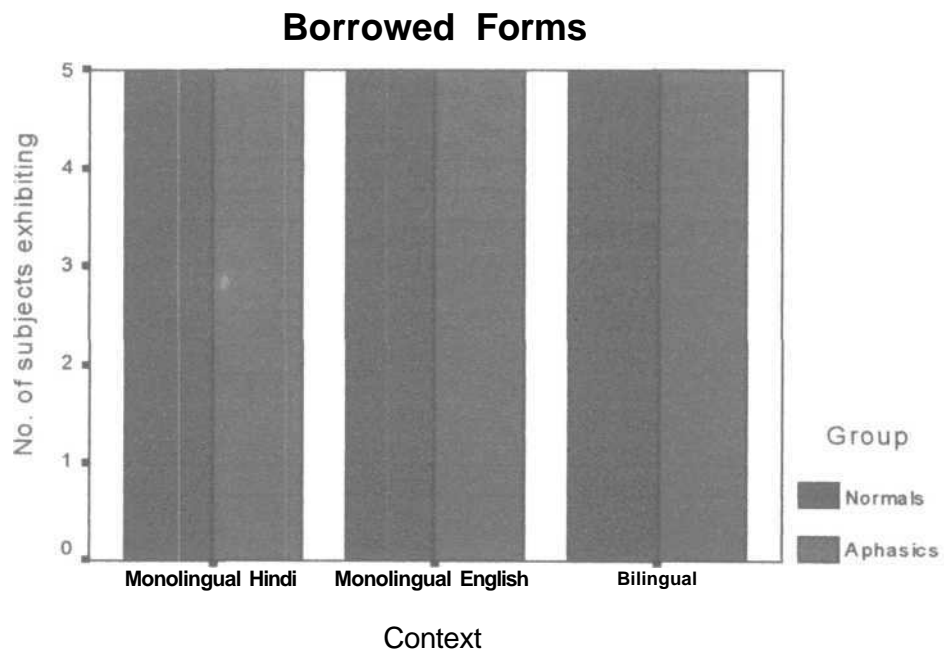
ML shift and revision were present in the all the subjects and also during all the three contexts. That means no contextual or subjects wise differences were for ML shift and revisions. Present study support Krupa (2002) findings but the revision were more in Sapna (2004) findings in case of aphasics as compared to normal.

### ***Borrowed forms***

Borrowed forms are lexemes from one language integrated into the phonological system of the second language.

Ex. *Mera ladaka school me padhata hai.* Here "school" is from English language and integrated into the phonological system of Hindi language. This was the example taken from one of normal subjects.

**Graph 4.7:** No. of subjects exhibiting code switching and mixing, borrowed forms in different contexts.



It is clear from the graph (4.7) it was frequent in the entire normal as well as aphasic group in every context. It means the presence of borrowed form does not depend on the context as well as subjects. This supports Krupa (2002) and Sapna (2004) findings.

## SUMMARY AND CONCLUSIONS

This study intended at comparing code mixing and switching behavior across bilingual aphasics and normal individuals. Though many studies have targeted code switching and mixing in normal bilingual individuals in the Indian context, such studies on bilingual aphasic population are only few.

Hence the aims of study were to compare the type and extent of code mixing and switching in aphasics and normal bilinguals speaker Hindi - English; find similarities and differences between code mixing and switching noticed in aphasics and normal bilinguals. The effect of code mixing and code switching was looked into.

Five bilingual Hindi-English aphasics and five normal Hindi - English bilinguals were the subjects. The controls were matched on age, gender, language (based on response to Australian Second Language proficiency rating scale and part A of Hindi English bilingual aphasia test), education level and handedness. Western aphasia battery (Kertesz and Poole, 1974) and short version of BAT (Paradis and Vaid, 1987) were administered on bilingual aphasics in Hindi - English in order to get a picture of language deficits across languages.

A conversational analysis was carried out in three different contexts i.e. monolingual English and bilingual on three different days. These samples were analyzed for different constituents of matrix language frame model (MLF, Myeers-Scotton, 1993) i.e. matrix language islands, (ML islands), Matrix language shift (ML shift), Embedded language islands (EL islands), matrix language + Embedded

language(ML+EL), revisions, borrowings, Embedded language insertion(EL insertion) and level of code mixing and switching . Wilcoxon Matched-Pairs Signed- Ranks test was used to see the difference of BAT score for both Hindi and English contexts for aphasic group.

Following are the important conclusions that can be drawn from the study.

