A study of markedness in lexical semantics in normal and clinical population, Hearing Impaired (HI) & Mentally Retarded (MR)

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CHAPTER 1

INTRODUCTION

Any patterns that are present but uncommon in the languages of the world (or in a specific language) are termed marked (Veeman, 1998). In semantics the term unmarked is used to refer to the more general or expected element of a pair of opposites whereas the term marked is used to refer to the more specific and unexpected element. In its most general sense, this distinction refers to the presence versus the absence of a particular linguistic feature (Crystal, 1980). A marked form is a non-basic or less-natural form. An unmarked form is a basic, default form. For example, 'lion' is the unmarked choice of English-it could refer to a male or female lion. But 'lioness' is marked because it can only refer to females. Markedness originally developed from phonology, where phonetic symbols were literally marked to indicate additional features such as voicing, nasalization, or roundedness. Markedness is still a concept in current phonological theory.

Twentieth century linguistic theories have developed the idea of hierarchy within language structure largely in terms of the concept of markedness, a concept that entails certain aspects of language being marked while others are unmarked. The marked versus unmarked distinction is shared by both Chomskyan generative grammar and Jakobsonian structuralism though each intellectual tradition treats the idea differently. In the Jakobsonian view, markedness ranges over the synchronic and diachronic oppositions of a language's structure and function, and the marked or unmarked character of elements is determined by examining the language as a system of oppositions that reflect conceptual and perceptual properties, some of which are universals. In the Chomskyan view, universals are both more central and more abstract; markedness is part of a metatheoretical universal grammar that is drawn upon in language acquisition. Learning is likened to the fixing of innate parameters, some of which are unmarked others of which are marked.

The concept of markedness follows naturally from the concept of universals. Structures that are consistent with universals are considered unmarked, and those that are inconsistent with universals are considered marked. The markedness theory implies that the unmarked members should be easier to process, recall and learn and hence, acquired early in childhood. It is hypothesized that aphasics tend to lose the marked forms earlier and unmarked forms later. It is also claimed that unmarked forms are regained earlier and marked ones later. Theories of language espoused by linguists during much of this century have assumed that there is a hierarchy to the elements of language such that certain constructions, rules, and features are unmarked while others are marked. 'Dance' for example, is unmarked or neutral, while 'danced' or 'dancer' is marked. This opposition, referred to as markedness, is one of the concepts which both Chomskyan generative grammar and Jakobsonian structuralism appear to share, despite their different theoretical orientations.

The present study aims to investigate whether the so called marked words (semantically complex words) form a part of the vocabulary of normal children and those with delayed speech-language due to hearing impairment or mental retardation and validating the markedness theory with children having delayed speech and language development due to hearing loss and mental retardation. Though the markedness theory is widely accepted theory in linguistics, its practical implications for language use and especially speech and language disorders are yet to be established. This study is aimed at establishing the clinical relevance of this theory and the findings are likely to contribute immensely to our knowledge and understanding of linguistic behaviour. It is also likely to shed new lights on communication disorders, their assessment and intervention. A list of 84 pairs of marked and unmarked words was designed as stimuli for the task of naming. 105 children (age-range: 3 - 10 years) in the group of typically developing and 20 children (age-range: 5 -10 years) in each groups of both hearing impairment and mental retardation comprised the subjects of the study. The presence or absence of marked or unmarked forms in each of these groups was investigated.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Semantics:

Semantics (Greek *semantikos*, giving signs, significant, symptomatic, from *sema*, sign) refers to the aspects of meaning that are expressed in a language, code, or other form of representation. ***Semantics*** may also denote the theoretical study of meaning in systems of signs. Though terminology varies, writers on the subject of meaning generally recognize two sorts of meaning that a significant expression may have: the relation that a sign has (1) to objects and objective situations, and (2) to other signs, especially the sorts of mental signs that are conceived of as *concepts*.

Most theorists refer to the relation between a sign and its objects, as always including any manner of objective reference, as its *denotation*. Some theorists refer to the relation between a sign and the signs that serve in its practical interpretation as its *connotation*, but there are many more differences of opinion and distinctions of theory that are made in this case. Many theorists, especially in the formal semantic, pragmatic, and semiotic traditions, restrict the application of *semantics* to the denotative aspect, using other terms or altogether ignoring the connotative aspect.

An area of study is the meaning of compounds, another is the study of relations between different linguistic expressions (homonymy, synonymy, antonymy, polysemy, paronym, hypernymy, hyponymy, meronymy, metonymy, holonymy, exocentric, and endocentric). A **compound** is a word (lexeme) that consists of more than one free morpheme. For example, the English compound *doghouse, white-collar*. Compounding should not be confused with derivation, where bound morphemes are added to free ones. A **lexeme** is an abstract unit of morphological analysis in linguistics that roughly corresponds to a set of words that are different forms of "the same word". For example, English *run*, *runs*, *ran* and *runnings* *are* forms of the same lexeme. A lexeme belongs to a particular syntactic category, has a particular meaning (semantic value), and in

inflecting languages, has a corresponding inflectional paradigm. A lexicon consists of lexemes.

2.2 Lexical semantics:

Lexical semantics is a subfield of linguistics. It is the study of how and what the words of a language denote (Pustejovsky, 1995). Words may either be taken to denote things in the world, or concepts, depending on the particular approach to lexical semantics. Lexical semantics studies the meanings of words; the focus here is on 'content' words like *tiger, daffodil, inconsiderate*, and *woo*, rather than 'form' words / 'grammatical' words like *the, of, than*, and so on (Cruse, 2004). Lexical units are the words; so, lexical semantics involves the meaning of each individual word. Lexical semantics is the one area of linguistics to which one can continually add throughout life, as learning of new words and their meanings is a lifelong process whereas the rules of native language are learnt during the critical period.

Lexical semantics could be defined as the 'study of word meaning', but in practice it is often more specifically concerned with the study of lexical (i.e. content) word meaning, as opposed to the meanings of grammatical (or function) words. This means that lexical semanticists are most interested in the open classes of noun, verb and adjective and with more 'contentful' members of the adverb and preposition classes (for instance over but not of). Lexical semantics is thus mostly exempt from considering issues that arise from the use of grammatical words, such as definiteness and modality

It covers theories of the classification and decomposition of word meaning, the differences and similarities in lexical semantic structure between different languages, and the relationship of word meaning to sentence meaning and syntax.
A question asked is if meaning is established by looking at the neighborhood in the semantic net a word is part of and by looking at the other words it occurs within natural sentences or if the meaning is already locally contained in a word. Another question is how words map to concepts. As tools, lexical relations like synonymy, antonymy (opposites), hyponymy and hypernymy are used in this field (Cruse, 1986).

Synonyms (in ancient Greek syn = plus and onoma = name) are different words with similar or identical meanings and are interchangeable. Antonyms are words with opposite or nearly opposite meanings. (*Synonym* and *antonym* are antonyms.). Synonyms can be nouns, adverbs or adjectives, as long as both members of the pair are the same part of speech.

A **hyponym** is a word or phrase whose semantic range is included within that of another word. For example, *scarlet*, *vermilion*, and *crimson* are all hyponyms of *red* (their hypernym). According to Victoria Fromkin and Robert Rodman's *Introduction to Language*, hyponyms are a set of related words whose meaning are specific instances of a more general word (so, for example, *red*, *white*, *blue*, etc., are hyponyms of *color*). A hypernym is the opposite of a hyponym. For example, *plant* is hypernymic to *flower* whereas *tulip* is hyponymic to *flower*.

A word is a **hypernym** (in Greek, literally meaning 'extra name') if its meaning encompasses the meaning of another word of which it is a hypernym; ***Hypernymy*** is the semantic relation in which one word is the hypernym of another. For example, *vehicle* denotes all the things that are separately denoted by the words *train*, *chariot*, *dogsled*, *airplane*, and *automobile* and is therefore a hypernym of each of those words. Hypernymy, the relation words stand in when their extensions stand in the relation of class to subclass, should not be confused with holonymy which is the relation words stand in when the things that they denote stand in the relation of whole to part. A similar warning applies to hyponymy and meronymy.

Holonymy (in Greek *holon* = whole and *onoma* = name) is a semantic relation which defines the relationship between a term denoting the whole and a term denoting a part of, or a member of, the whole. That is,

'X' is a holonym of 'Y' if Ys are parts of Xs, or

'X' is a holonym of 'Y' if Ys are members of Xs.

For example, 'tree' is a holonym of 'bark', of 'trunk' and of ' branch.' Holonymy is the opposite of meronymy.

Meronymy (from the Greek words *meros* = part and *onoma* = name) is a semantic relation concept used in linguistics. A meronym denotes a constituent part of, or a member of something. That is,

X is a meronym of *Y* if *X*s are parts of *Y*s, or

X is a meronym of *Y* if *X*s are members of *Y*s.

For example, 'finger' is a meronym of 'hand' because a finger is part of a hand. Similarly 'wheel' is a meronym of 'auto'. Meronymy is the opposite of **holonymy**. A closely related concept is that of mereology, which specifically deals with part/whole relations and is used in logic. It is formally expressed in terms of first-order logic. A meronym means part of a whole. A word denoting a subset of what another word denotes is a hyponym. In knowledge representation languages, meronymy is often expressed as "part-of".

