

**A STUDY OF CODE MIXING AND CODE SWITCHING IN NEURO-TYPICAL
TELUGU-ENGLISH BILINGUAL ADULTS**

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May, 2013

**DEDICATED TO
MY DEAR**

AMMA

PAPPA

**PRASU
&
SAILU**

Certificate

This is to certify that this dissertation entitled “**A Study of Code Mixing and Code Switching in Neuro- Typical Telugu-English Bilingual Adults**” is a bonafide work in part fulfillment for the degree of Master of Science (Speech-Language Pathology) of the student (Registration No. 11SLP013). 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.

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Declaration

This dissertation entitled “**A Study of Code Mixing and Code Switching in Neuro- Typical Telugu-English Bilingual Adults**” is the result of my own study under the guidance of Dr. S. P. Goswami, Professor of Speech Language Pathology and Head, Department of Speech Language Pathology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier in any other University for the award of any Diploma or Degree.

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"No matter who tries to teach you lessons about life, you won't understand it until you have to go through it on your own"

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CHAPTER I

INTRODUCTION

Communication is a process in which individual exchanges information, thoughts, opinions and news (Shames Wiig & Secord, 1998). Communication is multimodal. The process of communication is enhanced by the use of facial expressions, gestures, eye gaze along with the speech. Language is an essential part of human interaction and transmission of information. According to Owens (2006) language is as social tool. He defined it as a socially shared code system for representing concepts through the use of arbitrary symbols and rules governed by combination of those symbols. In the world people communicate efficiently using different languages. Some use single language, while others use more than one language for exchange of ideas. The ability to speak or write fluently in two languages is referred as bilingualism (Canadian Encyclopedia, 2009).

Language is the system of arbitrary verbal symbols set in a conventional code that evolved as a social tool to communicate ideas and influence the behavior of others (McLaughlin, 2006). Human possess a capacity to learn aspects of more than one language. Bhatia and Ritchie (1996) statistically revealed that there is a great increase in bilingualism all over the world. This increase in bilingualism has led to a great increase in the studies of bilingualism in the west. In bilingual and multilingual communities, changes in verbal and nonverbal behavior that accompany a change in language are commonly taken for granted and do not elicit much interest. In reality, language

boundaries can become quite unclear in contexts where code-switching and code-mixing exist (Auer, 1998).

Code switching, code mixing and code borrowings are some of the important phenomena of bilingualism/trilingualism. These phenomena are used to describe when a speaker uses a word, phrase or sentence from one language while communicating in the other (Langdon, 2008). It was thought that the phenomenon of language mixing revealed that there is a reduced linguistic capacity of a multilingual but these are rule governed behavior and there are various factors that could trigger a multilingual to mix languages. Studies of these behaviors in persons with brain disorder have indicated that language mixing is a commonly observed recovery patterns among the bilingual persons with aphasia (Paradis, 1995). The earlier investigations into code mixing and code switching suggested that these phenomena are atypical in normal bi/multi-lingual's and are indicative of linguistic deficits in bi/multilingual persons with aphasia who use it as a facilitating strategy to enhance communication. Instances of code switching and code mixing might increase as a compensation for the linguistic disability resulting from various brain disorders like aphasia. Thus, the degree of code switching and code mixing could serve as an indication of the aphasia stage.

1.1.Need for the study

India is being a multilingual country; only limited studies have been carried out in Indian context on code mixing and code switching in bilingual neuro typical adults. In the present era, the phenomenon of code mixing and code switching becomes apparent in a

person's language to meet up his/her every day necessities and sustain the relationship with the new society and its people. Code mixing and code switching are used when individuals speaking in diverse languages come in contact with one another and communication between them is carried either through one or combination of these languages. Therefore, the present study was aimed at analyzing the linguistic forms, extent and type of code switching and code mixing in young and elder Telugu-English bilingual neuro typical adults.

1.2. Aim of the study

- To investigate the code mixing and code switching in neuro- typical Telugu-English bilingual adults.

1.3.Objectives of the study

- To explain in detail the nature and level of code-mixing and code-switching using Matrix language frame model (Myers-scotton, 1993) and Peregman's (Peregman, 1984).
- To compare the type and extent of code-switching and code-mixing across the age and gender.
- To identify the effect of age and gender on two stimuli (conversational discourse and narrative discourse) based on code-mixing and code switching.
- To identify the effect of order of elicitation in three different conditions

 In narrative discourse:

- ✓ Bilingual context

- ✓ Monolingual telugu
- ✓ Monolingual English
- ✚ For conversational discourse
 - ✓ Bilingual context
 - ✓ Monolingual English context
 - ✓ Monolingual telugu context

Present study was undertaken to verify the following hypotheses:

1.4. Hypothesis

- i. There was no significant difference in the performance of adults on code mixing and code switching task across the two age groups (younger and elder) for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands).
- ii. There was no significant difference in the performance of adults on code mixing and code switching task across gender for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands).
- iii. There was no significant difference in the performance of adults on code mixing and code switching task across two stimuli (Narration and conversation) for different constituents i.e., Matrix language islands (ML Islands), Matrix language

shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands).

- iv. There was no significant difference between the order of instructions in three different conditions i.e for narrative discourse, contexts like bilingual, monolingual Telugu and monolingual English; for conversational discourse, contexts like bilingual, monolingual English and monolingual Telugu.

CHAPTER II

REVIEW OF LITERATURE

Communication refers to the sending and receiving of messages, information, ideas or feelings (Hulit & Howard, 2002). All living organisms communicate in one way or the other. Travis (1971) defines communication as “the process by which the individual interacts with his or her environment and with himself or herself”. Plante (2004) stated that “human communication embodies a rich needlepoint of information conveyed through elements of movements, emotional expression and vocalizations. Communication includes all means by which information is transmitted between a sender and a receiver. Humans are unique among animals because they have developed a system of symbolic communication called as language. Language may be written, spoken or signed. Although all forms of communication involve language, effective use of language for communication is not restricted to spoken words. Humans have developed additional modalities for the expression of language. Normal communication encompasses verbal and nonverbal elements that are used for a variety of purposes. Communication is successful when information is accurately transmitted from a sender to a receiver.

Language has been defined by American Speech-Language-Hearing Association (Committee on Language, 1983) as a “complex and dynamic system of conventional symbols that is used in various modes for thought and communication. Language evolves within specific historical, social, and cultural contexts. Language, as rule-governed behavior, is described by at least five parameters. Language learning and use are

determined by the intervention of biological cognitive, psychosocial and environmental factors”.

For the purpose of study, linguists have identified language as having many subsystems (phonology, morphology, syntax and semantics as well as pragmatics) which have to do with sound, grammar, meaning, vocabulary and knowing the right way to say something on a particular occasion in order to accomplish a specific purpose (Jacobson, 1987). The speaker who knows all these is said to have acquired communicative competence in that language (Hymes, 1972). Language acquisition progresses across these components with increasing quantity (e.g., sounds, words and sentences length) and gradual refinement, and understanding of the subtle and more complex points of usage (e.g., using “taught” rather than “teached”) as the child grows.

Language is marked by productivity that speakers can make many new utterances and can recombine the forms. It also has semanticity, that is, it can represent ideas, events and objects symbolically. It offers the possibility of displacement that is messages need not be tied to the immediate context. Language is non-instinctive, conventional, that is language is the outcome of evolution and convention. It is non-instinctive because it is acquired, and everybody has been provided with an innate ability to acquire language. Each generation transmits this convention on to the next. Language is arbitrary. The arbitrariness of language means that there is no inherent or logical relation between any given feature of language and its meaning. (That means, there is no direct connection between the nature of things or ideas the language deals with and the linguistic units).

“Language is the most powerful, permanent means of communication. Non-linguistic symbols such as expressive gestures, signals of various kinds, traffic lights, road-signs, flags, Morse and other codes, the sign language and Braille alphabet so forth are also means of communication. Language is the best means of self-expression. Through language, humans express their thoughts, desires, emotions and feelings and also they store knowledge, transmit messages and experience from one person to another. Most of the activities in the world are carried on through language. In the normal course of events, language development like cognitive development, motor development, continues beyond the point where the individual has assumed the external appearance of an adult” (Erikson, 1959).

Bilingualism is the choice to utilize two or more languages by the similar individuals. The individuals involved are bilinguals. Initially most people are monolingual in nature. When needs arise, for improving their knowledge, and for purposes of communication, use of more than one language is essential to each and every one. Thus, individuals, societies as well as nations can be bilingual. “Bilingual acquisition is a complex phenomenon; monolingual children usually learn language from parents. But, bilingual children may learn languages not only from parents but also from grandparents, playmates, babysitters, childcare/day care workers, school teachers, neighbors and TV.

2.1. Bilingualism:

The term "bilingualism" is defined differently by different people. Bilingualism is defined as the capability to speak or write confidently in two languages (Canadian Encyclopedia, 2009). Bilingualism is also defined as 'having or using two languages particularly as spoken with the fluency characteristics of a native speaker (Webster's dictionary, 1961). Diebold (1961) defined bilingualism as inactive knowledge of the written language or any contact with a succeeding language and the capability to use it in the setting of local language. A bilingual person can be the individual who can talk two languages absolutely (Hamers & Blanc, 2000). Some authors suggested that, even a minimal familiarity of two languages is sufficient to meet the criteria as a bilingual. Myers-Scotton (2006) believes bilingualism is the capacity to utilize two or more languages adequately to hold on a narrow informal conversation, but one cannot put definite restrictions on proficiency or how much the speaker in difficulty is speaking or comprehending of a different speaker.

A bilingual can be on a range depending on the locations he is in. In monolingual mode, sometimes there would be no mixing and other time they find themselves in a bilingual mode by mixing languages without limit (Grosjean, 1982). Bilingualism has been defined and described in terms of categories, scales, magnitude and dichotomies. Speaking more than one language is motivated by rising power of the global mass media and universal communication through internet and because of that the number of multilingual/ bilingual community in the world is rising (Bhatia & Ritchie, 2004). Adult

verbal communication has been examined by a mixture of elicitation methods related to differing discourse types (mainly narrative, procedural, descriptive, and conversational).

Second Language Acquisition has been studied extensively. Normally a bilingual either acquires or learns a second language. Acquisition refers to knowing a language in the natural environment without formal instruction. But, in case of 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 speakers and learning language through formal instruction. The use of a language in a particular context is influenced to a great extent on the acquisition or learning of a second language". Haugen (1956) introduced the terms infant, childhood, adolescent, and adult bilingualism. As for the two types of pre-adolescent bilingualism, infant bilingualism refers to the simultaneous acquisition of two languages, while childhood bilingualism refers to the establishment of a second language during the early school years, after the first has been learned in the family. Other researchers following Haugen's research labeled his definition of childhood bilingualism as successive or sequential acquisition of two languages.

2.2. Types of Bilingualism

Baetens-Beardsmore (1999) attempted to classify bilingualism by using topologies or descriptive labels.

- a) **Ambilingualism:** Ambilinguals exhibit in both languages equally in all domains of activity without the influence of one language on the other.
- b) **Equilingualism:** Equilinguals exhibit approximately the same in both languages as like monolingual norms of reference. But the equilingual is evidently different from monolingual speakers.
- c) **Functional Bilingualism:** It is the capability to achieve a limited set of behavior in a second language.
- d) **Receptive/Passive Bilingualism:** It is the capability to understand a second language in either its verbal or written form, or both.
- e) **Productive/Active Bilingualism:** Active bilingual is able to speak and/or write a second language in adding to comprehending that language.
- f) **Natural/Primary Bilingualism:** The achievement of a second language occurs in the absence of regular training or specific instruction.
- g) **Academic/Secondary Bilingualism:** The acquisition of a second language takes place by means of formal training.
- h) **Incipient Bilingualism:** The initial separating of the patterns of a second language takes place either at the decoding and encoding level.

Bilingualism research also tried to point out the different types of bilingualism so that one can suggest the definition for the each type of bilingualism. This classification is cited in Thirumalai and Shyamala (1986).

<p><i>Compound bilingualism:</i> compound bilinguals learn both languages in same context or learn the second language through translation (Weinreich, 1953).</p>	<p><i>Coordinate bilingualism:</i> coordinate bilinguals have acquired two languages in different contexts and they are able to keep both languages apart by deriving the different meaning from words in two languages (Weinreich, 1953).</p>
<p><i>Simultaneous bilingualism:</i> simultaneous bilinguals get all opportunities to learn two languages simultaneously in an entirely natural way.</p>	<p><i>Successive bilingualism:</i> successive bilinguals establish one language fully or partially first, and then a second language is established.</p>
<p><i>Dominant bilingualism:</i> dominant bilingualism is one who knows one language better than the other language (Peal & Lambert, 1962).</p>	<p><i>Non-dominant bilingualism:</i> non-dominant bilinguals know and use both languages equally well.</p>
<p><i>Second language acquisition:</i> acquisition of second language in the natural setting without formal instructions.</p>	<p><i>Second language learning:</i> second language learning takes place in an artificial linguistic environment that involves a formal learning situation with consistent feedback, error correction and the rule language.</p>

2.3. Bilingual phenomenon of code switching and code mixing

It is essential to study the manner in which bilingual mix and assimilate two systems in day to day spoken communications. A speaker who speaks more than one language, exhibit code switching and code mixing during communication. This incident takes place when bilinguals substitute a word or phrase from one language to another language. Some linguists suggest that people code switch as an approach in order to be better understood and to enhance the listener's comprehension. From this one can understand that the code-switching among bilinguals has traditionally been received as a strategy to compensate less proficiency of language. Language contact takes place when there is better group communications between people who are living in neighborhood and have conventionally verbalize dissimilar languages. But it is also initiated by the increase of languages of influence and status.

In a language contact situation, one can find three types of language interaction:

- ✓ Code mixing,
- ✓ Code switching and
- ✓ Interference.

2.4. Code switching and code mixing

Code switching is defined as the application of two or more languages in the similar speech context. In the beginning, code switching and code mixing were defined by Haugen (1956) and Gumperz (1982) as interchanging the use of two languages. According to Bhatia and Ritchie (1996), code switching is defined as the mixing of different linguistic units (words, phrases, clauses and sentences) mainly from two

participating grammatical structure across sentence boundaries within a speech event. Code mixing is defined as the mixing of diverse linguistic units (morphemes, words, modifiers, phrases, clauses, and sentences) mostly from two participating grammatical structure within a sentence. In other words code switching is inter-sentential and is controlled by some discourse principles, where as code mixing is intra-sentential and is controlled by grammatical principles. Speaker subconsciously uses code-mixing and code-switching as a mechanism for signaling his/her two social identities at the same time. Speaker's use of a particular language conveys meanings that go beyond the speaker's actual words (Trudgill, 2000).

Bokamba (1987) considers code-switching to be “the mixing of words, phrases and sentences from two different grammatical (sub) systems across sentence boundaries within the same speech event” and code-mixing to be “the embedding of different linguistic units such as affixes (bound morphemes), words (unbound morphemes), phrases and clauses from a mutual activity where the participants must resolve what they hear with what they understand”. Bloom and Gumperz (1972) categorize two types of code switching. In the “Situational code switching” the narrator will change their code depending on the suitable situation at that time where as in “metaphorical code switching” the speakers will change their code in order to achieve a particular communicative result. Spolsky (1998) says, "It is very common that people develop some knowledge and ability in a second language and so become bilingual. The simplest definition of a bilingual is a person who has some functional ability in a second language. This may vary from a limited ability in one or more domain to very strong command of

both languages." Wardhaugh (1992) refers, "Conversational code-mixing involves the purposeful mixing of two languages without an associated topic change." Hudson (1996) says code-mixing as a case "where a fluent bilingual talking to another fluent bilingual changes language without any change at all in the situation." He also says, "To get the right effect, the speakers balance the two languages against each other as a kind of linguistic cocktail." Poplack (1980) described four distinctiveness of language mixing in the normal bilingual adults:

- A Smooth shift among L1 (first language) and L2 (second language) without false starts, hesitations and lengthy pauses.
- No awareness of alternation between the languages.
- Switches consists of the segments, which are larger than single nouns are placed in to L2 sentence and
- Code switching is used for other purpose than simply conveying untranslatable things.

Code-switching can be used to accomplish two things: (a) to fill a linguistic/ conceptual gap or (b) for additional numerous communicative purposes (Gysels, 1992). The phenomenon of language mixing revealed reduced linguistic capacity of a multilingual. Mixing is the rule governed behavior and there are various factors that could trigger a multilingual to mix languages. Studies of these behaviors in persons with brain disorder have indicated that language mixing is a commonly observed recovery patterns especially among the bilingual persons with aphasia characterized by irregular language use at the word or sentence level (Paradis, 1995). Earlier investigations into

code mixing and code switching suggested that these phenomena are different in normal bi/multilingual and are indicative of linguistic deficits in bi/multilingual aphasics who use it as a facilitating strategy to enhance communication. Further, instances of code switching and code mixing might increase as a compensation for the linguistic disability resulting from various brain disorders like aphasia. Thus, the degree of code switching and code mixing could serve as an indication of the aphasia stage.

2.5. Types of Code-switching

Three types of code switching are observed based on the different situational variables. These variables affect the type and frequency of code switching, the theme of conversation, the participants, the situation, the emotional aspect of the message so on. Gumperz (1976) classifies code switching as:

- a) **Situational code-switching:** It is the choice of language, which changes as the situation changes. Language X is used in one particular situation, but Language Y is considered more appropriate for some other situation. Switching from one code to another can change the social state: from official to casual, from formal to private, from serious to funny, from civility to unity or intimacy.
- b) **Conversational code-switching:** This is not linked to the changes in external factors of the speech constellation, but occurs within an externally invariant speech situation within a turn or even intra sentential. Conversational code-switching serves to create various contexts” (Bussmann, 2000). For example, 'informality' in a formal situation, the different types of relationships between individual participants in a conversation, irony verses seriousness, and

background information verses the 'actual' message. These are all contextualized by means of code switching" (Bussmann, 2000).

- c) **Metaphorical code-switching:** The choice of language defines the social situation. "A variety of languages used in one kind of situation is used in a different kind because the topic is the class which would normally happen in the first kind of situation" (Hudson, 1996).