1. The result from BAT short version pointed towards a parallel deficit across the two languages of the subjects.
2. Western aphasia battery revealed Broca's aphasia in two subjects and anomia in three subjects in both Hindi and English.
3. For all normal subjects most of the ML islands were in the language established by the interlocutor. They conversed mostly in English in the monolingual English context and most of the sentences were in Hindi in the monolingual Hindi context. In case of aphasics one of the subject conversed in Hindi in spite of monolingual English context. In bilingual context out of five, three conversed in Hindi. These results suggest reduced mixing in normal control compared to aphasics.
4. Embedded language island (EL islands) are true form of code mixing where stretches of utterances having the syntactic structure of weaker language i.e. are incorporated into matrix language. EL islands were more in aphasics, compared to normals.

5. EL insertions are multiple EL lexemes demonstrating no syntactic structure inserted into the syntactic frame of ML morphemes unlike normal subjects most of the aphasics produced EL insertions, meaning that code switching and mixing of this type are frequent in aphasics and absent in case of normals.

6. ML+EL constituents were produced more by aphasics in monolingual Hindi as well as monolingual English context and it was same in case of bilingual contexts. It also supports the finding that there is an increase on code mixing and switching among bilingual aphasics.

The result of this study thus reveals similarities and differences in how neurologically normal and aphasic bilingual speakers, code switch or mix in verbal interactions. It was noticed that embedded language (EL) insertion, ML+EL constituents, were exhibited more frequently among aphasic subjects. Individual differences in the frequency and type of constituents produced and the contexts in which they were produced were significantly evident in the code switching patterns of bilingual aphasics.

**Limitations of the study:**

1. Only limited number of subjects was studied among normal and aphasic population.
2. The study was done among only Broca's and anomic aphasics.



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**Suggestion for future research:**

1. A large group of subjects can be included in both normal as well as pathological group.
2. The study can be carried out across various types of aphasics.
3. Similar studies can be conducted in other Indian languages and language pairs.
4. A cross linguistic (among different language pairs) comparison may be attempted.

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## APPENDIX - A

### Language use questionnaire (Sapna Bhat,2004)

(Modified for Hindi)

Name:

Education:

Age/Sex:

Mother Tongue:

Other languages known:

1. When did you start learning English?
2. How and where did you learn English?
3. How many years of education do you have in English?
4. When did you start using English in your daily conversation?
5. How often do you speak English?
6. Mark the frequency of English use in the following situation:

(0=nil, 1= occasional, 2=frequently, 3=most of the times)

Home-

Friends-

Neighbors-

College / Workplace-

7. Do you mix Hindi and English while speaking?

8. Frequency of mixing English with Hindi:

(0=nil, 1 occasionally, 2=frequently, 3=most of the times)

Home-

Friends-

Neighbors-

College / Workplace-

Formal talks / Official discussions / Presentations

9. How do you feel / react when it is pointed out that you mix languages?
10. Do you think it is important to mix Hindi and English while speaking?
11. Do you find it difficult to speak only in Hindi with out using English words?
12. What are the words you take from English while speaking in Hindi? Give a few examples.
13. Do you use Hindi words when you are speaking in English? If yes, when do you do that?
14. Do you think mixing of languages affects purity of languages?
15. Do you think we mix languages only when we do not know one of the languages?

## APPENDIX - B

### Australian second language proficiency (ASLPR, Ingram, 1985)

Speaking	Listening	Written	Reading
<b>S:0 Zero Proficiency</b>	<b>L:0 Zero Proficiency</b>	<b>W:0 Zero proficiency</b>	<b>R:0 Zero proficiency</b>
Unable to function in the language.	Unable to comprehend the spoken language.	Unable to function in the written language.	Unable to comprehend the written language.
<b>S:0+ Initial Proficiency</b>	<b>L:0+Initial proficiency</b>	<b><i>W:0+Initial proficiency</i></b>	<b>R:0+ Initial proficiency</b>
Able to operate only in very limited capacity within very predictable areas of need.	Able to comprehend only a very restricted range of simple utterances within the most predictable areas of need and only one face-to-face situations with people used to dealing with non-native speakers.	Able to write clearly a limited number of words or short formulae pertinent to the most predictable areas of everyday needs.	Able to read only a limited range of essential sight words and short simple sentences whose forms have been memorized in response to immediate needs.
<b>S:1-Elementary proficiency</b>	<b>L:1-Elementary proficiency</b>	<b>W:1-Elementary proficiency</b>	<b>R: 1-Elementary proficiency</b>
Able to satisfy immediate needs using learned utterances	Able to comprehend readily only utterances which are	Able to write with reasonable accuracy short words and brief	Able to read short simple sentences and short instructions.