2.3: Markedness: Some views and observations:

An analytic principle in linguistics whereby pairs of linguistic features, seen as oppositions, are given different values of positive (marked) and neutral or negative (unmarked). In its most general sense, this distinction refers to the presence versus the absence of a particular linguistic feature (Crystal, 1980). There is a formal feature marking plural in most English nouns, for example; the plural is therefore ‘marked’, and the singular is ‘unmarked’. The reason for postulating such a relationship becomes clear when one considers the alternative, which would be to say that the opposed features simply operate in parallel, lacking any directionality. Intuitively, however, one prefers an analysis whereby dogs is derived from dog rather than the other way round- in other words, to say that ‘dogs is the plural of dog’, rather than ‘dog is the singular of dogs’. Most of the theoretical discussion of markedness, then, centers on the question of how far there is intuitive justification for applying this notion to other areas of language (e.g. prince/princess, happy/unhappy, walk/walked, etc.).

Waugh (1979) identified markedness as the necessary presence of information given by the feature in all contexts in all the uses of the particular item; Henning

Anderson (1989) noted that markedness in phonology is a property of the relation between The 'two signs of a diacritic paradigm' which is 'in part, independent of linguistic substance' (i.e. articulation and perception) and should be defined primarily as conceptual. Michel Shapiro (1983) took a similar view, associating semantic markedness both with reference and with conceptual complexity. He writes that "the marked term of an opposition has a narrowed referential scope, while the unmarked term is broader in the scope of its application to the field reference," adding that more narrowly defined means "of greater conceptual complexity". George Lakeoff (1987) saw markedness as "an asymmetry in a category, where one member or subcategory is taken to be somehow more basic than the other (or others)."

The term markedness covers a range of concepts. Some attempts have been made to distinguish between different types of markedness. Jakobson maintained a distinction between phonological markedness, which involves conceptual categories whose meaning is mere differentiatedness, and semantic markedness, which involves conceptual categories that signal meaning as well as distinctiveness. Catharine Chvany (1993) made an attempt to distinguish markedness as two levels, which are "specification of asymmetric syntactic and semantic feature" and "markedness values that are relative to contexts". Chomsky distinguished three types of markedness: the distinction between an unmarked core grammar and a marked periphery, and preference structures; both within the core and within the periphery. Lyons (1977) distinguished three distinct types of lexical markedness; which are formal marking (formal elaboration, as in *lion vs. lioness*), distributional marking (restriction in range of contexts) and semantic marking (specific of meaning, as in *old vs. young*). The markedness distinction is sometimes applied to the specific and general units of the unmarked lexemes. Zwisky (1978) distinguished seven kinds of markedness in morphology: material markedness, (Lyon's formal marking) semantic markedness, implicational markedness, abstract syntactic markedness, productive markedness (productivity), stylistic markedness and statistical markedness.

One of the earliest uses of the notion was in Prague school of Phonology, where a sound would be said to be marked, if it possessed a certain distinctive feature (e.g.

+voice), and unmarked (used in cases of neutralisation) if it lacked it. Several other interpretations of the notion of marking are found in the literature, where the concept of 'presence vs. absence' does not readily apply. One interpretation relates marking to frequency of occurrence, as when one might say a falling intonation pattern was unmarked, compared with a rising one, because it is more common. A markedness hypothesis that is Sequential Markedness Principle (Clements, 1990), predicts that acquisition should progress from the least marked to relatively more marked structures. **(**"For any two segments A and B and any given context X_Y, if A is simpler than B, then XAY is simpler than XBY") and the fact that the coronal /n/ is less marked than the labial /m/, it follows that in /sm/ and /sn/ sequence is the least marked of the two clusters.

Another is found in the semantic analysis of lexical items, where pairs of items are seen as unmarked and marked respectively, on the grounds that one member is more specific than the other (e.g. dog/bitch, where the latter is marked for sex- one can say male/female dog, but these adjectives are inapplicable with bitch). A third, related sense occurs when the distribution of one member of an opposition is restricted, compared with the other: the restricted item is then said to be marked- several comparative sentences illustrate this, e.g. *How tall is John?* (where, *How short is John?* is abnormal) (Crystal, 1980).

Semantic markedness is governed by various principles such as transparency of meaning, lexicalization patterns, restriction imposed on the use of words, etc. Semantic complexity contrasts with formal complexity. Formal complexity may have to do with morphology or with syntax. In languages such as English morphological complexity is often explained in terms of irregularity. Semantic complexity and semantic markedness are two different notions. Semantic complexity is based on the amount of the semantic material contained in the lexical items, semantic markedness, on the other hand, has to do with restrictions on use, but it also related to such notions as productivity and semantic transparency. Semantic complexity determines semantic markedness to a large extent, however, whenever there is a conflict between semantic complexity and semantic markedness, the latter takes precedence over the former. It is markedness and not complexity that defines acquisition order. Markedness which is based on the notion of

"level of utility" is not restricted to category names but it is also extended to relational terms as well. (Kiefer, 2001).

Cruse (1986) uses the term neutralization to refer the non-appearance of a semantic contrast under certain circumstances, particularly when there is some reason for remarking on its absence. It is used to distinguish the unmarked term out of a set of contrasting terms: the unmarked item is the one with a co-lexemic sister-unit, which is superordinate to the members of the contrasting set. In the case of binary contrast, the second term is described as marked. So , for instance , animal is the unmarked member of the set which includes *bird , fish , insect* etc.; *dog* is the unmarked member and the *bitch* the marked member , in the *dog /bitch* contrast ; and *heavy* is the unmarked , and *light* the marked member , of the *heavy /light* contrast.

The impartial and committed units of an unmarked lexeme involved in a neutralized contrast may differ considerably in their frequency and distributional freedom. In the case of lion, dog and duck it is the impartial units which have the greatest freedom of occurrence; they are the most likely to be operative in neutral contexts; and there is no restriction on using the superordinate unit to refer to a single member or an unmixed group of members, of the marked category – dog (s), for instance, may be used to refer to a bitch or a group of bitches. The corresponding committed units are virtually restricted to contexts in which there is an explicit or implicit contrast with the marked term (e.g. the lion and lioness watched the cubs playing). In many cases it is the impartial units which are the more contextually restricted. The impartial unit of the lexeme man is even more restricted; it can only occur in generic usage – Man is mortal, men are mortal (a mixed group of men and women cannot properly be referred to as men).

Opposition is special case of incompatibility, long and short, for instance, is incompatibles, since nothing can be at once long and short, they are relative to the same reference point; but obviously their relationship is different from that between dog and cat. There is a peculiar nature for opposites. Some lexical items, it seems, are inherently non-opposable. While explaining non-opposability, we cannot simply say that opposable

notions belong to certain notional areas: both opposable and non opposable terms may often be drawn from the same area. A good example of this is provided by colour terms. Here we find one exemplary pair of opposites in black and white; but red, blue, green, yellow have no opposites. The binarity of opposites must be specified carefully.

Marking theory is based, not on what is normal (i.e. statistically preponderant) but on what is natural**.** Any patterns that are present but uncommon in the languages of the world (or in a specific language) are termed marked (Veeman, 1998). The notion of markedness applied to the semantics of a particular language; using the term unmarked refers to the more general or expected element of a pair of opposites. For example, we use tall, not short, when we ask about a person's height, unless we are insulting the listener's intentionally: *"How short are you?"*. Therefore, tall is considered to be unmarked and short the marked element of this pair of opposites. Similarly, dog is a more general term than bitch, although in a sense they are opposites (the word dog is used to refer specifically to male dogs and also for all dogs). Thus, dog is considered to be the unmarked term and bitch the marked term of the pair. This distinction can be written in semantic features by saying that (+ female) (or (- male)) is a marked feature for dogs. The choice of the adjective (male or female) really does not matter.

It is not necessary that the minus feature always be marked (or the unmarked) one, for example. In Texas, for instance, a restaurant order for tea automatically refers to iced tea (even at breakfast in January), whereas in Massachusetts, it is assumed to mean hot tea (even at dinner on a hot humid night in August). In Texas, (+cold) (or (-hot)) would be unmarked value for tea; in Massachusetts, it would be (-cold) (or (+hot)).Therefore, it is obvious that, semantic markedness is affected by culture as well.

Complementary coding preferences are also seen in markedness, which can be termed as markedness reversal and are best explained by economy, it can be seen in singular/plural, (counter – iconic marking); e.g. German *Eltern* 'parents', *Eltern-teil* 'parent' (Wurzel, 1994); *parents* is more frequent than *parent*! (Leech, Geoffrey & Rayson, Paul & Wilson, Andrew. 2001). Haiman (1994) says, "The phenomenon of

markedness reversal indicates that markedness is context sensitive. What is marked by more complex form is therefore never a more complex concept but a more surprising one, given the context. A concept is *surprising* if it occurs rarely." Standwell (1985) discusses the English grammar rule of back shifting in reported speech, that after a past tense reporting verb the reported verb is back shifted; however, back shifting need not always takes place. Examinations of numerous examples indicate that the past is the unmarked form; the un-back shifted present is marked, as is the past perfect.

Morphological forms can also be marked. In English morphology, adding –s is the usual (unmarked) way to indicate plural. Therefore, voicing changes (elf-elves) and vowel changes (woman-women) are considered to be marked morphological patterns. Speech sounds and features can also be marked or unmarked. E.g., +interdental fricatives (marked phones) are rare in the languages of the world than +alveolar sounds (less marked) (Veeman, 1998).

Thus, a marked form is a non-basic or less-natural form. An unmarked form is a basic, default form. For example, lion is the unmarked choice of English-it could refer to a male or female lion. But lioness is marked because it can only refer to females. Defaults (highly-preferred items) of this sort are assumed a more important in the theory of non-linear phonology (Veeman, 1998). Greenberg (1966) observed that a large number of similar properties of pairs of phonological, grammatical and lexical categories can be subsumed under generalizations formulated in terms of markedness.