2.6. Reasons for code-switching

Valdes-Fallis (1976) said that the code switching take place not because of the lack of the expression in the L1 (first language). Instead, proficiency of the speakers and their performance in the one or the other language influences the code switching pattern. Some studies on bilingual speech production considered the use of L1 content or function words in L2 speech. The use of L1 form is considered as the compensatory strategy (Poullisse & Bongaerts, 1994, Poullisse, 1997). Bilingual speakers make an attempt involuntarily to reduce the mental effort and can make things easier to monitor and direct the operations by reducing the language- specific options available to them. He also said that the cognitive motivation is quite powerful and thus, it will dominate the social and communicative restriction on the discourse, leading to unintentional choices (Yaron Matras, 2000).

2.7. Constraints on code mixing and code mixing

In the late 1970's and early 1980's attempts were made to confine grammatical constraints on code mixing and code switching. Challenging theoretical framework attempted to trace the universal set of laws to clarify grammatical constraints for acceptable intrasentential and inter sentential code switching.

2.7.1. The equivalent constraint

This was introduced by Poplack and her associates (Poplack, 1980, Sankoff & Poplack, 1981). According to Poplack, (1980), code switching likely to occur at points in discourse where the juxtapositioning of L1 and L2 elements does not violate syntactic rules of the language.(i.e., at points around which the surface structures of two languages map on to each other). The equivalent constraint implies that code mixing and code switching occurs only at positions which are similar to both languages and different points will not give up mixing. The equivalent constraint predicts that mixing will be allowable between noun and determiner, where it will be blocked between noun and adjective. For example, in Hindi-English mixing the phrase structure rule of the noun phrase (NP) of English and Hindi are the same (i.e., NP (Det) (Adj.) N). Mixing between Hindi and English can be estimated at the NP level.

I. a) The old man b) The /budda:/ man c) The /budda:/ /a:ḍmi:/

II a) /vo:/ /budda:/ /a:ḍmi/ b) /vo:/ old /a:ḍmi/ c) /vo:/ old man

The relation between I (a-c) and II (a-c) shows that II (b) and II (c) allow mixing with English in the adjectival and nominal positions, but the English translational

equivalent of II do not allow Hindi mixing in these two positions. The principle basis of ungrammaticality of I (b) and I (c) is seems that the Hindi lacks articles. To fill the space created by the absence of English articles in Hindi, the Hindi speaking bilingual will utilize one of the two strategies either the demonstrative pronoun ‘/vo:/' that is used in its place of the articles or the definite articles is dropped as in the code mixed phrase ‘old a:ḍmi’. The outcome thus, created is totally well formed and seems to obey equivalent 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.

2.7.2. The Free morpheme constraint (FMC)

According to this constraint, a switch can take place among a bound morpheme and a lexical form, if the lexical form has been phonologically integrated into the language of the bound morpheme (Sankoff & Poplack, 1981). The free morpheme constraint states that a narrator could switches code following any constituent that is not a bound morpheme. This constraint is parallel with the dimension of constituent constraint. For example, in Spanish word, it is proposed to relate for the ill-formedness of expression such as ‘run-eando’. The Spanish-bound morpheme –eando violates the restriction against the mixing of a bound morpheme.

2.7.3. The Clitic pronoun constraint

Clitic pronoun items are recognized in the similar language as the verb to which they are criticized and the location is mandatory by the syntactic rule of that language (Pfaff, 1979). Some of these utterances may be ruled out according to this example. Bhatia and Ritchie (1996) discussed example in Spanish. As both English and Spanish are SVO, individual would expect by equivalence constraint that mixing would be probable in verb and object position and still in the subject place. The clitic pronoun constraint rules out the sentences such as the following.

English-Spanish

She sees lo him

‘She sees him’

2.7.4. Dual structure principle

This principle was proposed by Sridhar and Sridhar (1980) to explain code switched utterances produced in Kannada-English. This principle says that the inner structure of the guest (Embedded constituent) need not verify to the constituent structure rules of host (matrix) language, so long as its position within the host language follow the set of laws of host language.

Example: kannada-English

a) /nənnə/ /əb^hɪpra:jəɖəllɪ/ his visiting her at home /sərijəllə/.

My opinion in his visiting her at home appropriate not.

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

b) ‘/əvənʊ/ /əvəl ənnʊ/ /mənə:jəllɪ/ /no:dʊvəɖu’

He her home his visiting her at home.

He visited her at her home

Kannada and English 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) come after the object English but it precedes in Kannada. But the reality is that that position of the English phrase in the matrix Kannada sentence (a) match up to that of (b) in an unmixed version of Kannada sentence (a) is sufficient to make (a) well formed. A Study conducted by Pandharipande in 1990 stated that, Dual structure principle incorrectly predicts the grammaticality of the sentence that results from replacing the English verb in matrix language as in Punjabi-English switching.

2.7.5. Close class constraint

This constraint was proposed by Joshi in 1985. According to this constraint, the close things (e.g., determiners, quantifiers, prepositions, possessive markers, auxiliaries, and tenses, helping verbs so forth) could not be switched. This is very simple and has less documented and researched

2.7.6. The government constraint

This was proposed by Discillo, Muysken and Singh (1986) to confine the constraint on code mixing in terms of government constraint formulated in terms of government binding (GB) theory. It is based on two grounds. First the assignment of language indices results from the procedure of lexical insertion and not from the

phrase structure (PS) rule. Second, the occurrence of syntactic integration is clarified by a fundamental principle that is suitable. This is not just for code mixing or for one language, but for linguistic structure in common and meant for all languages. It can also be presumed that, they should be in one language as the verb governs its complement clauses, direct and indirect objects and complement pre and post positional phrases. Government theory has been able to predict lot of code switched constraints, but has also failed to explain some of English – Hindi complex formations (Bhatia, 1989).

2.7.7. Matrix language frame model (Myers-Scotton 1993)

Matrix language frame model (Myers-Scotton 1993) supports the investigation on linguistic performance and on sentence production. This model recognizes that in bilingual code mixing, one language can be considered as the first or dominant language in relation to the other. The requirements of MLF model are contained in a set of organized hypothesis. Each hypothesis stands on its own and makes specific predictions. These predictions make clear the type of evidence which would misrepresent the hypothesis.

a) The Matrix language hypothesis: The ML (Matrix language) puts the morphosyntactic frame for ML+EL (Matrix language + embedded language) constituents as an early step in constructing the ML+EL constituents. This hypothesis is understood as two testable principles. In Morpheme order principle (MOP), the ‘Morpheme order should not violate Matrix Language Morpheme order’. For example, in Hindi/English sentence given by vaid (1980) “Idea /bura:/ /nahi:/ /həɪ”.

(It's not a bad idea). Here Hindi is the ML. In the system morpheme principle (SMP) 'all syntactically related system morphemes should appear from the ML.

Apart from this, three additional hypothesis were provided, these are

b) *The block hypothesis:* The ML (Matrix language) obstructs the emergence of any EL (Embedded language) content morphemes which do not meet up certain similarity conditions with ML (Matrix language) counterparts.

c) *The Embedded language island trigger hypothesis:* Each time an Embedded language morpheme come into view which is not allowable under either the Matrix language hypothesis or the Blocking hypothesis, the constituent holding it should be fulfilled as an obligatory Embedded language islands.

d) *The Embedded language implicational hierarchy hypothesis:* Here probable embedded language islands may take place, which are moreover standard or marginal to the core grammatical arguments of the sentence.

The constituents are categorized based on the connection between matrix language and the embedded language. Matrix language (ML) is the base language of the conversation supply the most system morphemes to the communication and put the morphosyntactic structure of the statement. The majority of the system morphemes will happens in ML while content morphemes can be admitted in the either language. Embedded language (EL) is the less energetic language placed into the constituents recognized by the matrix language.

I) **Matrix language (ML) islands** are constituents formed with only morphemes from the matrix language. The dominant language then functions as the Matrix Language (Chan, 1998). The Matrix Language determines the overall structure of the code-mixed utterances. The Matrix Language is sometimes called as the Host Code and the Embedded Language is called as the Guest Code (Chan, 1998).

Example-Swahili language: *nimemaliza kutengeneza vitanda* (I have finished fixing the beds)

II) **Embedded language (EL) islands** are constituents formed with only EL morphemes within the ML structure. The embedded language is the one which the speaker learns as his or her second language. This second language functions as the Embedded Language (Chan 1998). These are parallel ML islands.

Example - Swahili language: *ah si-vyo, kawaida hu-wa kwa gazeti. Kama last year i-li-ku-w-a gazeti under public service commission.*

III) **ML + EL constituents** are miscellaneous utterances. This consists of morphemes from both the ML and the EL. The prototypical ML+EL constituent contain a singly occurring EL lexeme in a frame of any number of ML morphemes. This follows morpheme order principles.

Example- Swahili language: *leo si ku come* (today I didn't come)

Swahili language: *Na books z-angu* (with my books)

Hindi language: *idea /bura:/ /nahi:/ /həɪ/* (it's not a bad idea)

MLF model has total of seven categories. Four categories of the MLF have their foundation in the hierarchical connection between ML and EL. Matrix language creates the phrase structure of a statement and code-mixing results from the placing of lexical constituents from both the matrix language and another language (the embedded language) into the proper gap of the phrase structure (Chan, 1998). The three supplementary constituent classes like borrowed forms, embedded language (EL) insertions and revisions were supplemented later by Munoz, Marquardt and Copeland (1998) to relate the type of utterances seen in the persons with aphasia.

IV) Borrowed forms: A word from one language integrated into the morphosyntactic structure of the second language and is extensively accepted by the monolingual speaker of that language is known as borrowed form. Language borrowing depends on the type of contact that exists between two languages. Contact might be geographical, social or technical. Borrowing is more commonly found at the higher levels of language, first in vocabulary, and then in syntactic patterns. Morphological patterns are rarely borrowed and phonological patterns are very less borrowed. Commonly loan words retain the phonemic shape of the donor language. Loan shifts / loan translations reproduce the morphemes of the donor language using native material. (As cited in language information service-LIS, India)

Eg. 'Catwalk' - /ma:rdʒa:la nədəkə/

'Violin' - /va:juli:nəmu/

In borrowed words, phonological and morphological modifications are brought about in the borrowed items according to the structure of the borrowing language.

Eg- 'Road' – /ro:ddu/
'Peppermint' – /pæppərmentu/
'Torch' – /ta:rtʃu/
'Schools' – /sku:llu/

V) Embedded language (EL) insertions: Many embedded language lexemes without any syntactic structure is placed into the syntactic structure of any number of Matrix language morphemes.

VI) Revisions: lexical insertions that do not give the sense of the statement including speech errors, restatement, circumlocutions and are sign of word finding problem.

Research on multilingualism found in Hyderabad has lead to formulation of three types of code-alternation: (*as cited in language information services-LIS, India*)

- (a) code-mixing
- (b) code-switching
- (c) code-sliding (all the three types are referred to by the acronym CMSSing).

(a) Code-mixing

A sentence from one language integrates the elements into another language by retaining its basic structure then it is called as code-mixing. The imported elements are:

(i) A single word as in example- They are all going for */grʊhə prəve:f æm/*.

(ii) A phrase as in example-Every now and then */ɪdɪ/ /ɪlə:/ /dʒərʊɡʊtu:/*
/vɪtʊdɪ/

(iii) A clause as in example-*/ɪdɪ/ /va:lləkɪ/ /tʃepɪe:/*, they will kill us.

(b) Code-switching

Code-switching takes place when a speaker changes the code within the utterance after completing a sentence grammatically.

Ex.: */ne:nu/ /velɪa:nʊ/*. ‘You also come with me’

(c) Code-sliding

In code-sliding, an utterance starts in one language and then gradually slides into another language. It happens without closing the sentence either semantically or grammatically.

Ex. (i) Whichever place you go */vʊtɪərə:lʊ/ /ra:stʊ: vɪdʊ/*.

(ii) */ələ:təppʊdʊ/ /mənə/ /gəvərnəmēt/ /e:do/ /tʃejjalɪ/*, so that they get
better opportunities.

Thus, all three varieties of language alternations namely, code mixing, code switching and code sliding coexist and the bilinguals can be included into all these three varieties.

2.7.8. Difference between code switching and borrowing

The structural statement of Matrix Language Frame (MLF) model implies a difference between the relationships of the borrowed forms and the code switching forms to the matrix language (ML) mental lexicon. The difference is a matter of lemma (that is, nonphonological part of an item's lexical information) entries. This information is used to construct the framework of an utterance without consider for the phonology of words (Levelt, 1986).

<i>Borrowed forms</i>	<i>Code switched forms</i>
Borrowed form is a part of matrix language (ML) mental lexicon.	Embedded language (EL) morpheme is recognized as a code switching form. But it doesn't occur singly.
Borrowed form probably has entries in the mental lexicon both of the Matrix language and of its parent, the embedded language. The two entries need not to be identical entries.	Embedded language origin word which is a code switching form is accessed in matrix language + embedded language (ML+EL) constituents through an embedded language (EL) lemma. But its true only if it is similar with an matrix language (ML) counterpart,
Borrowed form is accessed directly (through its own Matrix language lemma).	In Embedded language (EL) islands, a lexeme is accessed directly through its own lemma.
Borrowed forms may usually show more morphological mixing	Code switched forms may usually show less morphological mixing

Borrowed forms are divided into two groups. They are cultural forms and core forms. *Core borrowed forms* are directly linked with code switching forms and enter the matrix language first as code switching forms. Therefore core borrowed forms are related to code switching forms in two ways. These borrowed forms enter the matrix language through the process of code switching and both forms lie along a frequency continuum with code switching forms showing minimal recurrence principles. *Cultural borrowed forms* 'fill the gaps' within the syntactic structure of the language and are generally considered to be true of borrowed forms in general. The position of an embedded language or a code switching form can be established by measuring the rate with which it encodes in relation to the rate of the original form for the same concept. Cultural borrowed forms occur in relatively high frequency, because there is no original competition with them. Core borrowed forms will show high frequency in relational to the embedded language forms (code switching forms).

2.7.9. Studies on code switching and code mixing

Numerous studies have been taken up to deal with code switching and code mixing. Clyne (1967) declared that switching might be trained by internal or external factors such as the environment, the presence of a speech partner to communicate in the other language. He explained that the code switching is activated in a different way which is preceded by hesitation, pause or a prompt word that indicates activation. According to him, triggering can be trained due to individual emotional factors and even phonological factors such as phonemic similarity in the two languages.

Code mixing and code switching was considered to express speakers inability to access information in the base language. Valdes-fallis (1976) found that the code switching occurs because of the proficiency of the speakers and their performance in the one or the other language and not because of the lacked equivalent expression in the base language chosen. Her study presented two conclusions.

- a) The bilingual has a binary collection of symbolic procedures, of which he takes full advantage to highlight and produce his speech.
- b) The reliability of the pattern shows the extent to which two languages are combined into a kind of super system with a bilingual vocabulary and a phonic system that is not identical with that of their preference for one or the other of two languages.

Gumperz (1964) collected code switching data from three linguistically and socially dissimilar situations like Slovenian/German, hindi/English and Spanish/English. He came to an opposite view about relation between code switching and conversational situation. He disagreed 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 less likely to switch
- b) Sequential unity: discontinued sequences cannot be switched.
- c) Semantic and pragmatic unity: natural units cannot be broken as conjunctions and go with the phrase they run alongside.
- d) The total number of switches within any message sub unit cannot be more than one.

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

In a Sociolinguistic point of view, George Barker's (1947) studied the issues of language choice and code switching among Mexican Americans in Tucson, Arizona. Barker proposed that younger people were more appropriate to utilize various languages in a single interaction than were their elders.

Kolers (1968) took a diverse view and assumed that the categorization takes place in short term memory is not a word in a particular language instead it is a concept or meaning. His hypothesis was based on results of the experiment in which bilingual French/English participants were tested in reading and talking tasks. Passages were prepared in unilingual, alternating and mixed language forms. The participants were tested for comprehension, to read aloud, to make precise, and to speak freely in these forms. Results indicated that comprehension was found to be affected by the linguistic form of a message, but other tasks decreased by 20-40% when test was uttered. He suggested that, encoding and decoding of two languages are asymmetrical operations.

Discussing the bilingualism from a psychological point of view, McNamara (1967) stated that switching takes a noticeable 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, bilingual switched without pausing for a word or phrase so forth. He also suggested that such a bilingual has a capacity to reposition the L2 system, the selection of words and the syntactic organization more or less mechanically producing in L1 material that has already been prepared for production.

Perecman (1984) reported on language mixing of an 80-year-old male who experienced extensive bilateral temporal hematomas because of car accident. Data was investigated at various levels (phonological, morphological, lexical-semantic and syntactic) of code switching and the conclusion made was that language boundaries are weakly defined in bilingual persons with aphasia's mental grammar and stated that mixing at the utterance level and natural transformation are atypical behaviors observed in bilingual persons with aphasia. Grosjean (1985) disagree with these result by stating that utterance level mixing is not exclusive to bilingual persons with aphasia. He noted that the Perecman's study was on multilingual participants and this might activate language mixing in participants as a communicative approach. He recognized features such as language mode, pre morbid language use and test constraints as planned in any study agreeing with language mixing.

Verma (1969) studied linguistic analysis of registral features and concluded 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.

Vaid (1980) discussed the variety and purpose of code mixing evident in Indian films with reference to mixing of Hindi and English. Results suggested that English is mixed with Hindi most commonly by the young, educated and the westernized user, context of usage determines code mixing. There are typical contexts like greetings, office setting, educational setting and social gathering where English is mixed more frequently.

Pathak (1982) conducted a study on code mixing in Hindi- English bilinguals and concluded that code switching follows definite processes and strategies. He also said that in the conversation certain structural types like unit insertion, unit hybridization, clause insertion, idioms and collocations insertion, inflectional attachment and reduplication were seen to occur frequently.

Poullisse and Bongaerts (1994) checked the use of L1 content words (nouns, verbs, numerals, adjectives, and most adverbs) and L1 functional words (prepositions, determiners, conjunctions, and pronoun) in Dutch learners of English. The authors stated that Dutch learners of English used more of L1 content words than L1 function words in their L2 speech.

Grosjean (2008) stated that, like monolinguals, bilinguals have innate capacity for language and they develop competence in each of their languages to the extent needed by the environment. Yaron (2000) attempted to study the fusion and the cognitive basis for bilingual discourse markers. He concluded that, there is a strong cognitive drive in bilingual speakers that dominate the society and the level of communication on discourse

resulting in involuntary code switching. Gollan and Acenas (2004) showed that bilinguals have more tip-of-the-tongue states than monolingual speakers which are caused by hesitant production and selection processes due to cross lingual interference.