	thoroughly familiar or are predictable within the areas of immediate survival needs.	familiar utterances.	
<b>S:1 minimum survival proficiency</b>	<b>L:1 Minimum survival proficiency</b>	<b>W:1 Minimum survival proficiency</b>	<b>R:1 Minimum survival proficiency</b>
Able to satisfy basic survival needs and minimum courtesy requirements.	Able to comprehend enough to meet basic survival needs.	Able to satisfy basic survival <b>needs.</b>	Able to read personal and place names, street signs, office or shop designations, numbers, isolated words and phrases, and short sentences.
<b>S:1+ Survival proficiency</b>	<b>L:1+ Survival proficiency</b>	<b>W:1+Survival proficiency</b>	<b>R:1+Survival proficiency</b>
Able to satisfy all survival needs and limited social needs	Able to satisfy al survival needs and limited social needs.	Able to satisfy all survival needs and limited social needs.	Able to read short texts on subjects related to immediate needs.
<b>S:2 Minimum social proficiency</b>	<b>L:2 Minimum social proficiency</b>	<b>W:2 Minimum social proficiency</b>	<b>R:2 Minimum social proficiency</b>
Able to satisfy routine social demands and limited work requirements.	Able to understand in routine social situations and limited work situations	Able to satisfy routine social demands and limited work requirements.	Able to read simple prose, in a form equivalent to typescript or printing, on subjects within a familiar context.

<b>S:3 Minimum vocational proficiency</b>	<b>L:3 Minimum vocational proficiency</b>	<b>W:3 Minimum vocational proficiency</b>	<b>R:3 Minimum vocational proficiency</b>
Able to speak the language with sufficient structural accuracy and vocabulary to participate effectively in most formal and informal conversations on practical, social and vocational topics	Able to comprehend sufficiently readily to be able to participate effectively in most formal and informal conversations with native speakers on social topics and on those vocational topics relevant to own interests and experience	Able to write with sufficient accuracy in structures and spelling to meet all social needs and basic work needs.	Able to read standard newspaper items addressed to the general reader, routine correspondence, reports and technical material in his special field, and other everyday materials (e.g., novels and similar recreational literature)
<b>S:4 Vocational proficiency</b>	<b>L:4 Vocational proficiency</b>	<b>W:4 Vocational proficiency</b>	<b>R:4 Vocational proficiency</b>
Able to use the language fluently and accurately on all levels normally pertinent to personal, social, academic or vocational needs .	Can comprehend easily and accurately in all personal and social contexts and in all academic or vocational contexts relevant to own experience.	Able to write fluently and accurately on all levels normally pertinent to personal, social, academic or vocational needs.	Able to read all styles and forms of the language pertinent to personal, vocational, social, academic or vocational needs.

<b>S:5 Native-like proficiency</b>	<b>S:5 Native-like proficiency</b>	<b>W:5 Native-like proficiency</b>	R:5 Native-like proficiency
Speaking proficiency equivalent to that of a native speaker of the same socio-cultural variety.	Listening proficiency equivalent to that of a native speaker of the same socio-cultural variety.	Written proficiency equivalent to that of a native speaker of the same socio-cultural variety.	Reading proficiency equivalent to that of a native speaker of the same socio-cultural variety.

## APPENDIX-C

### Definition of matrix language frame constituents (Myers -Scotton,1993)

(Munoz et al 1999)

Constituents	Definition
ML Islands	Well formed constituents consisting entirely of ML Morphemes demonstrating syntactic structure of ML
ML shift	Change in ML in consecutive utterances or clausal structures
EL islands	Well- formed constituents consisting of at least two EL morphemes showing syntactic structures of EL which has been inserted into ML.
ML+EL	A single EL lexeme(not a borrowed form) inserted into The syntactic frame of any number of ML morphemes.
Borrowed forms	A lexeme from one language incorporated into the morpho-syntactic structure of the second language and is widely accepted by the monolingual speakers of that language.
EL insertion	Multiple EL lexemes demonstrating no syntactic structure inserted into the syntactic frame of any number of ML morphemes.
Revisions	Lexical insertions that do not contribute to the meaning of the utterance including speech errors, restatements circumlocutions and are indicators of word finding problems.