2.3.1: Criteria for Markedness:

Markedness is one of the most widely used terms in linguistics, and its senses range from a very narrow, structure-based notion of relative complexity to an extremely open sense of "unusual" or "unnatural." A recent definition of markedness located somewhere in the middle of the continuum is put forward by Givón (1995), who writes that "three main criteria can be used to distinguish the marked from the unmarked category in a binary grammatical contrast:

(a) **Structural complexity:** The marked structure tends to be more complex (or larger) than the corresponding unmarked one.
(b) **Frequency distribution:** The marked category (figure) tends to be less frequent, thus cognitively more salient, than the corresponding unmarked category (ground).
(c) **Cognitive complexity:** The marked category tends to be cognitively more complex—in terms of mental effort, attention demands or processing time—than the unmarked one (Givón, 1995). For instance, (Givón, 1991) claims that passive structures are more difficult to process than active structures.

Of these three criteria, (a) is the least controversial and the most universally accepted: given the contrast between two (comparable) signs A and B, the more complex of the two is the *marked* one. The second and third items on Givón's list, however, are much less straightforward. Greenberg (1966) emphasized the importance of frequency for markedness, asymmetries, and he was the first to assign it an explanatory role in this context. "To some extent, we can equate the term 'unmarked' with 'regular', 'normal', 'usual'; and 'marked' with 'irregular', 'abnormal', 'exceptional', or 'unusual'" (Radford 1988). "The typical pattern or property is called unmarked, the atypical one marked " (Archangeli 1992). Furthermore, Baayen et al. (1997), explicitly define "marked form" (of a singular-plural pair) as the form which occurs more frequently. Markedness also consider as a rarity or unexpectedness by different authors. Comrie (1986) claimed "Marked structures are used for marked situations". Tallerman (1998) said, "Object-fronting is quite rare in English. It's known as a marked construction, while the usual basic word order is termed unmarked." Levinson (2000) said, "What is said in an abnormal way indicates an abnormal situation, or marked messages indicate marked situations".

In another instance, Haiman (1985) rejects the identification of semantic markedness with semantic complexity: "a concept may be marked because it is relatively unfamiliar or infrequent" (his example is *female hippo*, which is not semantically more complex than *mare*). Levinson (2000) uses the expression "marked situation" in the formulation of one of his central principles, as a synonym of "abnormal", or "rare in the

world". He opines, “categories that are *cognitively* marked tend also to be *structurally* marked." Givon, 1991 and 1995 observes: “Iconicity of complexity”. He says, “marked forms and structures are typically both structurally (or at least longer) and semantically more complex than unmarked ones.” Newmeyer (1992) and Assien (2003) say that iconicity favors the morphological marking of syntactically marked configurations. Battistella (1990) had given tentative criteria for summarizing the markedness values: which included distributional criteria, amount of structure criteria and Proto-typicality.

Frequency is a very commonly cited criterion for markedness, due largely to the intuitive feeling that the unmarked is the most usual or standard form. While this may often be the case, it is not always so, and Trubetskoy (1969) argues explicitly against frequency as a reliable indicator of markedness, offering a number of examples of phonological segments which are marked (in terms of their complexity, etc.) but are statistically more frequent than their unmarked counterparts. Greenberg suggested that frequency is symptomatic of implicational relations between categories, the unmarked term being more frequent since it is implicated by the marked term; the idea of defining markedness in terms of universal implicational relations is still a richer idea than a mere frequency , because it opens up the possibility of a universal ranking of category and features. “Frequency of use is not just one correlating factor in markedness, but in fact the ultimate cause of the other correlating properties”(Croft, 2003) .

The unreliability of frequency as a measure of markedness also becomes obvious if we think in concrete terms (Haspelmath, 2005, 2006). In phonology, for instance, the appearance of a marked phoneme in a high-frequency word (say, a function word, a common morpheme, or a usual expression) could potentially make the instances of that phoneme more frequent than those of its unmarked counterpart. Based on sequential markedness principle and most frequency based studies there is an overlap between what is predicted by markedness and frequency (Zamuner 2003, Trofimovich et al. 2007). To test the effects of markedness against input frequency because they make different predictions regarding their order of acquisition, in our own domain of lexical classes, it turns out that in English the predicative use of adjectives is textually more frequent than

the attributive use (Thompson 1988) yet clearly, judged in terms of structural complexity (adjectival predicates require a copula), the former is the more marked of the two constructions. Thus, while frequency in a textual sense may tend to correlate with markedness, it is neither a necessary nor a sufficient criterion for it and was not used in the course of Beck's (in press) discussion.

The criteria for markedness that was used by Beck (in press), then, differ somewhat from those put forward by Givón (1995). Beck's discussion makes use of three criteria for syntactic markedness:

(a) **Structural complexity:** A sign X is marked with respect to another sign Y if X is more complex, morphologically or syntactically, than Y.

(b) **Contextual markedness:** An environment E is a marked one for a sign X if E is not a member of the largest subset of environments of X where X shares the greatest number of common properties with other instances of X (hence, the appearance of X in this environment can be said to be marked or an extended use).

(c) **Cognitive complexity**: A sign X is marked with respect to another sign Y if the representation of X is a less direct expression of X's meaning than the representation of Y is of Y's meaning.

An important point to be made about all of these criteria is that they are formulated in terms of contrast, that is, it is not enough to say that X is marked, it is necessary to specify what it is that X is marked in contrast to. Thus, it is essential to keep in mind that markedness is always *contrastive*.

Distribution within a language plays an important role in the determination of language, particular markedness values. The feature values that are implied in implicational relationships are marked: the feature values that are implying are unmarked. Unmarked terms are distinguished from their marked counter parts by having a greater freedom of occurrence and a greater ability to combine with other linguistic elements. Included as part of the criterion of distribution is the phenomenon of neutralization, according to which phonological and semantic markedness can be determined by which

term of an opposition occurs in positions of absolute neutralization. It emphasize that, wider distribution does not simply mean having a greater frequency in the language than the opposed category. Since the frequency of a token depends on such factors as lexical, grammatical, and discourse function, for the determination of markedness values, the relevant criterion of wider distribution and greater productivity is understood as the ability to occur in a wider range of contexts.

An example from lexical semantics is provided by Lyons (1977): English *dog* shows a wider distribution than *bitch* in that it can be combined with the adjectives *male* and *female* (*male dog*, *female dog*, vs. **male bitch*, **female bitch*). More interestingly, in gradable antonym pairs like *high/low*, *old/young*, only one member normally occurs in degree questions like *How old is she?* The positions where only one member of a pair can occur are said to exhibit "neutralization" of the opposition, and this was Trubetzkoy's main criterion for assigning phonological markedness values. Thus, restricted distribution has been important in determining markedness from the very beginning, but it has been taken as the sole definitional criterion only with respect to syntactic constructions.

In the pairs *dog/bitch* and *lion/lioness*, *bitch/lioness* has a much lower proportional frequency than *queen* has in the pair *king/queen.* But the wider distribution of terms like *lion, cow, dog* is not due to their greater frequency—rather, it is due to their wider meaning, which is itself ultimately due to the lower frequency of the opposite meaning (Haspelmath, 2005, 2006).

2.4: Review of previous research:

Linguistic features seen as oppositions are given different values of positive (marked) and neutral or negative (unmarked).Since it was first proposed by Nicholas Trubetzkoy and Roman Jakobson in the 1930s, the term *markedness* has been very popular in linguistics. It was embraced by European structuralists, generative phonology, functional-typological linguistics, Chomskyan principles-and-parameters syntax, neo-Gricean pragmatics, optimality theory, first and second language acquisition, creole studies, and probably other research areas as well (Haspelmath, 2005, 2006). From

Trubetzkoy's and Jakobson's earlier writings, it seems that markedness is conceived of as a language-particular phenomenon (Croft 1996). The use of *markedness* in generative phonology ultimately goes back to Chomsky & Halle (1968), where markedness values were a technical device to capture the relative "naturalness" of phonological structures. Archangeli (1997:2) opines that, "The term markedness is used to refer to the continuum between language-universal and language-particular properties, with completely unmarked properties being those found in virtually all languages and extremely marked properties found quite rarely."

Jakobson (1932, 1939, and 1957) adopted Trubetzkoy's notion of mark and applied it to oppositions of lexical and grammatical meaning such as those between male and female animal names. Jakobson's markedness concept (or rather, concepts) is discussed in detail by Battistella (1996).

Jakobson (1984) proposes that unmarked categories tend to be more differentiated than marked ones. Indeterminateness refers to the semantic criterion that marked elements are characteristically specific and determinate in meaning, while the opposed unmarked elements are characteristically indeterminate, a factor that follows from the definition of semantic markedness as having both a general meaning and a meaning opposite from that of the marked term. The indeterminateness of unmarked has been likened to a meaning inclusion relation; since the unmarked is capable of having a general interpretation and it can be a substitute for the marked term in all instances .A marked category tends to be interpreted in relation to the unmarked one as a complex compound category opposed to a simple one .The physically or formally simpler element is the unmarked one , the simplicity has been invoked at both the phonological level , where it refers to the acoustic and articulatory complexity of sound , and at the semantic level , where it refers to the morphological or syntactic complexity of a category .

Moravcsik and Wirth (1986) observe a classical version of markedness that can be defined relying upon three types of criteria: the distribution of elements, the amount of

structure they have, and their elaboration in terms of subtypes. Distribution of elements and amount of structure are cover terms for sets related and overlapping diagnostics.