According to the Frankel and Pen (2007), conversation is a complex effort, requiring executive function skills like planning, sequencing, monitoring, attention and linguistic skills. These aspects take place in conversation that will affect the individual ability to access and make use of the existing language resources. Glossor and Deser in 1990 found in his study that, the discussion of any topic related to family may or may not have resulted in actual narrative production that leads to simple description of names and physical characteristics. Hakuta and Pease-Alvarez, (1992), Anstrom, (1997), Hasson, (2006), Marian, Blumenfeld and Kaushanskaya (2007) stated that interaction with family members posed to be one of the major contributor for attaining proficiency in L1.

Smith (2002) studied the code switching patterns across age and gender. Results revealed that, younger male and females significantly differed from the older males and females in the rate of lexical insertion. He attributed this difference to the greater exposure of children to English in school. Other earlier studies also showed that younger group exhibited more lexical insertion than older group (Hudson-Edwards & Bills, 1992, Hudson, Hernandez Chavez,). Contradicting view of Fereshten Rezaeian (2009) showed that no difference in the rate of code switching in younger and elder group because of the fact that community tradition, life style, culture and length of residence common for both groups. According to Irani (2007), there are many communities with high technology

professions as university professors, physicians, specialists, dentists, and engineers. Hence, it can be concluded based on results that the environmental demands may play a key role in code switching and mixing. Geetha in 2010 conducted a study on code mixing and code switching in Tamil proverbs across age and social variables. She found that, borrowed proverbs are used by the younger generation in Tamil language because of the fact that, younger generation students have learned these borrowed proverbs in school as part of their peer communication. These participants employed the borrowed lexical items of the native language like cycle, bullet, aero plane, full, figure so forth.

Cheshire and Gardner-Chloros's (1998), Treffers-Daller (1992) and Fereshten Rezaeian (2009) found no significant difference across gender on code mixing and code switching. Contradicting views were provided by earlier studies in sociolinguistics that, females generated more rate of code switching. Mulac, Weimann, Widemann and Gibson (1988) stated that women use more adjustment strategies and unite towards the partners gaze in mixed-sex settings. James (1996) and Eckert (1989) considered that variation in the power status of the men and women, they act in a different way in many behavioral aspects. Duechar (1988) pointed out that females tend to use high-status forms to protect their own face.

According to the Word Association Model, a first language (L1) word is linked to its second language (L2) equivalent. So the activation of L2 is mediated by L1 equivalents and its word concept. Bilinguals are able to make use of all language cues that repeatedly to mix the target word without relying on the inhibitory control. This is an agreement with the view of Costa et al. (2006) that all bilinguals need not to rely on mechanism of inhibitory control. Another supporting view point given by Heredia and

Alterribe (2001) that language shift from L1 to L2 of same lexical categories is more accessibility in L2 because of the continuous exposure and usage. According to the inhibitory control model of Green (1986, 1998), dominant language (L1) needs more inhibition for words when compared to the less dominant language (L2), Hence, excitation takes longer time to reactive the L1. Revised Hierarchical Model (Kroll and Stewart, 1994), states that forward translation (L1-L2) takes more time than backward translation (L2-L1), which depends on the proficiency in L2. More proficient group performed equally in both translations, but less proficient group showed asymmetry in translation (Kroll, Michael, Tokowicz, & Dufour, 2002)

Krupa (2002) studied Code Switching in persons with aphasia who were age, gender matched normal Malayalam – English Bilinguals. Analysis was done using Matrix Language Frame Model. All the Code switching samples were evaluated using seven constituents like Matrix language islands (MLI), ML+EL Constituents, embedded language islands (ELI), borrowed forms, ML shifts, EL insertions and revisions. Results were established for each constituent separately

- ML islands were noticed in the native language in all the normal participants and 3 of the 6 persons with aphasia.
- No EL insertions were noticed in all normal participants and 1 person with aphasia.
- EL islands were formed by 2 normal participants and 1 person with aphasia in monolingual Malayalam situation and 3 persons with aphasia in Monolingual English situation.

- ML+EL constituents were formed by 4 of the normal participants and 5 persons with aphasia.
- Revisions and ML shifts were apparent in the language of all subjects. 2 of the normal participants and 4 of the aphasics.
- It was found that persons with aphasia showed repeated construction of EL, insertions, and ML shifts. Thus the results disagree with the idea that code switching remains unaltered by person with aphasia. Hence it supports the belief that language mixing is pathological. In normal Kannada-English bilingual participants, code switching is common and there is plenty of borrowed English words in list of Kannada speakers (Bhat & Chengappa 2003).

Bhat and Chengappa (2004) examined code mixing and code switching in Bilingual persons with aphasia. Results as follows

- Matrix language + embedded language (ML+EL) island more often by the persons with aphasia all the circumstances. But in monolingual English condition, this constituent was significantly reduced in few aphasics and normal subjects.
- Embedded Language Islands (EL Islands) were significantly better in persons with aphasia in monolingual condition as compared to control group.
- Revisions were apparently distinct in 2 set of participants with only bilingual persons with aphasics exhibited this constituent.
- Borrowed forms were noted in persons with aphasia frequently, but the distinction across 2 set of participants was not significant. Morphological mixing was used commonly by normal Kannada-English bilinguals. Aphasics used lexical semantic

level mixing more oftenly and this difference was significant in monolingual Kannada context.

Neeraja (2004) conducted a study to compare the code switching behavior exhibited by Tamil-English bilingual persons with stuttering and normal fluency. Results revealed an increase in frequency of occurrence in code switching utterances in persons with stuttering when compared to normal fluent individuals matched for the language background.

Kumar (2006) did a study on code mixing and code switching among Hindi-English bilingual persons with aphasia. He reported that similarities and differences in verbal interactions of the code switching and mixing in neurologically normal and aphasic bilingual speakers.

- ML Island was noticed in the native language for all the participants.
- In ELI, real variety of code mixing were more in persons with aphasia compare to normal's.
- EL insertions are more common in persons with aphasia.
- ML+EL constituents were demonstrated more by persons with aphasia both in monolingual Hindi and monolingual English context and it was similar in case of bilingual contexts.
- To conclude, Individual variation in the rate and form of constituents produced and the condition in which they were formed were significantly apparent in the code switching pattern of bilingual persons with aphasia.

Another study has been done by Rida Rabbani (2012) in undergraduate students to see the effect of gender in code switching and code mixing while texting messages. She has taken the text messages of two languages namely English and Urdu. Data was analyzed and established the mean values. Results indicated that there was no difference in the gender in code switching and code mixing while texting messages.

Studies have been done in Malayalam-English bilinguals, kannada- English bilingual persons with aphasia and Hindi-English bilingual persons with aphasia. There were no studies in the Indian context, reporting code switching or code mixing in Telugu-English bilingual neuro-typical adults. The present study is trying to fill a gap by conducting study among Telugu-English neuro typical bilingual adults. Above literature suggests there is a need to investigate and better understanding of code switching and code mixing in Indian languages.

CHAPTER III

METHODOLOGY

3.1. Participants

A total of 40 bilingual participants were considered in the present study. They were divided into 2 groups. Group I consisted of twenty young adults of which 10 were males and 10 were females in the age range of 20–30 years with the mean age range of 23.6 and 23.5 respectively. Group II consisted of twenty old adults of which 10 were males and 10 were females in the age range of 50-60 years with the mean age range of 54.6 and 52.9 respectively.

3.2. Ethical procedure

Participants were selected by ethical procedure. They were explained the purpose and procedure of the study and an informed consent was obtained from them.

3.3. Inclusion criteria

Participant selection criteria for bilingual adults were follows. All the participants had

- Telugu as their mother tongue.
- Completed their higher education in English.
- Telugu as their first language in the early childhood and English as learnt language as part of their higher education.
- No history of any neurological, communicative or sensory impairment.

3.4. Questionnaire/ Instrument

Bilingual neuro typical adults were assessed for second language proficiency (English) using the Language Experience Proficiency Questionnaire-LEAP-Q (Maitreyee & Goswami, 2009). It can be administered to both adult and adolescent bilinguals and multi-lingual with diversity in language familiarity and proficiency levels. In addition, the LEAP-Q can be used to gather detailed information of participant's language histories for descriptive point of view. It is also used to evaluate bilingual's knowledge and proficiency outline in both first (L1) and second (L2) languages. L1 stands for the language which was learned earlier (it does not mean that dominant or proficient in that language). Domains included in the LEAP-Q are acquisition history, background of acquisition, current language use, language choice and proficiency ratings (using 4 point rating scale for all the four domains of language use: speaking, understanding, reading, and writing), and accent ratings. A few questions are appropriate to all bilinguals, for example the questions include the ages of acquisition of L2. Some questions are useful to a subgroup of bilinguals only (for example, migrant group of people who learned their first language to some extent from their family unit and try to continue and increase L1 proficiency by the way of self instruction). Such as those interested about L1 learning from tapes, Questions related to each language were considered to be the same to hold variability in histories of L1 acquisition and to sustain maximal flexibility of the questionnaire.

3.5. Stimuli and data collection

Two different types of stimuli were considered for the study these included narration task and conversational task. A quiet room without any noisy and distractive environment was selected for recording. The participant was seated comfortably on a chair opposite to the investigator across the table. The investigator spoken to participant for sometime in order to build an informal atmosphere and to facilitate code switching in bilingual contexts before recording the sample. The following instructions were given to the participant in Telugu.

“Now I will be going to give a topic called ‘journey to a place’ to narrate followed by this, a general conversation will be initiated. I want you to describe the incidence and experience taking place while during journey followed by general conversation. Are you clear with the instructions? Do you have any questions to ask? Shall we start?”

For narrative discourse each participant was instructed to narrate a task orally on a topic ‘Journey to a place’. Verbal instructions were provided to narrate on a topic for duration of three minutes in three different conditions in the order mentioned below

- Bilingual context
- Monolingual telugu
- Monolingual English

For conversational discourse participants were asked the questions regarding the personal information, school life, college life, family, job and daily routine activities, interest and hobbies etc for duration of three minutes. All the participants were instructed to speak in three different conditions in the order stated below.

- Bilingual context

- Monolingual English context
- Monolingual telugu context

The discourse of participants was audio recorded using a Sony digital tape recorder. The tape recorder was kept in-front of the subject, approximately at a distance of 10cms. The recording was carried out in a single sitting. The same procedure was followed for rest of the participants in two age groups.

3.6. Data analysis

3.6.1. Transcription

Later Orthographic transcriptions have been carried out. Recordings were subjected to orthographic transcriptions using standard IPA symbols for further analysis. The accuracy of analysis was checked by the ten speech language pathologist for interrater reliability.

3.6.2. Analysis –

- Qualitative analysis:** qualitative analysis of the data was derived from the results of statistical analysis. This was used to find the differences in the language proficiency levels across all participants.

- Quantitative analysis:**

The recorded and transcribed samples were subjected to linguistic analysis using Matrix language frame model (Myers-Scotton 1993) to find the presence, nature and extent of code switching and code switching across gender and two age groups. The seven constituents given in Matrix Language Frame Model (Myers-Scotton, 1992) namely; Matrix Language Islands (ML islands), Matrix Language

+Embedded Language (ML+EL), Embedded Language Islands (EL islands), Borrowed forms, Matrix Language Shift (ML shift), Revisions, embedded language insertions (EL in) were identified. Accordingly, the seven constituents namely; ML Islands, ML+EL, EL Islands, Borrowed forms, ML Shift, revisions , EL insertions were identified and counted in two context (monolingual and bilingual) across two stimuli. The scores were considered in terms of percentage for all the constituents in two different contexts (monolingual and bilingual).

For example- Frequency of occurrence of MLI (%) =

$$\frac{\text{Number of MLI forms existed in sample}}{\text{Total number of words in the sample}} \times 100$$

In this task, the investigator ignored the repeated forms of the same constituents within the sample and counted such constituents only once. Hence accurate occurrences of the constituents were taken as appropriateness by ignoring total occurrence of the particular constituents.

For example:

Constituent	Total	Appropriateness
ML+EL constituents	20	15

3.7. Statistical analysis

Statistical analysis was carried out using SPSS (Statistical Package for the Social Sciences) version 17.0. Individual scores of all the constituents from each participant in two different contexts (monolingual and bilingual) and for two stimuli (narration and conversation) obtained were subjected to statistical analysis

Two way repeated measures ANOVA was carried out to compare the within subject variables (i.e. narration, conversation and monolingual, bilingual) and between subject variable (i.e. age, gender).

Paired t-test was carried out for each of the constituents in different conditions with respect to stimuli to find the significant difference.

Non-parametric test was computed to compare the proficiency ratings among two languages (monolingual & bilingual).

Mann-whitney U test: This was carried out to see the group (younger and elder) and gender (Males and females) difference, if any.

Wilcoxon-signed rank test: If there was a significant difference between two languages, the qualitative data was subjected to Wilcoxon-signed rank test pair wise analysis.

The results and discussion are presented in the following chapter based on the above methodology and statistical analysis.

CHAPTER IV

RESULTS

The Aim of the study was to investigate the code mixing and code switching in neuro-typical Telugu-English bilingual adults. Objectives of the study was to explain in detail the nature and level of code-mixing and code-switching using Matrix language frame model (Myers-Scotton, 1993) and Perelman's (Perelman, 1984) levels, to compare the type and extent of code-switching and code-mixing across the age and gender, to identify the effect of age and gender on two stimuli (conversational discourse and narrative discourse) based on code-mixing or code-mixing, to identify the effect of order of elicitation in three different conditions . In narrative discourse, contexts like bilingual, monolingual Telugu and monolingual English. Whereas in conversational discourse, bilingual context, monolingual English context, and monolingual Telugu context.

Present study was undertaken to verify the following hypotheses: There was no significant difference in the performance of adults on code mixing and code switching task across two age groups (younger and elder) for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands). There was no significant difference in the performance of adults on code mixing and code switching task across gender for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands). There was no significant difference in the performance of adults on code mixing and code

switching task across two stimuli (Narration and conversation) for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands). There was no significant difference between the order of elicitation in three different contexts i.e. for narrative discourse, in bilingual context, monolingual Telugu context and monolingual English contexts; for conversational discourse, in bilingual context, monolingual English and monolingual Telugu contexts.

4.1. Qualitative analysis:

All the participants had minimal vocational proficiency in English and native like proficiency in Telugu. All the participants had education up to graduation level. Table1 gives the demographic details and description of language usage.

Table1: *Demographic details of neuro-typical bilingual participants.*

Particip ants	Age	Gender	Education level	Occupation	Native language	Language of education
1	20	Male	Graduation	Student	Telugu	T/E
2	30	Male	Graduation	Engineer	Telugu	T/E
3	24	Male	Graduation	Student	Telugu	T/E
4	23	Male	Graduation	Student	Telugu	T/E
5	23	Male	Graduation	Student	Telugu	T/E
6	23	Male	Graduation	Engineer	Telugu	T/E
7	24	Male	Postgraduation	BankManager	Telugu	T/E
8	23	Male	Graduation	Student	Telugu	T/E
9	23	Male	Graduation	Student	Telugu	T/E
10	27	Male	Postgraduation	Lecturer	Telugu	T/E
11	23	Female	Graduation	Student	Telugu	T/E
12	22	Female	Graduation	Student	Telugu	T/E
13	22	Female	Graduation	Student	Telugu	T/E
14	25	Female	Graduation	Student	Telugu	T/E
15	22	Female	Graduation	Student	Telugu	T/E
16	23	Female	Graduation	Student	Telugu	T/E
17	30	Female	Postgraduation	Teacher	Telugu	T/E
18	22	Female	Graduation	Student	Telugu	T/E
19	22	Female	Graduation	Student	Telugu	T/E
20	25	Female	Postgraduation	Teacher	Telugu	T/E

21	57	Male	Ph.D	Lecturer	Telugu	T/E
22	61	Male	Graduation	Lawyer	Telugu	T/E
23	50	Male	Postgraduation	Teacher	Telugu	T/E
24	52	Male	Graduation	Postal assistant	Telugu	T/E
25	50	Male	Graduation	Teacher	Telugu	T/E
26	61	Male	Graduation	BankManager	Telugu	T/E
27	50	Male	Postgraduation	Teacher	Telugu	T/E
28	58	Male	Graduation	Manager	Telugu	T/E
29	59	Male	Graduation	Teacher	Telugu	T/E
30	60	Male	Postgraduation	Engineer	Telugu	T/E
31	60	Female	Ph.D	lecturer	Telugu	T/E
32	50	Female	Graduation	Teacher	Telugu	T/E
33	59	Female	Postgraduation	Teacher	Telugu	T/E
34	50	Female	Graduation	Teacher	Telugu	T/E
35	50	Female	Graduation	Teacher	Telugu	T/E
36	50	Female	Postgraduation	Teacher	Telugu	T/E
37	52	Female	Graduation	Teacher	Telugu	T/E
38	52	Female	Graduation	Teacher	Telugu	T/E
39	57	Female	Postgraduation	Teacher	Telugu	T/E
40	55	Female	Postgraduation	Lecturer	Telugu	T/E

*T/E = Telugu / English

4.1.1. Proficiency of the language:

Participants were asked to self rate their proficiency level in each of the two languages they knew in understanding, speaking, reading and writing. The overall median scores were calculated across languages for both groups which are given in Table 2. The median values indicated that participants rated themselves to be proficient in L1 than L2.