2.4.1: Types of Markedness (Researchers' view):

Martin Haspelmath (2003) described seven different kinds of markedness. Widespread assumption, often made with little reflection: there is a common core meaning of markedness, some kind of underlying intuition. Which are as follows:

A. Markedness as overt coding

Markedness acts as an overt coding in language. E.g. 'In English present-tense verbs, the third person singular is marked (by *-s*, e.g. *sing-s*), whereas other person-number forms are unmarked. Unproblematic, but perhaps better: *overtly coded* vs. *uncoded'*.

B. ***Markedness as specification for a feature ("featuredness")***

Trubetzkoy (1931, 1939) claimed, 'in the opposition [t]:[d], [t] lacks specification for voice, so it appears in neutralization contexts and is unmarked'. Jakobson (1932) said, 'in the opposition *lion:lioness*, *lion* lacks specification for gender, so it appears in neutralization contexts and is unmarked'.

C. ***Markedness as restricted cross-linguistic distribution***

Kean (1992) claimed, 'perhaps the most common view of markedness encountered in the literature is the one based on cross-linguistic distributional analysis... [e.g.] if a language has a voiced stop, then it has a voiceless one as well.' Archangeli (1997) said 'the term markedness is used to refer to the continuum between language-universal and language-particular properties, with completely unmarked properties being those found in virtually all languages and extremely marked properties found quite rarely.'

D. ***Markedness as a cluster of correlating properties of meaningful categories*** (*Typological Markedness*, Greenberg 1966, Croft 1990, 2003):

	unmarked	***marked***
Structural coding	zero	overt
Inflectional potential	more distinctions	fewer distinctions
Distribution	in more environments	in fewer environments
Text frequency	higher	lower
Cross-ling. frequency	higher	lower
examples:	*singular*	*plural*
	present	*past*
	third person	*second person*
	active	*passive*

E. ***Markedness as dispreference for difficult structures ("unnaturalness")***

Anderson & Lightfoot (2002) says, 'Markedness is the tendency for phonetic forms to be pronounced in a simple, natural way (as determined in part by the nature of speech articulation, acoustics, and audition, and in part perhaps by more abstract cognitive factors)'. Wurzel (1994) says, 'certain structural characteristics which are permitted by Universal Grammar are clearly preferred by languages, others avoided if at all possible. [Markedness principles] establish which structural characteristics are preferred (or unmarked), [and] which are marked.'

examples*:*	***unmarked***	***marked***
	[k]	[kw]
	[i]	[y]
	suffix	infix
	SVO order	VSO order
(iconicity:)	*boy/boys*	Welsh *pluen* 'feather', *plu* 'feathers'
(uniformity:)	*boy/boys*	*wife/wives*
(transparency:)	*boy/boys*	*sheep/sheep*

Difficulty of dispreferred ("marked") structures is revealed by: low cross-linguistic and textual frequency, late acquisition, slower processing, tendency to disappear in language change, etc. (Mayerthaler, 1981).

F. ***Markedness as rarity or unexpectedness***

Scholars like Archangeli (1992), called the typical pattern or property as unmarked and the atypical one as marked. According to Radford (1988) the term 'unmarked' can be equated with 'regular', 'normal', 'usual'; and 'marked' with 'irregular', 'abnormal', 'exceptional', or 'unusual'." Tallerman (1998) opine that Object-fronting, which is quite rare in English is a marked construction, while the usual basic word order is termed unmarked. Levinson (2000) said that if something is said in an abnormal way indicates an abnormal situation, or marked messages indicate marked situations. According to Comrie (1986) marked structures are used for marked situations,

e.g. "unmarked": *Tom intends to return before nightfall.*

"marked" : *Tom intends that Sally should return before nightfall.*

G. ***Markedness as deviation from default parameter setting***

Chomsky (1981)"In the absence of evidence to the contrary, unmarked options are selected." Van Riemsdijk & Williams (1986) "One way to construe the notions "marked" and"unmarked" is in terms of language learning: The marked case must be learned as a language particular fact, whereas the unmarked case is what the language learner will assume to be the case (because it is determined by the innate language faculty), in the absence of facts to the contrary.

Table 1 given below presents some of the markedness senses, their domains and salient representatives:

Types of Markedness	***Domain***	***Salient Representative***
Markedness as specification for a phonological distinction	phonemes	Trubetzkoy 1939
Markedness as	lexical items,	Jakobson 1932

specification for a semantic distinction	grammatical categories	
Markedness as phonetic difficulty	phonological/phonetic categories	Hayes & Steriade 2004
Markedness as morphological difficulty/unnaturalness	morphological patterns	Dressler et al. 1987, Wurzel 1998
Markedness as conceptual difficulty	(grammatical) conceptual categories	Givón 1991, 1995
Markedness as rarity in texts	any linguistic element or pattern	Greenberg 1966, Tallerman,1998.
Markedness as restricted distribution	phonological and grammatical categories, lexical items, syntactic patterns	Jakobson 1941, 1963, Archangeli,1997
Markedness as deviation from default parameter setting	parametric options	Chomsky 1981

2.4.2: Markedness and Optimality Theory (OT) related researches:

According to the Optimality Theory (Prince and Smolensky (1993)) all language learners are born with a set of universal constraints. Learnability arguments entail that, in the initial state, markedness constraints outrank faithfulness constraints [Prince (personal communication) September 26, 1993], Smolensky (1996). Headturn Preference Procedure Jusczyk (1998), Kemler Nelson et al. (1995) investigations introduced a general experimental paradigm for exploring infant's phonological grammars. English learners at 4.5 and 10 months of age gave evidence of observing both markedness and faithfulness constraints and ranked markedness above faithfulness. After a brief instability around 15 months, at 20 months they display the adult English pattern, with markedness outranking faithfulness. Tesar and Smolensky (2000) have done a study

which investigated whether English learners give evidence of observing markedness and faithfulness constraints relating to nasal place assimilation. Pace Hale and Reiss (2000), say that markedness cannot be equated with performance difficulty, and they demonstrate that infants require knowledge of markedness during language acquisition in order to transcend the limitations of inductive generalization. However, this does not necessarily imply that knowledge of markedness is innate and they argue, rather the most markedness constraints may in fact emerge in the course of linguistic development through the child's monitoring of her own performance.

According to Chomsky (1981), the theory of markedness “imposes a preference structure on the parameters of UG [=Universal Grammar]. In the absence of evidence to the contrary, unmarked options are selected". In other words, “the unmarked case of any parameter represents the initial hypothesis that children make about the language to be acquired” (Kean 1992; Haider 1993:635). In Chomsky & Halle (1968), the idea was proposed that markedness values are not just present in language-particular mental grammars, but are in some way defined at the level of the innate cognitive code for language (Universal Grammar or UG). Optimality Theory is claimed to *be* a formal theory of markedness (Gilbers and De Hoop,1998).This position lives on in Optimality Theory in the widespread claim that markedness constraints (as well as the other constraints) are innate and part of UG. And of course markedness in the sense of deviation from default parameter setting is part of the cognitive code.

2.4.3: Researches on Markedness in relation to Language Acquisition:

After the advent of generative linguistic theory in the 1960s and its subsequent expansion into areas such as second language acquisition (e.g. White 1982), the concept was incorporated into the field with convincing predictive and explanatory powers in the form of Eckman’s (1977) Markedness Differential Hypothesis (MDH): “The areas of difficulty that a language learner will have can be predicted on the basis of a systematic comparison of the grammars of the native language, the target language and the markedness relations stated in universal grammar.” Since then, the notion of markedness

has been extensively used as a tool to explain L2 acquisition phenomena (Carlisle 1988, Major 1996, Abrahamsson 1999, Rebello and Baptista 2006, Escartin 2005, Yavaş 2006, Yavaş and Barlow 2006, Cardoso 2007). More recently, there has been a major shift in linguistics with the emergence of usage-based approaches that support the notion that linguistic representation (i.e. competence, in generative terms) is mediated by the frequency with which certain linguistic structures occur in the language (Gass 1997, Bybee, 2001, Demuth 2001).

Another study (Schriefers, 1990) which presents evidence for the two sources of difficulty in producing lexical items for the domain of semantically unmarked versus marked dimensional adjectives (e.g., big versus small): The first set of experiments establishes an effect of semantic markedness in language production which is due to a difference in the difficulty of accessing unmarked versus marked lexical items; while the second set of experiments shows that competition between concepts for expression can lead to incorrect selection of an (unintended) lexical item (as reflected in certain types of speech errors), or to a higher processing load for producing the correct (intended) lexical item. Together, these experiments support the distinction between a preverbal conceptual and a lexical level of representation in language production, and show that both levels contribute to the relative difficulty of producing lexical items. Principle of markedness has proven to be relevant to the lexicalization of evaluations and emotions. It does not seem to affect the organization of the lexical fields constituted by speech act verbs other than expressive. Principle of markedness may also claim to affect the organization of lexical fields constituted by verb of communication (Proost, 2007).

Battistella (1996) aimed at clarifying the nature of markedness relation, in that markedness is taken to be an axiomatic property of oppositions, a theoretical primitive that follows from the definition of opposition. The thesis of Jakobsonian markedness is the proposition that all oppositions have an inherent nonequivalence defined in terms of the presence or absence of feature. But although markedness is defined as an abstract relation between feature values, it is not intended that the determination of markedness relations be a priori; rather they should be grounded in the analysis of linguistic data that

determine the features of language. It appeals to the facts of language to uncover its abstract relational structure; facts of semantic inclusion and dominance and of phonological distribution underlie the analysis of signs as marked and unmarked. A very critical evaluation of Jakobson's approach is found in Andersen (2001) where he says, 'this semantic sense of mark/ markedness is less abstract than Trubetzkoy's phonological sense, because it is not just defined in terms of the system, but also in substantive terms. The marked member is semantically more specific than the unmarked member'. Trubetzkoy's markedness notion was language-particular and purely structural, and substantive considerations were secondary for it. Jakobson (1941, 1963), however, observed that the marked members (with restricted distribution) of oppositions were acquired later by children and were found in fewer languages, suggesting that they are not only more complex in their abstract structure, but also more difficult for language users. Unmarked morphological structures are claimed to (i) be widely found cross-linguistically, (ii) be acquired early, (iii) be processed more easily, (iv) be affected less by language disorders, (v) used more frequently, and (vi) be more resistant to language change (Mayerthaler 1981, Faingold 2003).

Various diagnostic criteria have been suggested for ascertaining markedness values. The task of sorting out the proper criteria is complicated by the fact that markedness theory has developed in several ways since originally conceived. Jakobson's work at different times emphasized both the language particular aspect of markedness and the possibility of universal asymmetries .There is no single correlative property that can serve as an automatic diagnostic for markedness values, though some work better than others.

2.4.4: Researches on clinical implications of Markedness:

Not much of researches have been carried out in the field of Speech Language Pathology in relation to markedness. However, there are a few researches which are somehow related to the markedness issue, but these are all carried out in foreign context and of lesser relevance for the present study. There is no research which can be co-related to the present research especially in Indian context and on HI and MR population.

Research that supports markedness theory includes the areas of auditory short-term memory (Clark, 1977), dichotic listening (Hayden, Kirstein, & Singh, 1979), and speech production (Blumstein, 1973; Cairns, Cairns, & Williams, 1974; McReynolds, Engmann, & Dimmitt, 1974). Numerous other studies in the speech production have indirectly supported markedness theory (Irwin, 1947; Compton, 1970; McReynolds & Huston, 1971; Pollack & Rees, 1972; Singh & Frank, 1972; Oiler, 1973; Costello & Onstine, 1976). Analysis of speech errors in adult speech disorders (e.g., Blumstein, 1973; Marquardt et al., 1979) supports the hypothesis. The findings of Blumstein's study (1973) of articulatory errors in aphasia also provide some support.

Using markedness as a guide for choosing treatment targets, various studies have supported the notion that treating more marked sounds (because these imply the presence of other sounds) will result in more changes to the children's developing phonological system. Examples of such treatment paradigms include teaching voiced obstruents (Mc Reynolds &Jetzke , 1986) and fricatives instead of stops (Dinnsen & Elbert ,1984). In both studies, teaching an unmarked form resulted in generalization across classes and syllable positions, whereas teaching an unmarked form resulted in generalization across classes and syllable positions, whereas teaching the more unmarked form resulted only in category changes. Although most studies with English speaking children confirm the value of using markedness principle for choosing treatment targets, this pattern has been sole to emerge in treatment studies with other language groups. More recently, Gierut (1999) has applied a model of markedness for onset clusters to establish the treatment targets that may result in greater generalization. Target selection procedures for the treatment are guided by universal principles that govern the phonotactics of onset clusters and experimental evidence that supports the efficacy of phonologically complex targets. The prediction is that treatment of onset clusters will facilitate child's learning of both complex and simple properties of the sound system. The consequence for phonological treatment is that a complex target predictably leads to acquisition of related simpler targets without direct intervention. The applied consequences thus have potential to improve the efficacy of clinical treatment.

2.5 Statement of the problem and need for the study:

An unmarked sound or form is one which is relatively easy to produce and therefore occurs more frequently across the languages, is acquired earlier by the children, is retained when languages undergo historical/progressive changes and its frequency count is more in a given language. On the contrary, their corresponding marked forms occur less frequently and acquired later by children. Thus, the markedness theory implies that the unmarked members should be easier to process, recall and learn. It is believed that aphasics tend to lose the marked forms earlier and unmarked forms later. It is also claimed that unmarked forms are regained earlier and marked ones later. As can be seen in the review, markedness in lexical semantics (while there are quite some studies in phonology) is least worked upon. There have been very limited studies on clinical population in the West and none in the Indian context. Hence, the present study was undertaken.

2.6 Aim of the study:

To study whether the so called marked words (semantically complex words) form a part of the vocabulary of delayed speech and language children with hearing impairment and delayed speech and language children with mental retardation as compared with the normal subjects. This study examines the role of markedness to the process of lexical semantics in language acquisition.

Thus, the current study attempts to answer the following research questions:

- Are the marked words selectively missing in the clinical population as against the unmarked ones?
- If the marked forms are present, does it imply that the unmarked forms are already acquired?
- Conversely, does the teaching of marked forms facilitate automatic acquisition of the corresponding unmarked ones?

CHAPTER 3

METHOD

The present study aimed at whether the so called marked words (semantically complex words) form a part of the vocabulary of children having delayed speech and language with hearing impairment and delayed speech and language with mental retardation as compared with the normal subjects. The method of the study consisted of **five** different phases:

Phase 1: **Preparation of word list**:

The word list for the present study included a semantically marked form and its corresponding unmarked form. Most of the words were selected from the preschool text books which came under the category of most frequent nouns, verbs, adjectives and adverbs. To group these words under each category, the word list had been given for the consultation of two linguists and two speech language pathologists. The modifications were made according to their suggestions.

Phase 2: Preparation of picture cards:

All the words which were selected for the present study were picturized. The each word was picturized on white cards of size (4 x 6’’). For the picturization of the stimuli the word list was given to a professional artist. The artist made colored line drawings of the words and some words from picture books. The materials consisted of a total of 220 stimuli and were divided into four subsections like present tense, past tense, nouns and adjectives/adverbs.

Phase 3: Pilot study:

The pilot study was conducted on a small group of typically developing children (n -10) falling in the age range of 5 to 10 years. In order to finalize the word list developed, the picture cards of each stimulus were presented to the children and tried to elicit the response. The responses of the each child were interpreted and analysed. Based

on the results obtained, suitable modifications were incorporated in the word list by deleting and adding words.

Phase 4: Finalization of material:

Based on the pilot investigation, the words which are not suitable for the children were found out and deleted from the list. A new word list with suitable modifications was made for the further administration. The new word list included a total of 210 stimuli. That is 84 pairs of both marked and unmarked words from a lexical category of each verbs, nouns, adjectives and adverbs in each subgroup. This consisted of 42 pairs of both present tense and past tense (each pairs having male, female and neutral gender) and 42 pairs of both nouns and adjectives/adverbs. This word list included four different sub categories i.e.; present tense -78, past tense - 48, nouns - 48 and adjectives/ adverbs - 36 and these words were presented for both normal children and clinical population for the task of naming.

Phase 5: The present study:

Subjects:

A total of 145 children were selected for the present study consisting of the following sub-groups:

- typically developing children: n_1= 105
- children with severe to profound sensorineural hearing impairment: n_2= 20
- children with mild mental retardation: n_3= 20

Subject selection criteria:

For Normal subjects:

- Children with Kannada as their mother tongue and used Kannada extensively at home and other ambient. But most of them were exposed to a second language, English, as it is their medium of instruction at school.
- All the subjects had no known organic or sensory deficits.

For Clinical population:

- All hearing impaired children selected for the study were congenital severe to profound sensorineural hearing loss cases and they are native speakers of Kannada.
- All mentally retarded children selected for the study came under mild to moderate category with Kannada as their mother tongue.

Subject details are given in table 1, table 2 and table 3.

Table 1: Age groups and the number of normal subjects in each age group.

Age range	**No. of subjects**		
	Males	**Females**	**Total**
3-4	7	8	15
4-5	7	8	15
5-6	7	8	15
6-7	7	8	15
7-8	7	8	15
8-9	7	8	15
9-10	7	8	15
Total	**49**	**56**	**105**

Table 2: Age groups and the number of subjects in mentally retarded children depending upon both chronological & mental age.

Age range		**No. of subjects**		
CA	**MA**	**Males**	**Females**	**Total**
5-6	3-4	2	2	4
6-7	3-4	2	2	4
7-8	3-4	1	1	4
	4-5	1	1	
8-9	3-4	0	1	4
	4-5	1	1	
	5-6	1	0	
9-10	4-5	1	1	4
	5-6	1	1	
Total		**10**	**10**	**20**

Table 3: Age groups and the number of subjects in hearing impaired children depending upon both chronological & language age.

Age range		**No. of subjects**		
CA	**MA**	**Males**	**Females**	**Total**
5-6	3-4	2	1	4
	4-5	0	1	
6-7	3-4	2	1	4
	4-5	0	1	
7-8	3-4	1	1	4
	4-5	1	0	
	5-6	0	1	
8-9	4-5	1	0	4
	5-6	1	2	
9-10	4-5	1	0	4
	5-6	1	2	
Total		**10**	**10**	**20**

Procedure:

The testing was conducted in a quiet environment with a one to one interaction between the subject and the tester. The response time was not restricted but the test duration was noted for each subject. The normal groups took 30 to 40 minutes whereas the clinical population took 50 to 60 minutes depending on the severity. The time taken for testing the typically developing children was almost similar across the age groups. However, there was a decrease in duration of testing time as the age increased; but, the testing duration varied across the clinical population. The instructions for each task of picture naming was given differently based on the comprehension skills of the child.

For the familiarization of the task, few picture cards which were not included in the list were shown to the children. After familiarizing with the task, picture stimuli of the words were presented individually to the subject. If the child was not able to follow the instructions, suitable clues (which are constant) were given for eliciting the responses. In some cases simple questions, prompts and gestures were provided and these were

noted down. If the child found any difficulty to respond even with the help of two clues, then another stimuli was given.