Table2: *Median values of four skills across age and gender.*

	Younger group		Elder group	
	Males	Females	Males	Females
L1 Understanding	4	4	4	4
L1 speaking	4	4	4	4
L1 Reading	4	4	4	4
L1 writing	4	4	4	4
L2 Understanding	3	3	3	3
L2 speaking	3	3	3	3
L2 Reading	3.5	3.5	3	3
L2 writing	3	3	3	3

*L1-Telugu, *L2-English

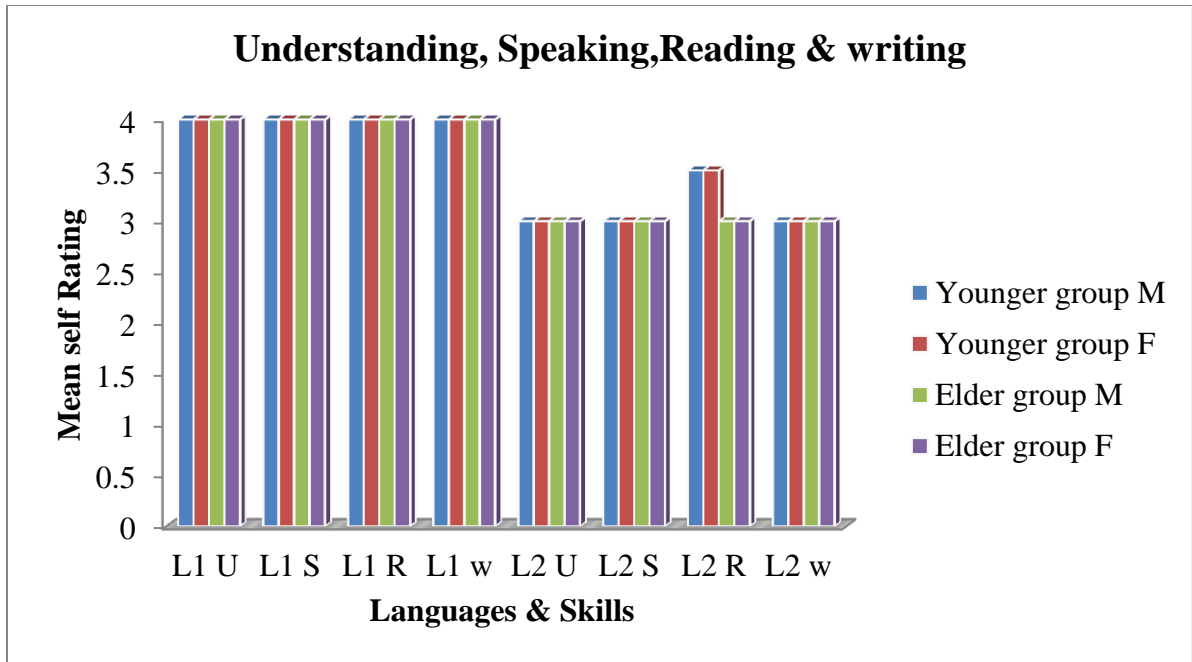


Figure 1: Median values of four skills across age and gender.

*L1 U- understanding in L1, *L1 S- speaking in L1, *L1R- reading in L1, *L1W- writing in L1, *L1-Telugu, *L2-English

Results of the Wilcoxon signed ranked test pair wise analysis revealed that there was a significant difference ($P < 0.01$) between the self ratings of L1 and L2 across different skills. L1 was better than L2 across four skills.

4.1.2. Duration of the exposure:

The data of the duration of exposure to two languages were analyzed to study the important factors that directly or indirectly contribute to proficiency in each of the language. The mean and standard deviation was computed and the following results were obtained.

Table3: *Mean and SD of different context and its duration of exposure across two languages.*

<i>Context</i>	<i>L1</i>		<i>L2</i>	
<i>Duration of exposure</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Interaction with family	3.70	0.72	1.82	0.99
Schooling/Work	2.78	1.14	2.88	0.85
Listening to instruction tapes at school	2.53	1.21	3.03	1.00
Text books	2.45	1.33	3.25	0.89
Dictionary	1.98	1.18	3.25	0.92
Story books	2.60	1.17	2.90	0.95
Newspapers	2.93	1.09	2.65	0.89
Historical books	2.35	1.23	2.63	1.10
Internet source	1.30	0.72	2.73	1.30
Writing	2.73	1.17	3.18	0.81
Interacting with friends	3.00	1.03	2.68	0.91
Interacting with neighbors	3.08	1.04	2.00	0.96
Watching television	2.78	1.12	2.20	0.79
Listening to the radio	2.65	1.14	1.80	0.91
Market places	2.95	1.13	2.03	0.83

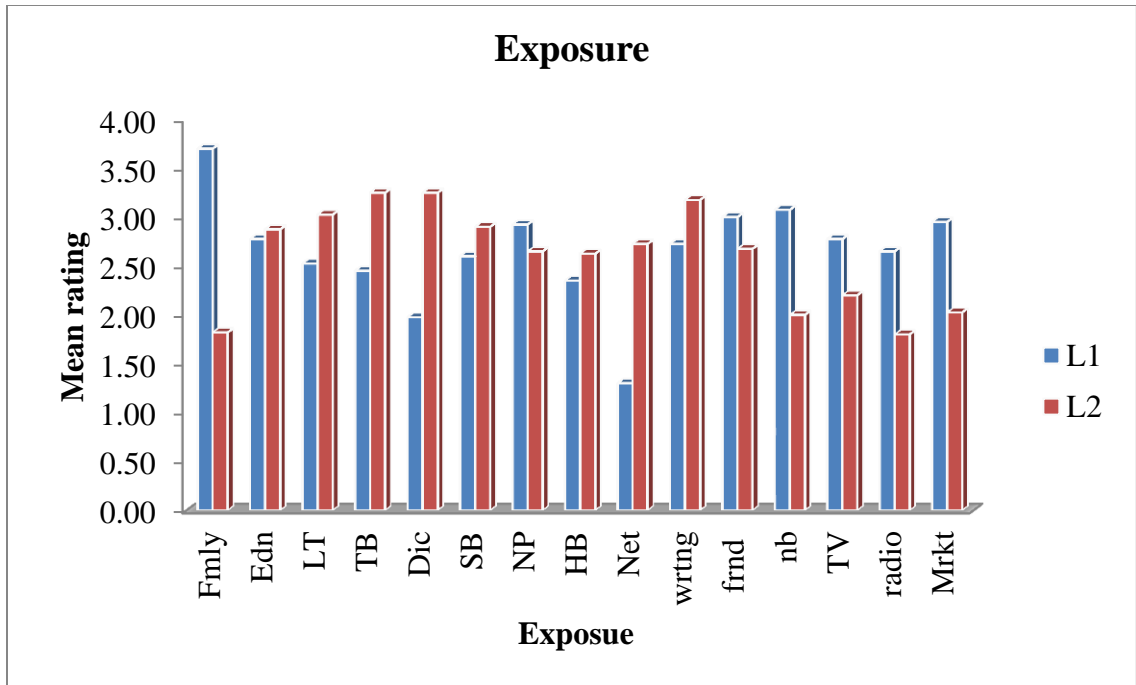


Figure 2: Mean values of different context and its duration of exposure across two languages.

*Fmly- interaction with Family, *Edn- Education, * LT- listening to the instruction tapes at school, *TB- Textbooks, * Dic- Dictionary, SB- Storybooks, NP- Newspaper, HB- Historical books, *Net- Internet source, *Wrtng- writing, *Frnd- Interacting with friends, *nb-Interacting with neighbours, *TV- watching television, *radio- Listening to the radio,* Mrkt-Market places.

For L1:

In different contexts in a day, the mean and standard deviation for interaction with family (3.70, SD=0.72), neighbors (3.08, SD=1.04), friends (3.00, SD=1.03) were the different settings where the participant maximally exposed for longer durations. Next major factors that contribute to L1 acquisition were market places (2.95, SD=1.13), newspapers (2.93, SD=1.09), watching television (2.78, SD=1.12), schooling/work (2.78, SD=1.14), writing

(2.73, SD=1.17), listening to the radio (2.65, SD=1.14), story books (2.60, SD=1.17), historical books (2.35, SD=1.23), listening to instruction tapes at school (2.53, SD=1.21) and text books (2.45, SD=1.33). Other remaining factors like dictionary (1.98, SD=1.18), internet source (1.30, SD=0.72) also contributed the acquisition of proficiency in L1, but at a least degree.

For L2:

InL2, Mean and standard deviation for most important contributing aspect like listening to instruction tapes at school (3.03, SD=1.00), text books (3.25, SD=0.89), writing (3.18, SD=0.81) and dictionary (3.25, SD=0.92). Factors which contributing to least acquisition of L2 were like schooling/work (2.88, SD=0.85), story books (2.90, SD= 0.95), newspapers (2.65, SD=0.89), historical books (2.63, SD=1.10), internet source (2.73, SD=1.30), interacting with friends(2.68, SD=0.91), neighbors (2.00, SD=0.96), market places(2.03, SD=0.83) and watching television(2.20, SD=0.79). Other factors like interaction with family (1.82, SD=0.99) and listening to the radio (1.80, SD=0.91) were showed having lesser extent in learning of L2.

In the present study all the participants completed their graduation and one cannot correlate the proficiency levels with the type of code switching and code mixing. Pattern of code switching differs with the proficiency levels of the participants. Some studies agreed with the proficiency views, but some are contradicting. Poplock (1982) established the relationship of self reported bilingual proficiency levels. More proficient speakers produced more intra-sentential code switching, where as less proficient speakers employed tag and inter sentential code switching. Contradicting to this view are Berk-

Seligon (1986) and Nortier (1990), who stated no effects of proficiency on the type of code switching in Hebrew/ Spanish or Moroccan Arabic/Dutch. According to the matrix language frame model (Myers-Scotton; 1971, 73) states the relationship between proficiency level and code switching.

4.2. Quantitative analysis:

4.2.1. Matrix language islands (MLI):

Matrix language Islands (ML Islands) are constituents consisting entirely of ML morphemes. They are well formed and show internal structural dependency relations i.e. they follow the grammatical structure of a particular language (Myers-Scotton, 1993). ML Islands represent an elongation of an utterance in one language and thus, do not signify any kind of code mixing or code switching. Increased quantities of ML Islands indirectly point to reduced code mixing and code switching in a particular context.

Table4: *Shows the mean and SD for ML Islands across different stimuli, context, age and gender*

Age	G	NTMC		NBC		CTMC		CBC	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
20-30 yrs	M	13.35	3.51	7.64	3.55	15.42	1.59	10.10	2.75
	F	13.47	2.33	10.72	2.16	16.45	2.30	9.85	2.35
50-60yrs	M	12.49	1.84	11.23	2.27	15.77	1.68	10.89	2.96
	F	13.72	1.06	11.71	2.90	15.96	2.57	11.68	2.79

*NTMC- narration Telugu monolingual context, *NBC- narration bilingual context,
 *CTMC- conversation Telugu monolingual context, *CBC-conversation bilingual
 context.

Performance of Younger group in MLI:

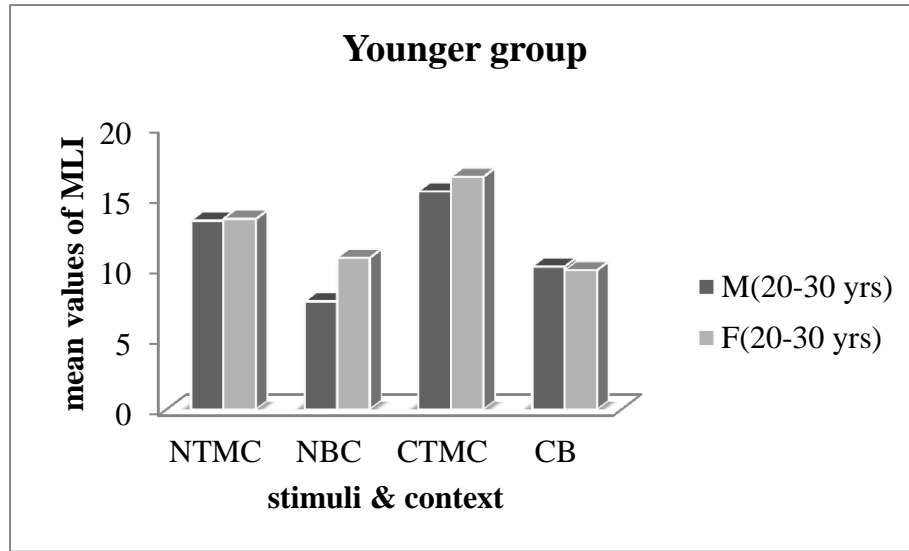


Figure 3: Mean values of MLI across gender, stimuli and context in younger group

From Table 4 and Figure 3 it can be observed that the mean score for ML Islands in the narration Telugu monolingual context was 13.35(SD=3.51685) and 13.4780(SD=2.33895) for both males and females respectively. In narration bilingual context, participants had a mean of 7.64 (SD=3.55) and 10.72 (SD=2.16) for both males and females respectively. Whereas in conversation Telugu monolingual context, the participants had a mean value of 15.42 (SD=1.59) and 16.45 (SD=2.30) for both males and females respectively. In the conversation bilingual context, for both males and females mean values ranges from 10.10 (SD=2.75) and 9.85 (SD=2.35) respectively.

Performance of elder group in MLI:

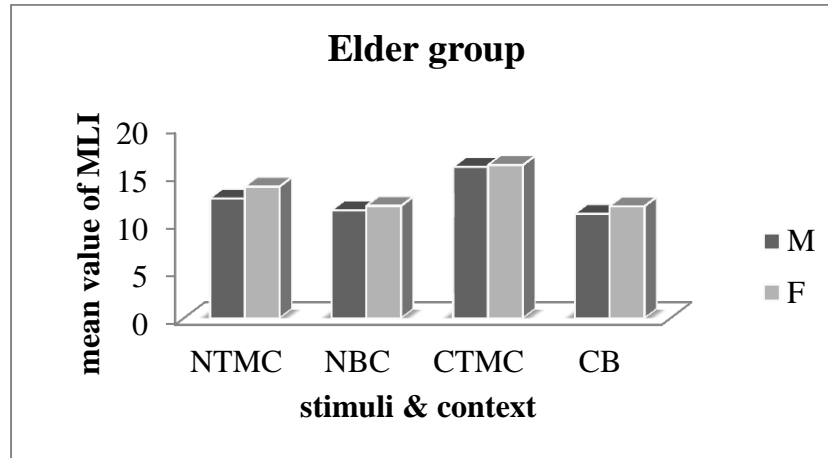


Figure 4: Mean values of MLI across gender, stimuli and context in elder group

In narration Telugu monolingual context mean scores were 12.49 (SD=1.84) and 13.72 (SD=1.06) for both males and females respectively in elder group. In narration bilingual context, participants had a mean of 11.23 (SD=2.27) and 11.71 (SD=2.90) for both males and females respectively. Similarly, in conversation Telugu monolingual context, the participants had a mean value of 15.77 (SD=1.68) and 15.96 (SD=2.57) for both males and females respectively. Finally, in the conversation bilingual context, for both males and females mean values ranged from 10.89 (SD=2.96) and 11.68(SD=2.79) respectively.

Effect of age:

As mentioned in the table, there was no significant difference [$F(1, 39) = 102.96$, $P = 0.000$] in the performance of younger and older group while producing matrix

language islands. Both performed equally as matrix language represents the base/native language of all the participants.

Effect of gender:

Across gender, there was no significant difference [F (1, 36) =0.092, p=0.000] between males and females while producing ML islands.

Effect of stimuli and context

Occurrences of ML islands were observed predominantly in conversation Telugu monolingual context, followed by narration Telugu monolingual context and narration bilingual context. Hence, the participants were able to produce more ML islands in Telugu monolingual context during conversation. Least occurrences were observed in conversation bilingual context. There was a significant difference [F (1, 36) =18.38, p=0.000] in construction of ML islands in both narration and conversation.

Effect of order of elicitation:

More number of ML islands were observed in conversation Telugu monolingual context even though prior insertion of English monolingual context was there. Significant difference [F (1, 39) =33.16, p<0.01] was found between narration Telugu monolingual context and conversation Telugu monolingual context. Thus, there was no effect on introduction of English monolingual context prior to conversation monolingual Telugu context.

Interaction effects across different variables:

The interaction effect was observed across different context and age with a same trend and it showed a significant difference [F (1, 36) =0.00, P=0.000]. In a similar way, for two contexts and two stimuli F (1, 36) =11.91, P=0.001) same tendency was noticed. Two contexts, two stimuli, two age groups and two gender [F (1, 36) =11.91, (P=0.046] also showed significant difference.

4.2.2. Matrix language and embedded language (ML+EL):

Matrix language + embedded language 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 any lexemes non-congruent rules of matrix language are blocked by a blocking filter as discussed by Myers-Scotton, (1993) and these would appear in embedded language islands. Matrix language + embedded language are thus signifiers of code mixing as they occur intra sententially. This constituent was formed by single lexemes from English.

Table 5: Mean and SD for ML+EL Islands across different stimuli, context, age and gender

Age	G	NTMC		NBC		CTMC		CB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
20-30yrs	M	4.83	3.52	7.94	2.84	5.89	2.22	7.79	2.08
	F	3.62	1.72	7.08	2.25	4.99	2.99	8.80	2.84
50-60yrs	M	3.01	1.75	6.04	1.72	4.64	2.90	6.04	2.65
	F	4.09	3.79	6.24	2.86	4.53	3.34	6.27	3.03

*NTMC- narration Telugu monolingual context, *NBC- narration bilingual context, *CTMC- conversation Telugu monolingual context, *CBC-conversation bilingual context.