The children were provided with token and tangible reinforcements at the end of testing and with verbal reinforcement whenever necessary. The responses were considered as correct response, correct response with clues and incorrect responses. The oral responses on the task of naming were recorded with digital recorder for the purpose of transcription (IPA). All the responses were recorded on a response sheet maintained for each child for detailed analysis.

Scoring:

A correct response is one which is the expected response or acceptable response for a particular item. An incorrect response is the wrong response or a no response. Correct responses with the clues are the subject's response, which is acceptable with clues. E.g. In past tense section children tend to use the present tense words instead of past tense and they need simple questions and prompt to correct it.

A scoring was done in the following manner (table 4).

Table 4: scores for different responses

Responses	Scores
Incorrect response	0
Correct response with clues	1
Correct response	2

Based on these responses each response was scored. The total scores were calculated for each subsection and also overall. Two judges, both SLPs (Post-Graduate with minimum 3 years of experience) well versed with linguistic markers, scored the transcribed responses. Good inter - judge reliability was ensured. Subsequently, the transcribed sample was subjectively as well as statistically analyzed and interpreted.

CHAPTER 4

RESULTS AND DISCUSSION

The present study aimed to find out whether the marked words form a part of the vocabulary of children with hearing impairment and children with delayed speech and language with mental retardation, as compared with the normal children. The intra group and inter group comparison, and the comparison of performance of clinical groups with normal group was also made.

In this study, a word list which was designed and used, consisted 84 pairs of both marked and unmarked words that included 42 pairs of present tense and past tense and 42 pairs of nouns and adjectives. This list consisted of a total of 210 words which is enclosed and is given in appendix 1, four different sub categories i.e.; present tense -78, past tense – 48 (each verb had male, female &neutral gender forms), nouns - 48 and adjectives/ adverbs – 36; and these words were presented for both normal children and clinical population for the task of picture naming. The response of each subject was recorded in a cassette recorder and a diary was also maintained. The recorded sample of each subject was analyzed. Each correct response was given the score- 2, partially correct response-1 and wrong response-0.

For each subject the scores out of 420 were calculated and statistically analyzed using SPSS 16.0 software. Descriptive statistics and inferential analyses using various tests were carried out at each juncture. The detailed analysis was divided further in to 2 sections:

- analysis of scores using chronological age
- analysis of scores using mental age

After the detailed analysis of each data, the performance of typically developing children, hearing impaired children and mentally retarded children were compared to find out the difference between each groups in their development of language.

- **Section 1: Analysis of scores using chronological age:**

Analysis of scores of normal children:

- Total scores across ages
- Comparison of ages within each linguistic task
- Comparison of linguistic tasks within each age group

Analysis of scores of Hearing Impaired children:

- Total scores across ages
- Comparison of ages within each linguistic task
- Comparison of linguistic tasks within each age group

Analysis of scores of Mentally Retarded children:

- Total scores across ages
- Comparison of ages within each linguistic task
- Comparison of tasks within each age group

To compare the performance between normal and clinical population.

- Comparison between total scores
- Comparison between linguistic task
- Comparison between age groups

To compare the performance between each clinical population i.e., both mentally retarded and hearing impaired children.

- Comparison between total scores
- Comparison between linguistic task
- Comparison between age groups

- **Section 2: Analysis of scores using mental age:**

To compare the performance between normal and clinical population

- Comparison between total scores

- Comparison between linguistic tasks
- Comparison between age groups.

To compare the performance between each clinical population i.e., both mentally retarded and hearing impaired children.

- Comparison between total scores
- Comparison between linguistic tasks
- Comparison between age groups

4.1: Analysis of scores obtained by normal subjects:-

Using descriptive statistics of the SPSS statistical package mean and standard deviation was calculated for all the normal subjects in the seven age groups studied. On statistical analysis using One-Way ANOVA, it was observed that there was a significant difference across the seven age groups for total performance. [$F(6, 98) = 112.243$, $p<0.001$]. Mean and standard deviation of total scores are listed in the table 5. An increasing trend can be observed in mean scores with age; and the standard deviation shows a reduction towards the higher age groups. Table 5 depicts the mean and standard deviation of the total scores across each age group.

Table 5: Mean and standard deviation of the total scores from 3 to 10 years of age

Age range	N	Mean	Std. Deviation
3-4 years	15	173.9333	29.4605
4-5 years	15	257.8000	37.6169
5-6 years	15	295.4000	37.6654
6-7 years	15	321.0000	27.8875
7-8 years	15	344.5333	14.9612
8-9 years	15	363.7333	14.9211
9-10 years	15	395.1333	13.3410
Total	105	307.3619	73.6567

Using Duncan's Post-Hoc test, pair-wise differences between the ages were tested at 5% level of significance. It was observed that there was no significant difference between

age group of 7-8 and 8-9 and a significant difference between all other pairs of age groups.

- **Comparison of each task across the age groups:**

One-Way ANOVA was used to observe the performance of subjects in each task across the age range. In all tasks an increasing trend in scores with age can be observed.

a) Present Tense

Children performed better for present tense when compared with the other tasks. On statistical analysis, using One-Way ANOVA it was observed that there was a significant difference across the age groups [$F(6, 98) = 82.18$, $p<0.001$]. The mean and standard deviation of present tense across the age groups is shown in the table 6.

Table 6: mean and standard deviation of present tense across the age group

Age range	Mean	Std. Deviation
3-4 years	86.8000	16.8022
4-5 years	125.0667	13.2852
5-6 years	132.8000	13.6549
6-7 years	144.4667	6.1046
7-8 years	148.1333	4.7188
8-9 years	151.0667	3.3051
9-10 years	155.4667	.9904
Total	134.8286	24.1229

Using Duncan's Post-Hoc test, pair wise differences across age groups were tested at 5% level of significance. It was observed that there was no significant difference between higher age groups from 6-7 to 9-10 and the higher age groups are significantly different from lower age groups and lower age group were significantly different from one another.

b) Past Tense

Lower age groups such as 3 to 4 and 4 to 5 performed poorly for past tense but significant improvement can be seen in the performances as age increases. From One-

Way ANOVA, [F (6, 98) =68.74, p<0.001], it was evident that there was a significant difference across the age groups; it was evident that there was a gradual but consistent increase in scores. The mean and standard deviation of past tense across the age group is shown in the Table 7.

Table 7: mean and standard deviation of past tense across the age group

Age range	Mean	Std. Deviation
3-4 years	19.2667	6.7872
4-5 years	43.3333	15.5226
5-6 years	57.5333	15.9681
6-7 years	63.8667	15.1840
7-8 years	72.7333	6.8813
8-9 years	78.5333	9.2340
9-10 years	93.6000	2.5579
Total	61.2667	25.2839

Using Duncan's Post-Hoc Test, pair wise differences between the ages were tested at 5% level of significance. There was no significant difference between the means across 5-6 with 6-7, 7-8 with 8-9 and all other pairs of age were significantly different.

c) Nouns

The result of nouns also showed a significant difference across the age groups. An increasing trend can be seen in the scores as the age increases. From One-Way ANOVA, [F (6, 98) = 75.51, p<0.001], it indicated that there was a significant difference across the age group. The mean and standard deviation of nouns across the age group is showed in the table 8.

Table 8: mean and standard deviation of nouns across age group

Age range	Mean	Std. Deviation
3-4 years	34.1333	6.5232
4-5 years	43.2000	6.9508
5-6 years	53.5333	7.4245
6-7 years	56.2667	8.5813
7-8 years	64.0667	4.0965
8-9 years	68.9333	3.4737
9-10 years	77.6667	7.9522
Total	56.8286	15.3613

Duncan's Post-Hoc Test showed significant differences at 5% significance between all pairs of age group except for 5-6 and 6-7.

d) Adjectives / Adverbs

The performance of children for the adjectives /adverbs also showed an improvement across the higher age groups. From One-Way ANOVA, $F(6, 98) = 87.39$, $p<0.05$. It also indicated that there was significant difference between age groups. The mean and standard deviation of adjectives/adverbs across the age group is shown in the table 9.

Table 9: mean and standard deviation of adjectives/adverbs

Age range	Mean	Std. Deviation
3-4 years	33.5333	2.9488
4-5 years	46.2000	7.1434
5-6 years	50.9333	6.0174
6-7 years	55.0667	5.2978
7-8 years	59.6000	3.7947
8-9 years	65.2000	3.9316
9-10 years	68.0000	3.8730
Total	54.0762	12.0134

Duncan's Post-Hoc Test showed significant difference between all pairs of age groups except for 8-9 and 9-10.

Graphical representation of mean scores of each task across the age range of 3 to 10 years in normal children is given in the figure 1. It was found that by the age range of 9 to 10 years the mean scores of present tense, past tense and adjectives/adverbs is reaching towards the maximum percentile but the score of nouns are still lagging behind. The scores increased as a function of age. From the mean scores obtained from the children in these seven age groups, it was evident that there was a gradual but consistent increase in scores. There is an increase in the overall performance of each subgroup across the age range.