Performance of younger group in ML+EL:

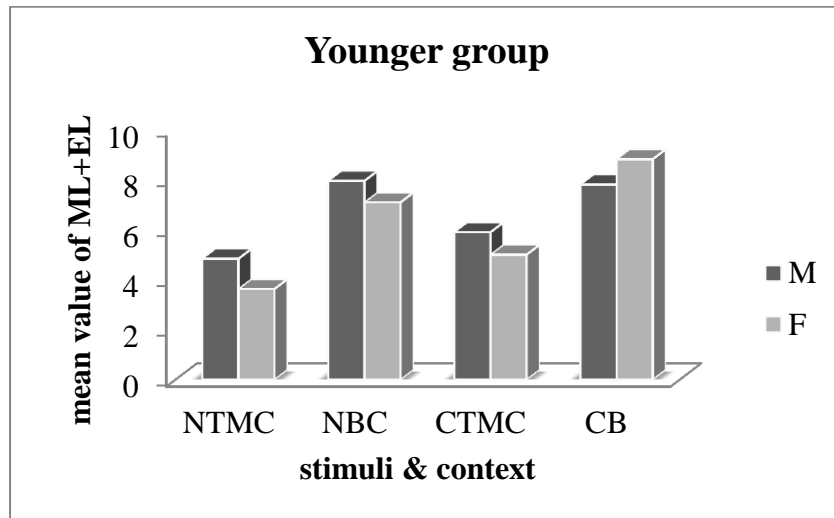


Figure 5: Mean values of ML+EL across gender, stimuli and context in younger group

Participants obtained a mean values of 4.83 (SD=3.52) and 3.62 (SD=1.72) for both males and females respectively in the narration Telugu monolingual context as shown in the table. In narration bilingual context, male participants had a mean of 7.94 (SD=2.84) and female participant had a mean of 7.08 (SD=2.25). Similar way, in conversation Telugu monolingual context, the participants had a mean value of 5.89 (SD=2.22) and 4.99 (SD=2.99) for both males and females respectively. In the conversation bilingual context, both males showed a mean value of 7.79 (SD=2.085) and females showed a mean value of 8.80 (SD=2.84)

Performance of elder group in ML+EL:

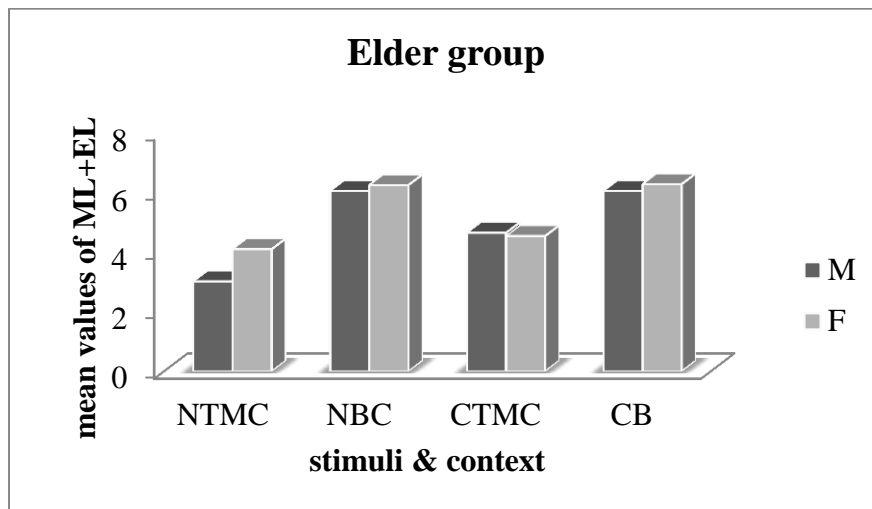


Figure 6: Mean values of ML+EL across gender, stimuli and context in elder group

The average mean scores of the ML+EL constituent for male participant was 3.01 (SD=1.75) and for female participants was 4.09 (SD=3.79) in narration Telugu monolingual context. In narration bilingual context, male participants had a mean of 6.04 (SD=1.72) and female participant comprised a mean of 6.24 (SD=2.86). But, in

conversation Telugu monolingual context, the participants had a mean value of 4.64 (SD=2.90) and 4.53 (SD=3.34) for both males and females respectively. Likewise in conversation bilingual context, for both males and females mean values gained were 6.04 (SD=2.65) and 6.27 (SD=3.03) respectively.

Effect of age:

Both younger and elder perform differently in the production of ML+EL constituent [F (1, 36) =4.66, P<0.05]. From the mean value of the Table 5, it can be observed that the younger's produced more code mixed and code switched forms than older group.

Effect of gender:

Both males and females performed equally. Therefore, no significant difference [F (1, 36) =0.014, p=0.000) between males and females while generating ML+EL islands were observed.

Effect of stimuli and context

Mean and standard deviations scores were indicated in the Table 5. ML+EL islands were observed more in conversation bilingual context followed by narration bilingual context and conversation Telugu monolingual context. Less number of constituents was noticed in narration Telugu monolingual context. Increase in the production of constituents in conversation bilingual context is because of the influence of the monolingual English conversation context effect which was introduced prior to the conversation bilingual context. Statistically there was a significant difference [F (1, 36) =P<0.05] narration and conversation.

Effect of order of elicitation:

More number of ML+EL islands was accounted in conversation Telugu monolingual context when compared to narration Telugu monolingual context. A significant difference [F (1, 39) =4.635, p<0.05] was found between narration and conversation. Hence there was an effect of introduction of English monolingual context prior to conversation monolingual Telugu context.

Interaction effects:

Results of the repeated measure ANOVA showed that, there were no interaction effects (p>0.05) among the four variables (i.e. age, gender, context and stimuli).

4.2.3. Embedded language islands (ELI):

Embedded language Islands (EL Islands) are formed when syntactic procedures of embedded language are activated and those of matrix language are inhibited. Thus, embedded language lexemes in embedded language Islands show embedded language morphemic order (thus cannot occur in ML + EL as they will be blocked by blocking filter) and include only syntactically relevant EL system morphemes as highlighted by Myers-Scotton (1993). Sometimes a single embedded language lexeme may trigger the formation of EL Island as highlighted in Trigger Hypothesis by Myers-Scotton in 1993. EL Islands are indicators of code mixing as they are produced intra sententially and obey the grammar of less dominant embedded language.

Table6: Mean and SD for ELI across different stimuli, context, age and gender

Age	G	NTMC		NBC		CTMC		CB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
20-30yrs	M	2.29	2.29	6.37	3.81	1.52	1.24	7.26	4.01
	F	1.80	1.37	5.55	2.00	.99	.91	7.04	2.83
50-60yrs	M	1.00	1.15	4.15	1.76	1.69	1.10	6.77	3.95
	F	1.11	1.07	3.55	2.34	2.06	1.85	6.26	3.41

Performance of Younger group in ELI:

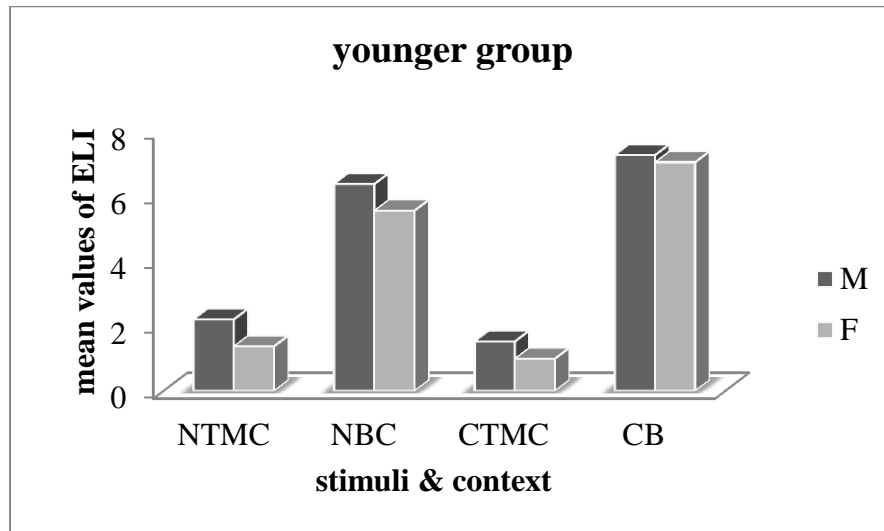


Figure 7: Mean values of ELI across gender, stimuli and context in younger group

Male participants demonstrated the mean value for EL Islands in narration Telugu monolingual context is 2.29 (SD=2.20) and female participants demonstrated 1.80 (SD=1.37) as stated in the Table 6. In narration bilingual context, participants had a

mean of 6.37 (SD=3.81) and 5.55 (SD=2.00) for both males and females respectively. While in conversation Telugu monolingual context, a mean value of 1.52 (SD=1.24) for male participant and 0.99 (SD=.91) for female participants was obtained. In the conversation bilingual context, males obtained a mean of 7.26 (SD=4.01) and female had a mean of 7.04 (SD=2.83).

Performance of elder group in ELI:

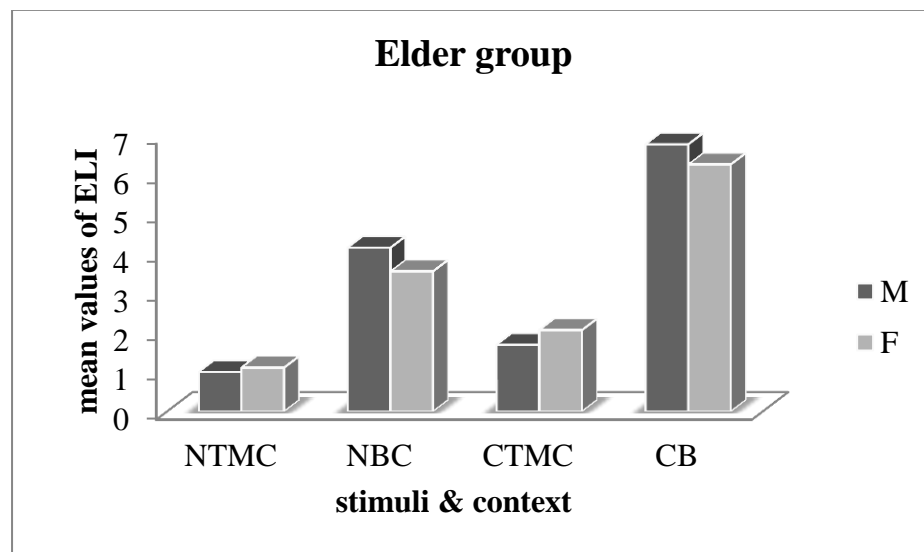


Figure 8: Mean values of ELI across gender, stimuli and context in elder group

In elder group, a mean of 1.00 (SD=1.15) obtained for males and 1.11 (SD=1.07) for females during narration Telugu monolingual context. In narration bilingual context, participants obtained a mean of 4.15 (SD=1.76) and 3.55 (SD=2.34) for both males and females respectively. At the same time as in conversation Telugu monolingual context, the participants had a mean value of 1.69 (SD=1.10) and 2.06 (SD=1.85) for both males and females respectively. In the conversation bilingual context, for both

males and females mean values ranged from 6.77 (SD=3.95) and 6.26 (SD=3.41) respectively.

Effect of age:

As compared to younger group, older group also performed similar in the construction of EL islands. Hence, there was no significance difference [F (1, 36) =1.99, $p>0.05$) across two age groups as shown in the Table 6.

Effect of gender:

No significant difference was observed in both males and females [F (1, 36) =0.554, $P>0.05$) as revealed in the Table 6.

Effect of stimuli and context

A significant difference [F (1, 36) =7.75, $p<0.05$) between the narration and conversation was observed. From the mean value of the Table 6, it can be concluded that more number of EL islands were observed in conversation bilingual context followed by narration bilingual context. Least occurrence was observed in conversation Telugu monolingual context.

Effect of order of elicitation:

Same numbers of EL insertions were noticed in both conversation Telugu monolingual context and narration Telugu monolingual context. No significant difference [F (1, 39), $p<0.01$] was found between narration and conversation. Hence, there was no effect on introduction of English monolingual context prior to conversation monolingual Telugu context.

Interaction effects

From the mean, it can be noticed that the two stimuli and two age groups [F (1, 36) =3.60, p=0.006] and two context and two stimuli [F (1, 36) =8.243, p=0.007] were having interaction effects and they show the same fashion.

4.2.4. Borrowed forms (BF):

These are lexemes from one language integrated into the phonological system of the second language. In general, this is distinguished from lexical insertion that is Matrix Language + Embedded Language by the acceptability. If any lexical insertion was acceptable in monolingual vocabulary by two out of three judges it was taken as borrowed form. So utterances containing borrowed forms were considered as instances of Matrix Language islands without any code mixing and code switching.

Table 7: *Mean and SD for borrowed forms across different stimuli, context, age and gender*

Age	G	NTMC		NBC		CTMC		CB	
		<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
20-30yrs	M	3.24	1.83	2.88	1.30	2.40	1.38	3.08	1.32
	F	2.00	1.47	2.84	1.15	2.00	1.18	2.75	1.30
50-60yrs	M	3.46	1.96	2.56	2.13	2.53	1.53	2.02	.78
	F	1.44	.96	1.82	2.02	1.67	1.13	2.41	1.51

Performance of Younger group in BF:

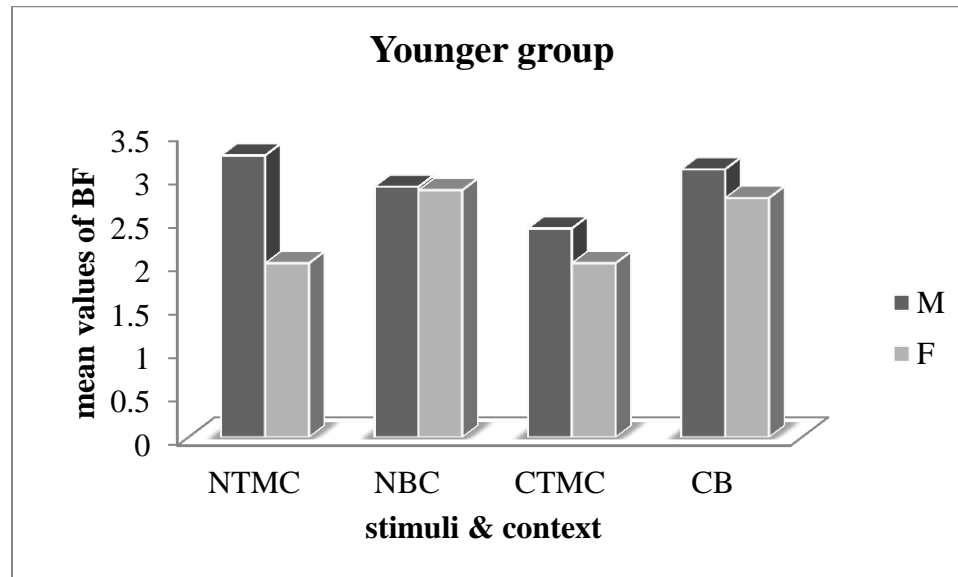


Figure 9: Mean values of borrowed forms across gender, stimuli and context in younger group

The mean score for borrowed forms in the narration Telugu monolingual context was 3.24 (SD=1.83) for male participants and 2.00 (SD=1.47) for females participants as depicted in the Table 7. During narration bilingual context, male participants had a mean of 2.88 (SD=1.30) and female participant had a mean of 2.84 (SD=1.15). But in conversation Telugu monolingual context, the participants had a mean value of 2.40 (SD=1.38) and 2.00 (SD=1.18) for both males and females respectively. In the conversation bilingual context, both males and females had a mean values of 3.08 (SD=1.32) and 2.75 (SD=1.30) respectively.

Performance of elder group in BF:

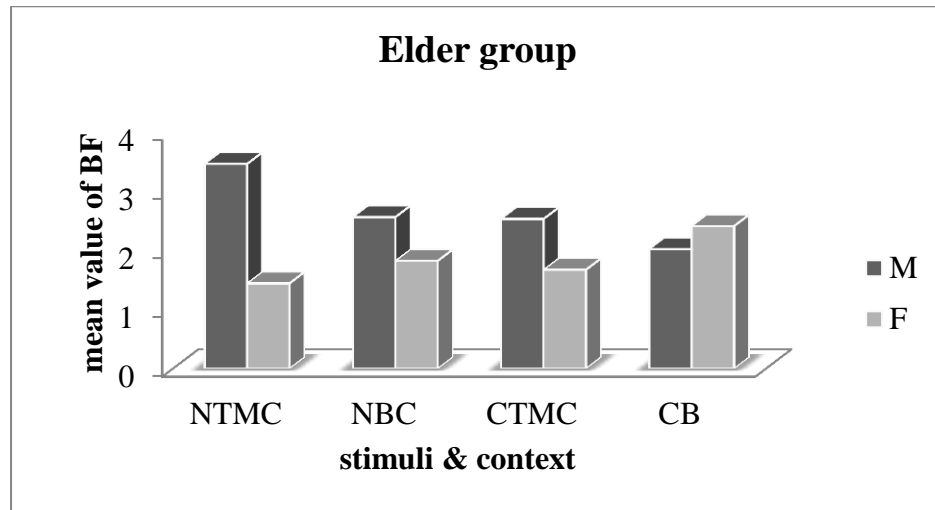


Figure 10: Mean values of borrowed forms across gender, stimuli and context in elder group

In narration Telugu monolingual context, the average mean scores of the male participant was 3.46 (SD=1.96) and for female participants was 1.44 (SD=.96). In narration bilingual context, male participants had a mean of 2.56 (SD=2.13) and female participant comprised a mean of 1.82 (SD=2.02). Likewise, in conversation Telugu monolingual context, the participants had a mean value of 2.53 (SD=1.53) and 1.67 (SD=1.13) for both males and females respectively. Similarly males had a mean of 2.02 (SD=.78) and females had a mean of 2.41 (SD=1.51) in conversation bilingual context.

Effect of age:

Results indicated that, both younger and elder group did not differ [$F(1, 36) = 1.96$, $p > 0.05$] in the exhibition of borrowed forms.

Effect of gender:

In the case of gender as indicated in the mean table 7, there was a significant difference across gender [$F(1, 36) = 5.07, P < 0.05$]. Males produced more borrowed forms than females.

Effect of stimuli and context

Two stimuli exhibited almost same number of borrowed forms with no significant difference [$F(1, 36) = 0.414, P > 0.05$] among them.

Effect of order of elicitation:

Same numbers of borrowed forms were observed in both conversation Telugu monolingual context and narration Telugu monolingual context. There was no significant difference [$F(1, 39) = 1.469, p > 0.05$] was found in the performance of borrowed forms across two stimuli (i.e. narration and conversation). Hence there was no effect on introduction of English monolingual context prior to conversation monolingual Telugu context.

Interaction effects:

Interaction effects between age, gender, stimuli and context revealed that the trend of inclination was observed only in context and gender wise comparison with significance difference [$F(1, 36) = 8.11, P < 0.05$].

4.2.5. Matrix language shift (MLS):

Matrix language shift (ML shift) is change in the matrix language in consecutive utterances or clausal structures preceded by a pause of two or more seconds or a change in pitch. Thus, it represents change from one language to another and is present only in Bilingual and Trilingual contexts. Hence, it represents code switching, because it has a shift of languages intersentential.

Table 8: *Mean and SD for ML shifts across different stimuli, context, age and gender*

Age	G	NTMC		NBC		CTMC		CB	
		<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
20-30yrs	M	0.79	0.54	1.40	0.66	1.34	0.89	1.03	0.79
	F	1.23	2.55	0.53	0.50	1.38	1.28	1.10	1.29
50-60yrs	M	0.44	0.42	0.49	0.72	0.43	0.69	0.39	0.55
	F	0.80	0.77	0.61	0.54	0.54	0.69	0.83	0.84

Performance of Younger group in ML shifts:

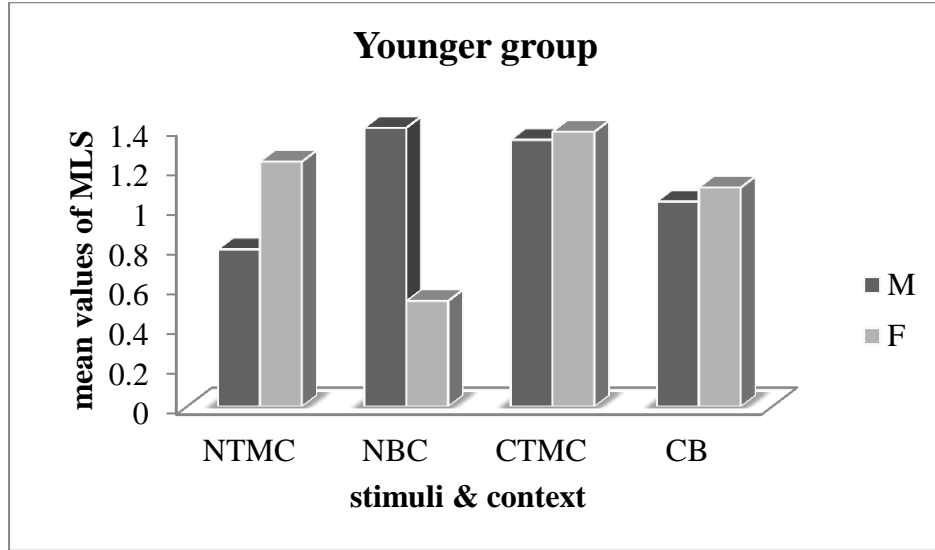


Figure 11: mean values of ML shifts across gender, stimuli and context in younger group

In the narration Telugu monolingual context, males had the mean value of 0.79 (SD=0.54) and females obtained the mean value of 1.23 (SD=2.55). In narration bilingual context, participants had a mean of 1.40 (SD=0.66) and 0.53 (SD=0.50) for both males and females respectively. From the mean value of the Table 8, it can be observed that in the conversation Telugu monolingual context, a mean value of 1.34 (SD=0.89) for male participant and 1.38 (SD=1.28) for female participants. In the conversation bilingual context, males demonstrated a mean of 1.03 (SD=0.79) and female demonstrated a mean of 1.10 (SD=1.29).

Performance of elder group in ML shifts:

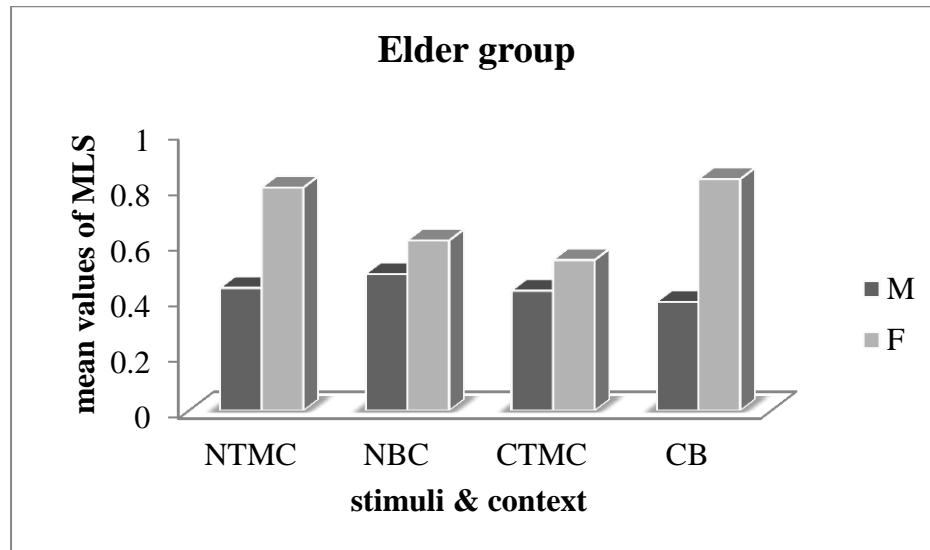


Figure 12: Mean values of ML shifts across gender, stimuli and context in elder group

In elder group, during narration Telugu monolingual context mean scores were 0.44 (SD=0.42) and 0.80 (SD=0.77) for both males and females respectively. In narration bilingual context, participants obtained a mean of 0.49 (SD=0.72) and 0.61 (SD=0.54) for both males and females respectively. A mean of 0.43 (SD=0.69) obtained for male participants and for female participants, a mean of 0.54 (SD=0.69413) was gained in conversation Telugu monolingual context. finally, in the conversation bilingual context, for both males and females mean values ranged from 0.39 (SD=.55) and 0.83 (SD=0.84) respectively.

Effect of age:

Significant difference was observed in both younger and elder group [F (1, 36) =12.15, P<0.05] Occurrence of more ML shifts in younger group was observed. Hence it can be concluded that the number of code mixing and switching forms are directly related to the MLS.

Effect of gender:

Males and female participants performed equally. There was no significant difference [F (1, 36) =0.33, P>0.05) males and females with respect to Matrix language shifts.

Effect of stimuli and context

Significant difference [F (1, 36) =0.267, P>0.05) was not seen between the narration and conversation.

Effect of order of elicitation:

In both conversation Telugu monolingual context and narration Telugu monolingual context, no significant difference [F (1, 39=0.146), p>0.05] was found. Thus, there was no effect on introduction of English monolingual context prior to conversation monolingual Telugu context.

Interaction effects

On repeated measures of ANOVA, no interactions effects [F (1, 36), P>0.05) were seen among age, gender, stimuli and context.

4.2.6. Revisions:

Revisions consists of lexical insertions that do not contribute to the meaning of an utterance, including speech errors, restatements, and circumlocutions and thus, are indicators of word finding problems.

Table 9: Mean and SD for revisions across different stimuli, context, age and gender

Age	G	NTMC		NBC		CTMC		CB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
20-30yrs	M	0.99	0.59	0.67	0.65	1.48	1.23	0.33	0.29
	F	2.51	1.50	1.07	0.57	1.55	1.16	0.47	0.50
50-60yrs	M	0.96	0.78	0.51	0.68	1.19	1.42	0.37	0.40
	F	1.19	1.01	0.54	0.46	1.15	0.55	0.72	0.71

Performance of Younger group in Revisions:

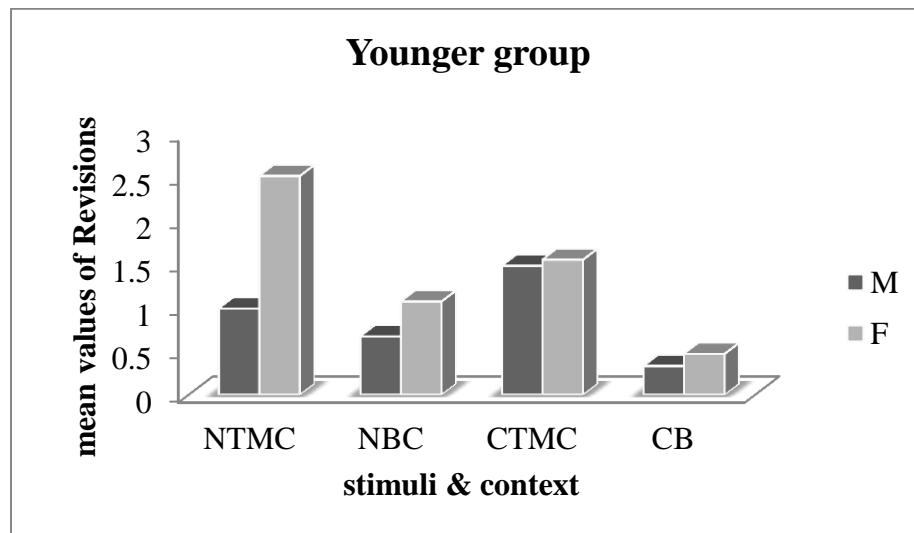


Figure 13: Mean values of revisions across gender, stimuli and context in younger group

It is apparent from the Table 9, that the mean score for revisions in the narration Telugu monolingual context is 0.99 (SD=0.59) for male participants and 2.51 (SD=1.50) for females participants. In narration bilingual context, male participants had a mean of 0.67 (SD=0.65) and female participant had a mean of 1.07 (SD=0.57). During conversation Telugu monolingual context, the participants had a mean value of 1.48 (SD=1.23) and 1.55 (SD=1.16) for both males and females respectively. In the conversation bilingual context, both males and females had a mean values of 0.33 (SD=0.29) and 0.47 (SD=0.50) respectively.

Performance of elder group in revisions:

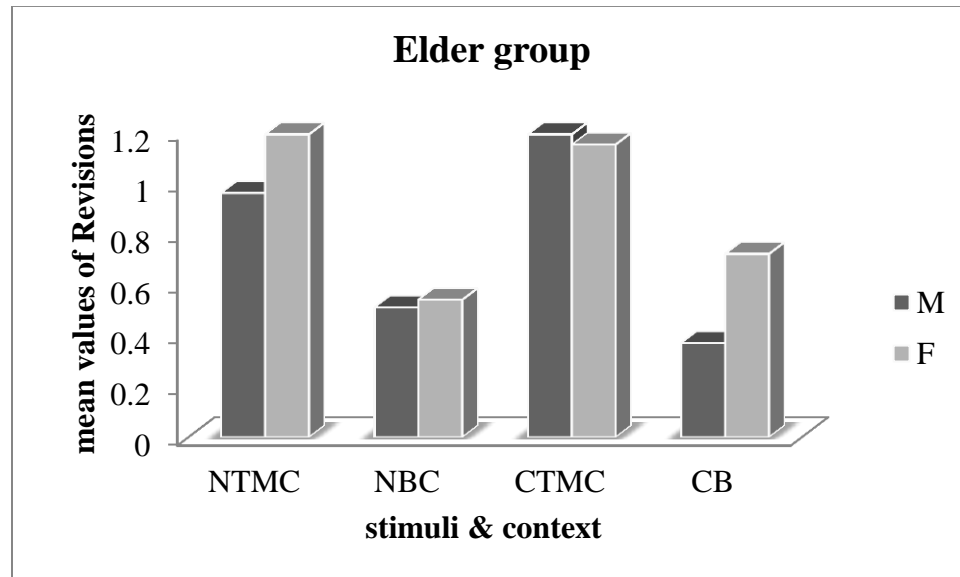


Figure 14: Mean values of revisions across gender, stimuli and context in elder group

Both male and female participants exhibited a mean value of 0.96(SD=0.78) and 1.19 (SD=.1.01) respectively in narration Telugu monolingual context. During narration

bilingual context, male participants had a mean of 0.51 (SD=0.68) and female participant comprised a mean of 0.54 (SD=0.46). While, in conversation Telugu monolingual context, the participants obtained a mean value of 1.19 (SD=1.42) and 1.15 (SD=0.55) for males and females respectively. Similarly, a mean of 0.37 (SD=0.40) was obtained by male participants and a mean of 0.72 (SD=0.71) was showed by female participants in conversation bilingual context.

Effect of age:

Age does not influence the production of revisions among younger and elders. Hence, there was no significant difference. [F (1, 36) =3.52, $p>0.05$]

Effect of gender:

Table 9 depicts that the female participants had more revisions when compared to male participants. Hence, there was a significant difference across gender. [F (1, 36) =4.256, $p<0.05$]

Effect of stimuli and context

Revisions were noticed in both narration and conversation equally in all the contexts and in both stimuli. Hence, there was no significant difference [F (1, 36) =1.10, $P>0.05$] between two types of discourse.

Effect of order of elicitation:

No significant difference [F (1, 39)=0.089), $p>0.05$] was found in both conversation Telugu monolingual context and narration Telugu monolingual context. Thus, there

was no effect on introduction of English monolingual context prior to conversation monolingual Telugu context.

Interaction effects:

Overall there was no significant difference in the interaction of age, gender, stimuli and contexts. [F (1, 36), P>0.05]

4.2.7. Embedded language insertions (EL insertions):

Table 10: *Mean and SD for EL insertions across different stimuli, context, age and gender*

Age	G	NTMC		NBC		CTMC		CB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
20-30yrs	M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.21
50-60yrs	M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.18

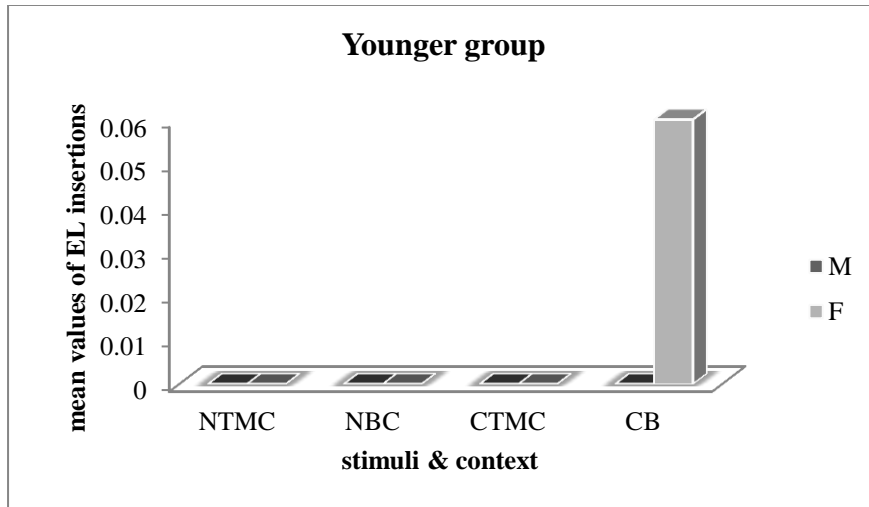


Figure 15: Mean values of EL insertions across gender, stimuli & context in younger group

In conversation bilingual context, female participants showed the mean value of 0.06 (SD=0.21), 0.05 (SD=0.18) in both younger and older groups.

There was no significant difference [$F(1, 35) = 1.88, p > 0.05$] among age, gender, stimuli and context. Similarly no interaction effects were seen.

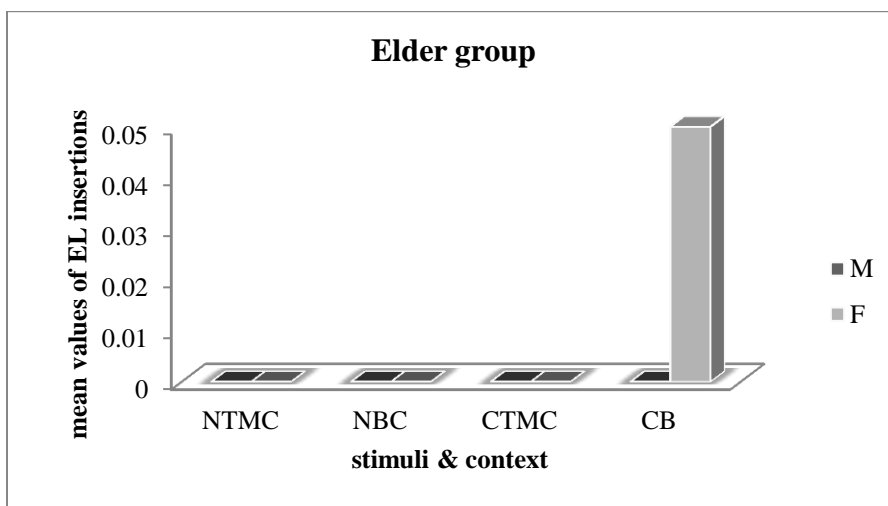


Figure 16: Mean values of EL insertions across gender, stimuli & context in elder group

Effect of order of elicitation:

No significant difference [F (1, 39)=0.146, p<0.01] was found in both conversation Telugu monolingual context and narration Telugu monolingual context. Thus there was no effect on introduction of English monolingual context prior to conversation monolingual Telugu context.

4.2.8. All Seven constituents:

Table 11: *Mean and SD of seven constituents across different stimuli, context, age and gender*

Age	G	NTMC		NBC		CTMC		CB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
20-30yrs	M	25.44	8.29	26.92	3.48	27.96	5.60	29.51	3.03
	F	24.23	5.20	27.63	2.52	27.37	4.04	30.22	3.57
50-60yrs	M	21.18	3.86	25.90	1.59	26.29	5.20	26.49	2.93
	F	22.36	5.05	24.63	5.42	26.84	6.45	28.10	4.15

Performance of Younger group in all constituents:

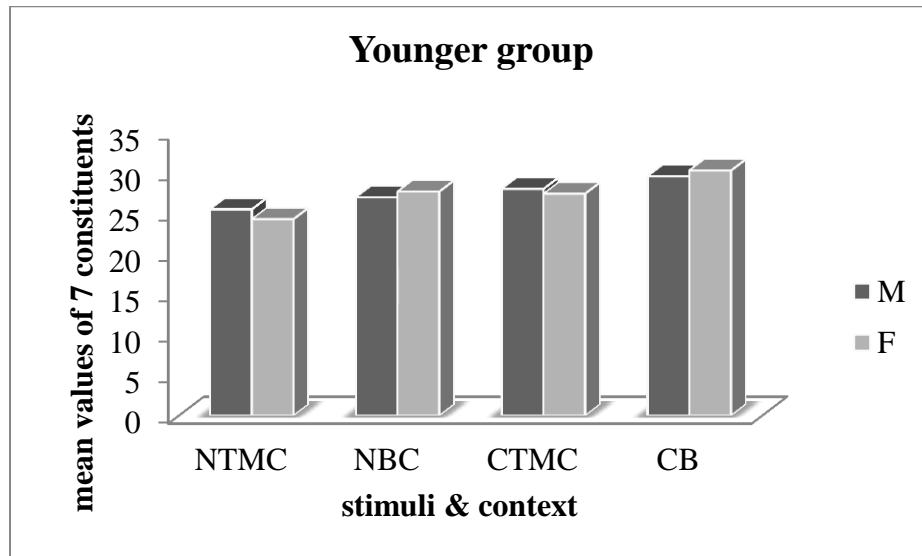


Figure 17: Mean values of seven constituents across gender, stimuli and context in younger group

The mean score for seven constituents were depicted in the table. In the narration Telugu monolingual context is 25.44 (SD=8.29) for male participants and 24.23 (SD=5.20) for females participants. In narration bilingual context, male participants had a mean of 26.92 (SD=3.48) and female participant had a mean of 27.63 (SD=2.52). But in conversation Telugu monolingual context, the participants had a mean value of 27.96 (SD=5.60) and 27.37 (SD=4.04) for both males and females respectively. In the conversation bilingual context, both males and females had a mean values of 29.51 (SD=3.03) and 30.22 (SD=3.57) respectively.