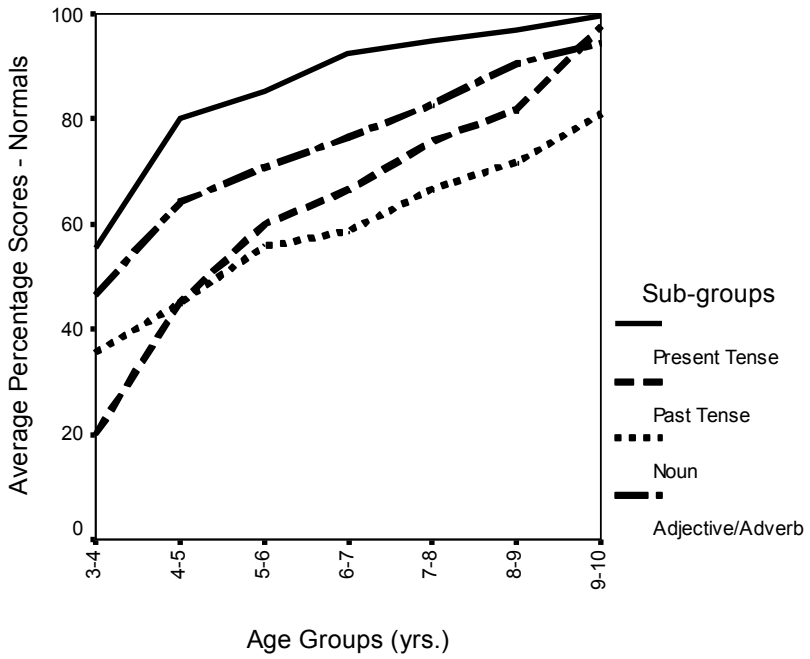

Figure 1: Graph representing mean values of each subgroup across the age group in normal children

- **Comparison across tasks within each age group**

Repeated Measure of ANOVA was used for comparison of the four tasks; present tense, past tense, nouns, and adjectives/adverbs in each age group. Each age group was analyzed separately; percentage score in these tasks were analyzed, since the maximum scores across tasks being different.

a) 3-4 years

The mean and standard deviation of four tasks in 3-4 years were calculated and showed in table 10. Repeated measure ANOVA showed a significant difference between the tasks [F (3, 42) =148.04, p<0.001]. Children showed a better performance for present tense and adjectives when compared to the other tasks. Bonferroni's multiple comparison indicated that there was a significant difference between each task within this age group at 5% level of significance. The results showed that the mean difference was significant for the past tense, nouns and adjectives/adverbs.

Table.10: mean and standard deviation of subgroups in the age range of 3 - 4 years

3 - 4 years	Mean	SD
Present t	55.6410	10.7706
Past t	20.0694	7.0700
Nouns	35.5556	6.7950
Adj/adv	46.5741	4.0955

b) 4-5 years

For the age range of 4 to 5 years, the mean and standard deviation showed a better performance for all tasks when compared with the lower age group and it is given in table 11. A marked improvement was seen in all tasks compared to 3-4 years. The standard deviation of past tense was higher than all other subgroups. Repeated measure ANOVA, [F (3, 42) = 85.43, p<0.001] revealed a significant difference between tasks within this age group. Bonferroni's pair wise comparison revealed that the each task was significantly different from other task except past tense and nouns.

Table.11: mean and standard deviation of subgroups in the age range of 4 -5years

4 -5 years	Mean	SD	
Present t	80.1709	8.5161	
Past t	45.1389	16.1694	
Nouns	45.0000	7.2405	
Adj/adv	64.1667	9.9214	

c) 5-6 years

An improvement in the performance for all tasks can be observed as age increases. While considering the age group of 5 to 6 years, children were able to respond better for the past tense than the lower age groups. Repeated measure ANOVA, [F (3, 42) = 49.13, $p<0.001$] indicated that there is significant difference between tasks. Pair wise comparison was done for each subgroups and it shows that the results of each subtests are significantly different each other except past tense and nouns. The mean and standard deviation is shown in table 12.

Table.12: mean and standard deviation of subgroups in the age range of 5 - 6 years

5 -6 years	Mean	SD
Present t	85.1282	8.7532
Past t	59.9306	16.6335
Nouns	55.7639	7.7339
Adj/adv	70.7407	8.3575

d) 6-7 years

There is an increasing trend in the performance of children as age increases .For the age group of 6 to 7 years, [F (3, 42) =45.52, $p<0.05$], repeated measure of ANOVA showed a significant difference between tasks. The mean and standard deviation is shown in table 13.

Table.13: mean and standard deviation of subgroups in the age range of 6 -7years

6 -7 years	Mean	SD
Present t	92.6068	3.9132
Past t	66.5278	15.8166
Nouns	58.6111	8.9388
Adj/adv	76.4815	7.3581

e) 7-8 years

For the age group of 7 to 8years, the mean scores of each subtests showed a marked increment. [F (3, 42) = 130.08, $p<0.05$], repeated measure ANOVA showed a

significant difference between tasks. According to Bonferroni's multiple comparison all tasks were significantly different as seen in Table 14.

Table 14: mean and standard deviation of subgroups in the age range of 7-8years

7 -8 years	Mean	SD	
Present t	94.9573	3.0248	
Past t	75.7639	7.1680	
Nouns	66.7361	4.2671	
Adj/adv	82.7778	5.2705	

f) 8-9 years

For the age group of 8 to 9 years, the mean scores for both present tense and adjective is more than 90% but the scores of nouns still lags behind. The mean and standard deviation is shown in table.15. Repeated measure ANOVA, [$F(3, 42) = 68.17$, $p<0.05$] indicated that there was significant difference between tasks.

Table.15: mean and standard deviation of subgroups in the age range of 8-9years

8-9 years	Mean	SD
Present t	96.8376	2.1187
Past t	81.8056	9.6187
Nouns	71.8056	3.6184
Adj/adv	90.5556	5.4605

g) 9-10 years

The scores obtained for present tense, past tense and adjectives/adverbs were towards the maximum as seen in table 16. But this was not achieved in nouns. Repeated Measure of ANOVA, [$F(3, 42) = 70.17$, $p<0.05$], indicated significant difference between the tasks.

Table.16: mean and standard deviation of subgroups in the age range of 9-10years

9 -10years	Mean	Std. D
Present t	99.6581	.6349
Past t	97.5000	2.6645
Nouns	80.9028	8.2836
Adj/adv	94.4444	5.3791

Under four tasks, better performance was observed for present tense from all age groups. The mean scores obtained for present tense was significantly higher; reaching the maximum limit by 7 years. Further it was also observed that over years, as the mean score increased, the standard deviation was found to decrease. This shows consistency with ages. An overall increase in performance for all items was obvious across the age range studied i.e., with increase in age, the performance improved. Same can be observed in figure1.

4.2: Analysis of data obtained by HI & MR

The second part of the study focused on the analysis and interpretation of the data obtained from the clinical population. Mean and standard deviation were calculated for both the groups in Hearing impaired and mentally retarded children.

The data obtained for 20 children with hearing impairment, ranging in age from 5 to 10 years, 4 children in each age group was statistically analyzed. The mean and standard deviation of total scores obtained for each age group was found out and it was observed that the mean scores increases with age. An improvement in the overall performance was observed across the age range studied. Table.17 shows the mean and standard deviation across the age group. On statistical analysis, since sample size is small, non parametric tests were used for the analysis, using Kruskal Wallis Test, ($p>0.05$) it is observed that there is no significant difference between the age groups of hearing impaired population.

Table .17: Mean and SD of HI population across the age group

Age range	N	Mean	Std. Deviation
5-6 years	4	156.5000	41.0650
6-7 years	4	141.2500	62.6811
7-8 years	4	186.5000	74.9111
8-9 years	4	195.0000	34.9762
9-10 years	4	217.5000	44.0795
total	20	179.3500	55.2890

The data obtained for 20 children with mentally retardation, ranging in age from 5 to 10 years was statistically analyzed. The mean and standard deviation of total scores obtained for each age group is found out and it observed that the mean score increases with age. The scores remained low for all the age groups whereas a little improvement in performance was observed with increases in age but this was not true for the age group of 9 to 10 years, as the scores obtained for 8 to 9 years was better when compared with 9 to 10 years age group. However it is probably because of the reason that in MR acquisition of language is based on the mental age, IQ, degree of severity, and intervention etc. Table.15 shows the mean and standard deviation across the age group. On statistical analysis using Kruskal Wallis Test, ($p>0.05$) it is observed that there is no significant difference between the age groups of mentally retarded children as shown in table 18.

Table .18: Mean and SD of MR children across the age group

Age range	N	Mean	Std. Deviation
5-6 years	4	100.0000	15.6418
6-7 years	4	134.0000	43.6654
7-8 years	4	138.2500	50.7765
8-9 years	4	214.7500	76.9475
9-10 years	4	198.0000	81.4002
Total	20	157.0000	68.2148

- **Comparison across ages within each task, separately for HI & MR**

In HI, the mean and standard deviation of scores in each task was obtained, and it was observed that there is a slight increase in the mean scores as age increased. Using Kruskal Wallis Test, difference between ages within each task was tested at 5% level of significance. It was found that there is a significant difference only on past tense and other three tasks showed no significant difference in performance across the age group. Mann - Whitney Test was used to observe the pair wise differences on past tense across ages and found out that there is no significant difference in 5 to 6 years as compared to 7to 8 years and all other age groups showed a significant difference from each other. There is an increase in the mean scores of past tense across the age group but 6-7 years age group showed a poor response as compared to others. Probably this is because of the individual difference in cases that have been taken for the study in each age group. Table.19 shows the mean and standard deviation of each subgroup across age range in HI. The overall results showed an increase in mean scores as the age increased.

Graphical representation of mean of each task is shown in the figure 2. It reveals that both present tense and adjectives/adverbs showed a better performance compared to other tasks. The performance was relatively same across the age group for these two tasks. The performance for past tense was poor at the lower age group and showed gradual improvement towards the higher age group, the performance was better with a sudden improvement at around 7+ years. The mean scores of nouns indicated an overall average performance compared to other groups in the list, with relatively same performance across the age groups.