Performance of elder group in all constituents:

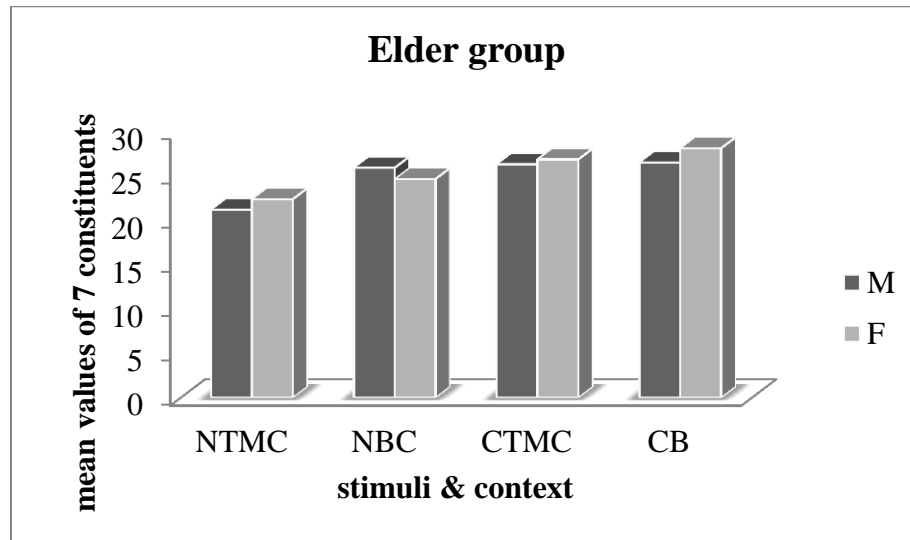


Figure 18: Mean values of seven constituents across gender, stimuli and context in younger group

In narration Telugu monolingual context, the average mean scores of the male participant was 21.18(SD=3.86) and for female participants 22.36 (SD=.5.05). In narration bilingual context, male participants had a mean of 25.90 (SD=1.59) and female participant comprised a mean of 24.63 (SD=5.42). During conversation Telugu monolingual context, the participants had a mean value of 26.29 (SD=5.20) and 26.84 (SD=6.45) for both males and females respectively. Similarly, for both males and females mean values ranged from 26.49 (SD=.2.93) and 28.10 (SD=3.57) respectively in conversation bilingual context.

Effect of age:

Overall there was a significant difference [F (1, 36) =5.28, $p < 0.05$] between the younger and elders in the presentation of code mixing and code switching. Younger group exhibited more code mixing and code switching than elder group.

Effect of gender:

No gender difference [F (1, 36) =0.048, $p > 0.05$] was found. Both males and females performed same on code mixing and code switching.

Effect of stimuli and context

In conversation, more number of code mixing and code switching forms were observed than in narration. There was a significant difference [F (1, 35) =24.45, $p < 0.01$] in both types of stimuli. When compared in context wise, more number of code mixing and code switching forms were noticed in conversation bilingual context, followed by conversation Telugu monolingual and narration bilingual context. Least number of code mixing and code switching forms were seen in narration in Telugu monolingual context.

Effect of order of elicitation:

Overall there was a significant difference [F (1, 39) =11.801, $p = 0.001$] was seen across narration Telugu monolingual context and conversation Telugu monolingual context.

4.3. Inter-judge reliability:

Chronbach's alpha for inter judge reliability was found to be 0.96 across 10 judges rating's of the different constituents of matrix language frame model (MLF).

4.4. Interaction effects:

Out of the seven constituents, only four constituents (Matrix language islands, embedded language islands, borrowed forms and revisions) showed interaction effects which are mentioned below in table 12.

Table 12: *Constituents which showed interaction effects: (paired t-test)*

Constituents	Pairs	younger	Younger	Elder	Elder
		males	females	male	female
MLI	NTMC-NBC	3.845**	2.877*	2.144**	1.946
	CTMC-CBC	6.358***	8.781***	3.756**	3.611**
	NTMC- CTMC	1.654	4.314**	4.954**	2.255
	NBC-CBC	1.856	1.230	0.410	0.033
ELI	NMTC-NBC	3.784**	9.635***	6.603***	4.127**
	CTMC-CBC	4.956**	6.156***	3.680**	6.444
	NTMC- CTMC	0.806	0.542	1.322	1.768
	NBC-CBC	0.494	2.458*	2.286*	3.000*

BF	NMTC-NBC	0.584	3.651**	1.567	0.663
	CTMC-CBC	1.132	1.355	1.438	1.608
	NTMC- CTMC	1.158	0.002	1.181	0.525
	NBC-CBC	0.356	0.142	0.662	0.867
	R	NMTC-NBC	1.385	3.520**	1.471
	CTMC-CBC	2.704*	2.789*	2.241	1.607
	NTMC- CTMC	1.295	1.914	0.473	0.115
	NBC-CBC	1.488	1.950	0.622	0.858

NOTE: * Indicates less significant (< 0.05)

** indicates significant (< 0.01)

*** indicates highly significant (< 0.001)

4.5. Summary of the results:

Summary of the results for each constituent across all variables are shown in the below table 13.

<i>Constituent</i>	<i>Effect of Age</i>	<i>Effect of Gender</i>	<i>Effect of Stimuli</i>	<i>context</i>	<i>Effect of order of elicitation</i>
<i>ML islands</i>	No effect of age was seen.	No effect of gender was observed.	More in conversation (monolingual telugu context)	More in Monolingual telugu context	No effect of order of elicitation was noticed.
<i>ML+EL islands</i>	More in Younger group	No gender effect was seen.	More in conversation (bilingual context).	More in Bilingual context	More conversational monolingual telugu context.
<i>EL islands</i>	No effect of age was noticed.	No effect of gender was observed.	More in conversation (bilingual context).	More in Bilingual context	No effect of order of elicitation was seen.
<i>Borrowed forms</i>	No effect of age was seen.	males exhibited more borrowed	No effect of stimuli and context were observed.	No effect of context was seen.	No effect of order of elicitation was noticed.

		forms			
<i>ML shifts</i>	More in Younger group	No effect of gender was observed.	No effect of stimuli and context were seen.	No effect of context was noticed.	No effect of order of elicitation was seen.
<i>Revisions</i>	No effect of age was noticed.	Females exhibited more revisions	No effect of stimuli and context were seen.	No effect of context was noticed.	No effect of order of elicitation was seen.
<i>EL insertions</i>	No effect of age was observed.	No effect of gender was observed.	No effect of stimuli and context were seen.	No effect of context was noticed.	No effect of order of elicitation was seen.
<i>Overall</i>	Younger group had more code switched and code mixed forms.	No effect of gender was found.	More in conversation (bilingual context).	More in Bilingual context	More conversational monolingual telugu context.

4.6. Level of mixing:

ML+EL:

Example : Telugu

i) /ɪvənnɪ/ compulsory /gə/ /mənəkʊ/ /əvəsərəm/ /vũḍi/.

(These all compulsory for us need there)

These are all very needful and compulsory for us.

ii) Weekends/ **lo:**/ /ənte:/ /eḍəɪna:/ /books/ /tʃəḍəvʊt̪a:nʊ/.

(Weekends in means something books reading).

In weekend's means I will read any books.

iii) /ḍəggərəlo:/ /vʊnnə/ /məntʃi/ /places ki/ /vel̪t̪ūta:mʊ/.

(Near by there good places to will go).

We will go to good places, which are nearby.

EL islands:

Example :

iv) /Na:kʊ/ four to five friend's /vʊnna:rʊ/.

(For me four to five friends are there).

I have four to five friends.

v) /Ne:nʊ/ /ekkuvəga:/ window seat prefer /tʃe:s̪t̪a:nʊ/.

(I most of the time window seat prefer do)

(I do prefer window seat most of the time.)

vi) /kodəikena:l/ /ten years back/ /vella:mʊ/ /tʃa:la:/ beautiful place /əḍɪ/.

(kodaikanal ten years back went. Most beautiful place that).

We went kodaikanal ten years back. That was the most beautiful place.

Borrowed forms:

Example :

vii) /Bus lo/ /chala/ /allari/ /chesamu/.

(In the bus more fun did)

Had more fun in the bus.

vii) /me:mʊ/ /ɔ̃ɪa/ /okə/ **auto** /pəttukoni/ hostel /ki/ vella:mʊ/

(We all one auto took to hostel went)

We were all took one auto and went hostel.

In the above examples, Telugu bound morpheme attached to an English free morpheme. In examples (ii) and (vii) a locative case marker ‘-/lo:’ is attached to the free morpheme in English. Whereas as in example (i) a dative post position ‘-/ga:’ is attached to the word principal. Hence, morphological mixing occurred.

Morphological and lexical semantic level mixing was apparent in all the participants. These results rule out the nature of morphological mixing. But earlier it was considered as abnormal by Perecman (1984). Mixing at the level of morphemes is a frequent occurrence in normal Telugu-English bilinguals. This is statement is supported by a previous study by Bhat and Chengappa (2003).

The occurrences of lexical mixing were more prominent than morphological mixing signifying the vulnerability of lexical system for an earlier breakdown in neuro

typical participants as well as aphasics. It may also point out that lexicon may be more loosely bound than other levels of language. (Bhat & Chengappa, 2003).

Accessing the lexemes from a one language is depends on the availability of the word or concept in that language. Sometimes this t would strain the memory as well as production system of the persons with aphasia. Thus the individual prefers use easily accessible word. E.g. use of English word cook instead of Kannada word “/əɖige:/ /ma:duṭuni/” (Bhat & Chengappa, 2005)

4.7. Testing of Hypothesis:

Hypothesis 1: There was no significant difference in the performance of adults on code mixing and code switching task across two age groups (younger and elder) for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands).

According to the results obtained, this hypothesis was accepted only for Matrix language islands (ML Islands), revisions, borrowed forms, and embedded language (EL Islands). However, as there was significance difference for Matrix language shifts (ML shifts) and Matrix language + embedded language (ML+EL) for these tasks this hypothesis was rejected.

Hypothesis 2: There was no significant difference in the performance of adults on code mixing and code switching task across gender for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands).

Based on the results obtained, this hypothesis was accepted only for Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + embedded language (ML+EL) islands and embedded language islands (EL Islands). However, rejected for constituents like revisions and borrowed forms as there was a significant difference.

Hypothesis 3: There was no significant difference in the performance of adults on code mixing and code switching task across two stimuli (Narration and conversation) for different constituents i.e., Matrix language islands (ML Islands), Matrix language shifts (ML shifts), Matrix language + Embedded language (ML+EL), revisions, borrowed forms, Embedded language (EL Islands).

From the results gained, this hypothesis was accepted for constituents like Matrix language shifts, revisions, borrowed forms, and embedded language insertions since there was no significant difference. But rejected for Matrix language islands (ML Islands), Matrix language + embedded language (ML+EL) and embedded language (EL Islands) indicating that more code switching and mixing forms more in conversation than narration.

Hypothesis 4: There was no significant difference between the order of elicitations in three different contexts i.e. for narrative discourse, in bilingual context, monolingual Telugu and monolingual English contexts; for conversational discourse, in bilingual context, monolingual English and monolingual Telugu contexts.

This hypothesis was rejected only for Matrix language + embedded language (ML+EL) since there was an order of elicitation effect.

Thus, based on the findings of the study, it can be concluded that none of the hypothesis in totality was either accepted or rejected. However, for few tasks the hypothesis was accepted and for few it was rejected. Thus, at one glance it can be stated that the four hypotheses were accepted for 50% of the tasks and for equal number of tasks they were rejected.

CHAPTER V

DISCUSSION

The present study was aimed at analyzing the linguistic forms, extent and type of code switching and code mixing in young and elder Telugu-English bilingual neuro typical adults. The proficiency levels of the participant were assessed by using LEAP-Q Questionnaire (Ramya Maitreyee & Goswami, 2009). Two types of stimuli were included in the study (Narration & conversation). All the samples were recorded, transcribed and analyzed by using Matrix Language frame model. The seven constituents given in Matrix Language Frame Model (Myers- Scotton, 1992) namely; Matrix Language Islands (ML islands), Matrix Language +Embedded Language (ML+EL), Embedded Language Islands (EL islands), Borrowed forms, Matrix Language Shift (ML shift), Revisions, embedded language insertions (EL in) were identified. Accordingly, the seven constituents namely; ML Islands, ML+EL, EL Islands, Borrowed forms, ML Shift, revisions , EL insertions were identified and counted in two context (monolingual & bilingual) across two stimuli.

5.1. Comparison of Matrix Language model constraints across Age, gender, stimuli, context and order of elicitation:

5.1.2. ML islands:

- *Age and gender:* No significant difference was found across age and gender. All the participants were able to perform equally in ML islands. As all the participants were native speaker of Telugu language, they could maintain the proficiency

levels in base language which activated the base language system to be readily available for all the participants equally. This supports to view of Grosjean (2008) that, like monolinguals, bilinguals have innate capacity for language and they will develop competence in each of their languages to the extent needed by the environment. Another reason can be stated from the present finding that, all the participants self rated themselves as proficient in L1 than L2. Hence, these base language proficiency levels make them to activate the particular system.

- **Stimuli:** The study demonstrated the presence of more occurrences of ML islands in conversation monolingual context. These results were in accordance to the views stated by Gumperz (1972). He stated that the switching occur very less in bilinguals, if there are short phrases and breakdown strings. He also said that natural units cannot be broken down when conjunctions go with the phrase alongside. From the mean values of ML islands (as shown in table), it can be stated that more number of ML islands were seen in conversation when compared to narration. Because, the length of utterance and phrases were very less in conversation. Another reason could be that, participants were asked to tell about their profession, details of the family members and their roles, likes, dislikes, daily schedule, future plans and memorable events so forth. Thus, there is a possibility of triggering of the base language with short phrase. Results of the present study contribute to the finding of Glossor and Deser (1990). He concluded that the discussion of any topic related to family may or may not have resulted in

actual narrative production that leads to simple description of names and physical characteristics.

- ***Context:*** more number of ML islands was observed in monolingual context. Monolingual context provide the individual to produce more phrases of the base language. From the qualitative analysis of the present study, one can reason out that usage of L1 is more contributing to the conversational factors like interaction with family, interacting with friends and neighbors that could exhibit the base language (L1) activation in bilinguals. This view received support from the finding of Hakuta and Pease-Alvarez, (1992), Anstrom, (1997), Hasson,(2006), Marian, Blumenfeld and Kaushanskaya,(2007) where these authors stated that interaction with family members posed to be one of the major contributor for attaining proficiency in L1.
- ***Order of elicitation:*** even though monolingual English context was introduced prior to the monolingual Telugu context, participants showed no significant difference. This might excite the base language system more by suppressing the other language. Since bilingual participants showed excitation of base language and inhibition of second language at the same time, excitation of base language was eminent because of the fact that their cognitive drive and motivation was more in native language.

5.1.3. *ML+EL islands:*

- *Age:* more number of ML+EL islands were observed in younger group compared to elder group in the present study because of the current globalization, effect of mass media, text messages, internet sources and medium of instruction at schools. These factors might trigger the younger generation people to mix and switch the languages freely since childhood. The use of English language with their children's may be due to the necessity of mothers, adjusting to the common language for globalization or higher educational achievements (Ramya maitreyee, 2009). This view was also supported by Carlson and Meltzoff (2008), August and Hakuta (1997) who stated that, parents uses combination of languages with the children during childhood. Smith (2002) view was supporting to the results, that younger male and females significantly differed from the older males and females in the rate of lexical insertion. He attributed this difference to the greater exposure of children to English in school. Other earlier studies supported to current view that younger group exhibited more lexical insertion than older group (Hudson-Edwards & Bills, 1992, Hudson, Hernandez Chavez & Bills, 1995). Contradicting view of Fereshten Rezaeian (2009) showed that no difference in the rate of code switching in younger and elder group because of the fact that community tradition, life style, culture and length of residence common for both groups. According to Irani (2007), there are many communities with high technology professions as university professors, physicians, specialists, dentists, and engineers. Hence, it can be concluded based on results that the environmental demands may play a key role in code switching and mixing.

- **Gender:** males and females performed same in ML+EL islands in the current study, because of their different occupation levels and exposure to the different environments in a day to day life. Cheshire and Gardner-Chloros (1998), Treffers-Daller (1992) and Fereshten Rezaeian (2009) found similar pattern on their study that no significant difference across gender. Contradicting views were provided by earlier studies in sociolinguistics that females generated more rate of code switching. Mulac, Weimann, Widemann, & Gibson (1988) stated that women use more adjustment strategies and unite towards the partners gaze in mixed-sex settings. James (1996) and Eckert (1989) considered that variation in the power status of the men and women, they act in a different way in many behavioral aspects. Duechar (1988) pointed out that females tend to use high-status forms to protect their own face. Milroy and Milroy (1993) stated that group solidarity, social network and social class differences across gender.
- **Stimuli:** in the current study, participants exhibited more ML+EL constituents in conversation, which are more of mixed vocabulary. The participants were asked to tell about their profession, details of the profession (job/college), family members and their roles, hobbies so forth. Such type of interview may cause the bilingual participants to mix and switch the languages more, because of the fact that, exposure and usages of those words occur commonly in a day to day life.
- **Context:** ML+El islands were more in bilingual context than in monolingual context. Single words were inserted more frequently than the entire clauses. A

probable reason can be that single words such as nouns, verbs, and adjectives exist in both the languages and these are considered "categorical equivalents" by speakers of the languages involved (Muysken 1995). According to the Word Association Model, a first language (L1) word is linked to its second language (L2) equivalent. So the activation of L2 is mediated by L1 equivalents and its word concept. Thus more occurrences of mixed words like nouns, verbs and adjectives were observed. Even though it is a monolingual Telugu context, bilinguals were able to make use of all language cues that repeatedly to mix the target word without relying on the inhibitory control. This is an agreement with the view of Costa et al. (2006) that all bilinguals are need not to rely on mechanism of inhibitory control. Gollan and Acenas (2004) proved that bilinguals have more tip-of-the-tongue states, caused by hesitant production and selection method due to cross lingual interference. Hence, the bilingual participants share the common grammaticality in both languages. Another supporting view point given by Heredia and Alterribe (2001) that language shift from L1 to L2 of same lexical categories, more accessibility in L2 because of the continuous exposure and usage.

- ***Order of elicitation:*** More constituents were observed in conversation monolingual context when compared to narration in monolingual context. This might be because of the insertion of the English monolingual context prior to conversation in monolingual context. This finding supports to the view of Yaron, M (2000) that, there is a strong cognitive drive in bilingual speakers that dominate

the society and the level of communication on discourse resulting in involuntary code switching. According to the inhibitory control model of Green (1986, 1998), dominant language (L1) needs more inhibition for words when compared to the less dominant language (L2), Hence, excitation takes longer time to reactive the L1. Present study supporting to the view of Green (1986, 1998) that insertion of English monolingual context prior to the Telugu monolingual context. More number of mixing forms takes place because of the slow rate of reactivation of L1.

5.1.4. EL islands:

EL islands produced are confirmed with the Myers Scotton (1992) hypothesis where code switches occurs but maintains the grammatical integrity of both languages.

- ***Age and gender:*** no significant difference was found across age and gender. All the participants were able to perform equally in EL islands but the purpose of exhibition can be different. Younger group might exhibit due to their level of the occupation, current globalization and technology. Whereas, elder group exhibited due to the requirement of lesser effort.
- ***Stimuli:*** In conversation, more number of EL islands noticed. According to the Frankel and Pen (2007), conversation is a complex effort, requiring executive function skills like planning, sequencing, monitoring, attention and linguistic skills. These aspects take place in conversation that will affect the individual

ability to access and make use of the existing language resources. Thus, present study is in agreement with the view of Frankel and Pen (2007) that bilingual participants might have poor accessibility in one language and pick up the words from other language.

- ***Context:*** In the current study, more EL islands occurred in conversation bilingual context, where as more numbers of ML islands were observed in conversation monolingual context. These two types of islands were observed in conversation because of the contextual influences (monolingual/ bilingual). Thus, this might be the reason for an individual's proficiency level, language background and choice of the language the speakers used. Another reason could be that, there was no restriction on selection of languages of the participants and free usage of both English and Telugu. This flexibility would activate the system of both languages resulting in increase of EL islands. In bilingual context, Gollan and Acenas (2004) showed that bilinguals have more tip-of-the-tongue states than monolingual speakers which are caused by hesitant production and selection processes due to cross lingual interference. Hence, it can be concluded that formation of EL islands (for example, thirty five years back) is due to the trigger reaction to complete the utterance in English.
- ***Order of elicitation:*** even though monolingual English context was introduced prior to the monolingual Telugu context, participants showed no significant difference. According to the inhibition control model, this might be due to the fact that excitement of base language system more by suppressing the other language.

Since bilingual participants showed excitation of base language and inhibition of second language at the same time, excitation of base language was eminent because of the fact that their cognitive drive and motivation was more in native language.

5.1.5. Borrowed Forms:

Borrowed forms were noticed equally across age, stimuli, context and order of elicitation in the current study. As borrowed forms are not code switched forms, these can appear irrespective of the age, gender and stimuli. However, across gender, males exhibited more borrowed forms than females. This might be because of the varied occupations levels and exposure to different environments. Eckert (1989) considered that variation in the power status of the men and women, they act in a different way in many behavioral aspects. Duechar (1988) pointed out that females tend to use high-status forms to protect their own face. Milroy and Milroy (1993) stated that group solidarity, social network and social class differences across gender. Present results are contradicting the views that, a borrowed form does not depend on the context, participants, age, gender (Krupa, 2002 & Sapna Bhat, 2004). Another finding of the present study contradicting the views of Geetha (2010) that, borrowed proverbs are used by the younger generation in Tamil language because of the fact that, younger generation students have learned these borrowed proverbs in school as part of their peer communication. These participants employed the borrowed lexical items of the native language like cycle, bullet, aero plane, full, figure so forth. Therefore, it can be concluded that borrowed forms may or may not depend on the

age, gender, context and stimuli. Grosjean (1982) noted that when one culture is influenced by another culture by technologically, politically and socioeconomically, the language which is using also gets influenced. In the present study, more borrowed forms occurred in the form of nouns and adjective, because nouns were easy to borrow from English and the insertion was less disturbing. This view was supported by Myers-Scotton (1993) that nouns are easily borrowed forms.

5.1.6. ML shifts:

- **Age:** younger group showed more ML shifts compared to elder group. This could be because of the more occurrences of code switched and code mixed that could initiate the more shifts since younger group participants were early bilinguals compared to elder group. Another explanation can be stated with reference to the Revised Hierarchical Model. (Kroll and Stewart, 1994) which states that forward translation (L1-L2) takes more time than backward translation (L2-L1), which depends on the proficiency in L2. More proficient group performed equally in both translations, but less proficient group showed asymmetry in translation (Kroll, Michael, Tokowicz, & Dufour, 2002) but in the present study forward switching and mixing took more time in younger group. Contradicting to this, one cannot state the relation of proficiency to ML shifts in the current study. McNamara (1967) confirmed that switching takes evident time and that variation in switching time is not linked to the level of bilingualism. Disagree with the view

of McNamara (1967) present study stated the relation between level of bilingualism and switching time.

- ***Gender, stimuli, context and order of elicitation:*** even though difference in code switching and mixing has been observed across stimuli, context, gender and order of elicitation, ML shifts are directly or indirectly linked to the code switching and mixing. Hence, no significant difference was seen across gender, context, stimuli and order of elicitation. McClure and Wentz (1975) found that situation, role and style are not capable of predicting code choice consistently. Hence, one can be concluded that code mixing across stimuli, context, gender and order of elicitation cannot be related to the ML shifts.

5.1.7. Revisions:

- Female participants showed more revisions compared to male participants because females were more conscious about their switching and mixing results in more number of restatements. In neuro-typical adults one cannot observe the variable like age, stimuli, context, and order of elicitation in revisions since neuro typical adults make appropriate word morphemes and sentence structure to mix in to other languages. Either through verbal cues (mixing and switching words) or nonverbal cues (pauses, ML shifts) All the participants' recommended that the bilingual context was easier for them compared to monolingual contexts and that they used mixed languages very frequently in their daily life.

To conclude the findings, in monolingual Telugu context all the participants showed the following difficulties

- Reduced rate of speech resulted in overall reduction of the number of words in three minute duration when compared to bilingual context.
- In monolingual context, all the participants were conscious about their speech and able to maintain the monolingual context. But at the end of the speech, they become unconscious and exhibited code mixing and code switching.
- Demonstrated more self corrections. Munoz, et, al in 1999 stated that pauses and hesitations were more in L1 if a concept or words is more available in L2.

CHAPTER VI

SUMMARY AND CONCLUSION

In the present day activities, the phenomenon of code mixing and code switching becomes apparent in a person's language to meet up his/her every day necessities and sustain the relationship with the new society and its people. Code mixing and code switching are used when individuals speaking in diverse languages come in contact with one another. Therefore, the present study was aimed at analyzing the linguistic forms, extent and type of code switching and code mixing in Telugu-English bilingual neurotypical adults. Objectives of the study were to explain in detail the nature and level of code-mixing and code-switching using Matrix language frame model (Myers-Scotton, 1993) and Peregman's (Peregman, 1984), to compare the type and extent of code-switching and code-mixing across the age and gender, to identify the effect of age and gender on two stimuli (conversational discourse and narrative discourse) based on code-mixing or code-mixing, to identify the effect of order of elicitation in three different conditions. That is in narrative discourse (Bilingual context, Monolingual Telugu context and Monolingual English context) where as in conversational discourse (Bilingual context, Monolingual English context and Monolingual Telugu context).

A total of 40 bilingual participants were considered in the present study. They were divided into two groups. Group I consisted of twenty young adults of which ten were males and ten were females in the age range of 20–30 years with the mean age range of 23.6 and 23.5 respectively and Group II consisted of twenty old adults of which

ten were males and ten were females in the age range of 50-60 years with the mean age range of 54.6 and 52.9 respectively. All were native speakers of Telugu language. The proficiency levels of the participant were assessed by a LEAP-Q Questionnaire (Ramya Maitreyee & Goswami, 2009). Two types of stimuli were included in the study (Narration & conversation). All the samples were recorded, transcribed and analyzed by using Matrix Language frame model. The seven constituents given in Matrix Language Frame Model (Myers- Scotton, 1992) namely; Matrix Language Islands (ML islands), Matrix Language +Embedded Language (ML+EL), Embedded Language Islands (EL islands), Borrowed forms, Matrix Language Shift (ML shift), Revisions, embedded language insertions (EL in) were identified. Accordingly, the seven constituents namely; ML Islands, ML+EL, EL Islands, Borrowed forms, ML Shift, revisions , EL insertions were identified and counted in two context (monolingual & bilingual) across two stimuli. The scores were considered in terms of percentage for all the constituents in two different contexts (monolingual & bilingual). The scores were tabulated and subjected to statistical analysis using Statistical packages for the social sciences (SPSS-17 version) .

The results indicated that all participants used code mixing and code switching to fill the lexical gaps in different discourse functions (narration and conversation). The variations in mixing and switching in terms of both frequency and type were observed. Two age groups performed differently for some of the constituents in MLF model. A study by Nicholas and Brookshire (1993) found that the both younger and older participants produced dissimilar pattern when administered a set of stimuli in common use for the elicitation of language samples from adults. He conclude that the there is a

need to consider age and cognitive demands of the different language elicitation procedures. Present study results are supporting the view of Nicholas et al (1993) which revealed that, younger group performed better in code switching and code mixing. Hence, there is a need to consider age, cognitive demands of the individuals by selecting appropriate elicitation stimulus. It is clear from the results that, even though code mixing and code switching forms were observed in monolingual context, participants found it very difficult to perform. More number of switching and mixing occurred in bilingual context. In order to get clear picture of deficits of persons with aphasia, it is important to assess his/her communicative repertoire in all context. Thus, one should keep in mind the context variable while assessing bilingual neuro-typical adults and bilingual person's with adult language disorders. Stimuli also played an important role in code switching and mixing. More number of switching and mixing constituents observed in conversation. Thus, it can be concluded that one to one interaction is better to facilitate language mixing and switching in bilingual neuro typical adults.

Implications of the study

The current study has implications in understanding the:

- i) Extent and type of code mixing and switching in Telugu speaking adults who are exposed to two languages in their various facets of life.
- ii) Importance of Language variables in intervention purposes in Indian context.
- iii) Theoretical understanding of bilingual language processing in bilingual adults.

- iv) Language specific issues related to the nature, degree and extent of code switching and code mixing in cross linguistic studies.
- v) Clinical consideration of conversational discourse as stimuli, while assessing bilingual persons with adult language disorders.
- vi) Clinical consideration of age, cognition and linguistic demands while assessing the bilingual persons with adult language disorders.

Future directions:

- One can study the comparison of code mixing and code switching between bilingual persons with aphasia and neuro-typical adults in Telugu.
- Future studies can be focused on cross linguistic comparison of code switching and code mixing across different languages to know the extent and type of switching and mixing.

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Appendix I

Stimuli:

1. Narrative discourse (3 times recording)

- ✓ 1st condition- bilingual context (their daily speaking language)
- ✓ 2nd condition- monolingual Telugu context.
- ✓ 3rd condition- monolingual English context.

Topic for narration – instructed the participant to narrate their experience on the following topic.

- ✓ Journey to a place based on either past experience journey/ future imaginative journey for a minimum duration of 3 -4 minutes)

- Hints for narration-

Participant name--Present place-- destination place—purpose of journey—completion of the work before the day of journey—luggage packing—things to pack (i.e. snacks, newspaper, clothes, mobile charger, others if any)—time of packing—sleeping early before night— get up next day early morning—fresh up activities—way to go bus station or railway station (i.e. through auto or walk)—platform enquiry—waiting—entering in to the bus/train—seat selection/finding—ticket checking and conformation details—time spending during journey (i.e. eat snacks, reading news paper, speaking with others, sleeping, listening songs, site seeing outside etc)—time of reaching to the destination place—way to go home.

2. Conversation (3 times recording)

- ✓ 1st condition- bilingual context.
- ✓ 2nd condition- monolingual English context.
- ✓ 3rd condition- monolingual Telugu context.

General conversation- (minimum of 3 -4 minutes).

Instructed the participant's to answer in sentences/ phrases without yes-no answers kind of response.

1. Name?
2. Occupation?
3. Qualification?
4. How many family members? What are they doing?
5. School/college name & where did studied? How was it?
6. Scholl/college life incidence (i.e. any memorable events/bad experience)?
7. How many Best friends do u have? What are they doing?
8. What are your hobbies? If yes, why?
9. What is your favorite tourist place? Why?
10. What do you do in the early morning after get up?
11. What do you do in the evening time?
12. Do you have a habit of watching movies? If yes, what kind of movies?
13. What are your future plans?

Appendix 2

Language Proficiency Questionnaire

Name:

Age:

Gender:

Instructions: Please read the questions carefully and choose the most appropriate choice whenever applicable.

1. Name all the languages you know beginning with the language you learnt first using the below mentioned scale, answer the questions below.
(1-L1, 2-L2, 3-L3, 4-Combination of any of the languages)

L1- First language that you learnt, L2- Second language that you learnt in your life, L3- Third language

2. When you were a child, which language did you speak?

At home	1	2	3	4
With your father	1	2	3	4
With your mother	1	2	3	4
With siblings	1	2	3	4
With guardians	1	2	3	4
With neighbors	1	2	3	4

3. Native language of

Father	1	2	3	4
Mother	1	2	3	4
Siblings	1	2	3	4
Guardians	1	2	3	4

4. Language spoken with you by your

Father	1	2	3	4
Mother	1	2	3	4
Siblings	1	2	3	4

Guardians	1	2	3	4
Neighbors	1	2	3	4

5. Which language did you learn first for

Understanding	1	2	3	4
Speaking	1	2	3	4
Reading	1	2	3	4
Writing	1	2	3	4

6. Mention the age when you first started using each of the languages for each of the following parameters:

Language	Understanding	Speaking	Reading	Writing
L1				
L2				
L3				

7. Mention the age when you became proficient for each of the following parameters:

Language	Understanding	Speaking	Reading	Writing
L1				
L2				
L3				

8. How many years of formal education do you have? (Please specify your qualification)

What was the medium of instruction?	1	2	3	4
Which language was used maximally?	1	2	3	4
Which language did you speak with teachers?	1	2	3	4
Which language did you speak with classmates?	1	2	3	4
Which language was spoken by your teacher with you?	1	2	3	4
Which language was spoken by your classmate with you?	1	2	3	4
Did you change your medium of instruction?	Yes		No	
If yes, specify the changed medium of instruction. At what age did you change your medium of instruction?	1	2	3	4

Have you changed your state? If yes, then which language do you use to communicate?	1	2	3	4
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9. On a scale from one to five, mark your level of proficiency in each of the skill (1-Zero proficiency, 2-Low, 3-Good, 4-Native like/perfect)

Language	Understanding	Speaking	Reading	Writing
L1				
L2				
L3				

10. How many dialects can you speak in each of the languages?

L1-
L2-
L3-

11. On a scale of one to five, mark your level of proficiency in each of the skill of the dialects in L1, L2, L3 (1-Zero proficiency, 2-Low, 3-Good, 4-Native like/perfect)

	L1			L2			L3		
Dialect	D1	D2	D3	D1	D2	D3	D1	D2	D3
Understanding									
Speaking									

12. On a scale from one to five, mark your level of proficiency in shifting from one language to the other (1-Zero proficiency, 2-Low, 3-Good, 4-Native like/perfect)

13. Use the rating scale mentioned below, indicate which language you used maximum for the following: (1-L1, 2-L2, 3-L3, 4-Combination of any of the languages)

Interaction with family	1	2	3	4
Education/Work	1	2	3	4
Listening to instruction tapes at school	1	2	3	4
Text books	1	2	3	4
Dictionary	1	2	3	4
Story books	1	2	3	4
Newspapers	1	2	3	4
Historical books	1	2	3	4

Internet source	1	2	3	4
Writing	1	2	3	4
Interacting with friends	1	2	3	4
Interacting with neighbors	1	2	3	4
Watching TV	1	2	3	4
Listening to radio	1	2	3	4
Market places	1	2	3	4

14. On an average, mention below the time you are exposed to each of the languages

Languages	Number of days per week	Number of hours per day
L1		
L2		
L3		

15. Mention the number of years you have spent in each language environment:

	Family	School	State	Work place
L1				
L2				
L3				

16. Using the rating scale mentioned below, indicate the extent to which you are currently exposed to each of the languages in the following contexts in a day.
(1-Never, 2-Sometime, 3-Most of the time, 4- Always)

	L1	L2	L3
Interaction with family			
Schooling/Work			
Listening to instruction tapes at school			
Text books			
Dictionary			
Story books			
Newspapers			
Historical books			
Internet source			
Writing			
Interacting with friends			
Interacting with neighbors			
Watching television			
Listening to the radio			
Market places			

17. Rate how frequently others identify you as a native speaker based on your accent or pronunciation in the language
(1-Never, 2-Sometime, 3-Most of the time, 4- Always)

L1

L2

L3

Appendix 3

Definition of Matrix language frame constituents (Myers-Scotton), 1993; Munoz et al. 1999)

Constituents	Definitions
ML Islands	Well-formed constituents consisting entirely of ML morphemes demonstrating syntactic structure of ML.
ML Shift	Change in ML, in consecutive utterances of 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 big EL lexeme (not a borrowed form inserted into the syntactic frame of any number ML morphemes
Borrowed Form	A lexeme from one language incorporated into the morpho-syntactic structure of the second language and is widely accepted by monolingual speakers of that language.
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.

Key: ML-Matrix language, EL- Embedded language.