Table.19: mean and SD of each subgroup across age range in HI

	Present tense		**Past tense**		**Nouns**		**Adjectives/adverb**	
Age range	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
5-6 years	76.7500	26.7753	5.2500	6.0759	5.2500	6.0759	39.0000	6.4807
6-7 years	73.5000	37.9254	1.5000	3.0000	1.5000	3.0000	34.0000	17.5689
7-8 years	90.2500	36.6185	15.7500	20.4675	15.7500	20.4675	39.5000	11.7047
8-9 years	87.0000	13.5154	31.0000	13.9284	31.0000	13.9284	39.7500	4.8563
9-10 years	98.7500	14.6828	40.5000	19.2959	40.5000	19.2959	37.7500	7.3201
Total	85.2500	26.5228	18.8000	19.9225	18.8000	19.9225	38.0000	9.6899

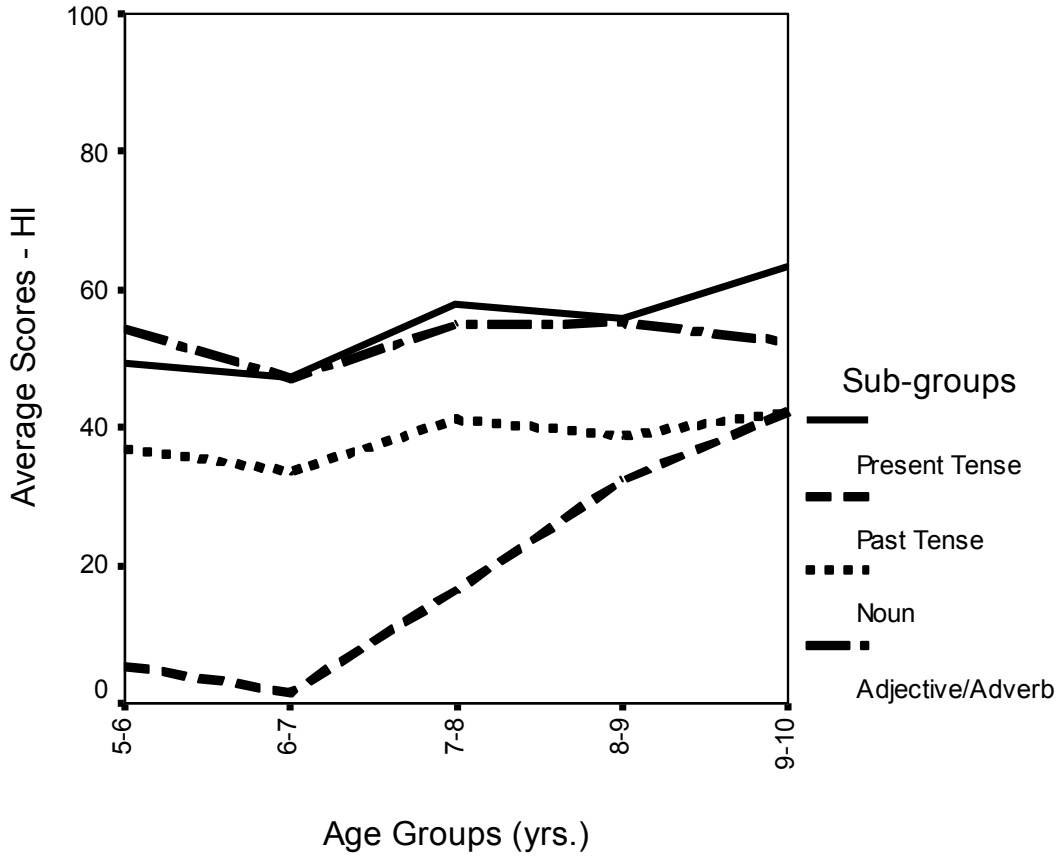

Figure 2: Graph representing mean values of each subgroup of HI children

In MR population, mean and standard deviation of each tasks across ages was obtained which is shown in table 20. On statistical analysis using Kruskal Wallis test, it is observed that there is no significant difference between the age groups in all the tasks except for past tense at 5% level of significance. The overall result showed a slight increase in mean scores as the age increased but not a marked increment. Kruskal Wallis test, showed a significant difference across age groups in past tense. Mann - Whitney test was used to observe the difference across age group on performance of past tense and it was found out that there is a significant difference in 5 to 6 years as compared to 7to 8 years, and 5-6 years with 8-9 and 9-10 years age groups; and there is no significant difference between other age groups.

Table.20: mean and SD of each subgroup across age range in MR.

	Present tense		**Past tense**		**Nouns**		**Adjectives/adverb**	
Age range	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
5-6 years	45.0000	4.6904	.0000	.0000	30.2500	7.0887	24.7500	6.2915
6-7 years	65.5000	25.6710	9.5000	13.6748	28.2500	3.7749	30.7500	5.7373
7-8 years	67.2500	28.8834	13.5000	16.2993	29.7500	2.9861	28.0000	6.8313
8-9 years	109.2500	42.4451	31.7500	20.2711	38.5000	6.3509	33.2500	10.3078
9-10 years	96.5000	35.1805	27.5000	17.2530	39.0000	11.1056	39.2500	13.3010
Total	76.7000	35.7978	16.4500	18.0918	33.1500	7.7410	31.2000	9.4345

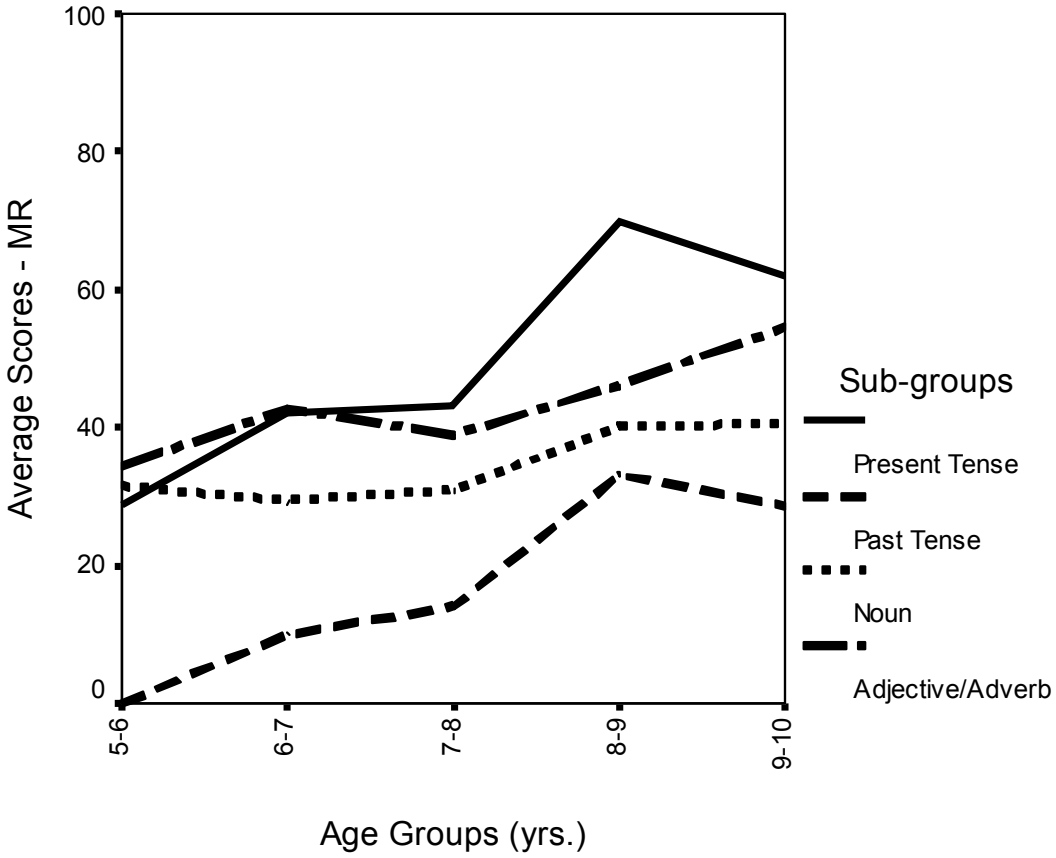

Figure 3: Graph representing mean values of each subgroup of MR children

Graphical representation of mean of each task in MR children is shown in the figure 3. The mean scores of task showed poor performance at the lower age group and a gradual improvement in the performance from 8+ year age.

- **Comparison of subgroup in each age group for both HI & MR**

Comparisons of four tasks in each age range from 5 to 10 years were done for both HI&MR. Mean and standard deviation of each task in all the age range in percentages were calculated and analyzed by using non parametric test. Using Friedman Test, tasks were compared within each age group from 5 to 10 years. Wilcoxon Signed Rank Test was used to find out the significant difference between task pairs. In the age range of 5-6 years there is no significant difference between present tense and adjectives

but all other subgroups showed a significant difference between each other at 5% level of significance as shown in table 21.

Table.21: mean and SD of each task across ages in HI

	5-6yrs		6-7yrs		7-8yrs		8-9yrs		9-10yrs		total	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Present	49.19	17.16	47.11	24.31	57.85	23.47	55.76	8.66	63.30	9.41	79.49	17.00
Past	5.46	6.32	1.56	3.12	16.40	21.32	32.29	14.5	42.18	20.09	61.46	20.75
Nouns	36.97	8.00	33.59	8.34	41.14	8.73	38.80	7.23	42.18	8.77	52.08	7.96
Adj/adv	54.16	9.00	47.22	24.40	54.86	16.25	55.20	6.74	52.43	10.16	81.94	13.45

Using Friedman test, the difference across four subgroups was found out for all the age range in mentally retarded population. Wilcoxon Signed Rank Test showed that in age group of 5-6, 6-7 and 9-10years, there is a significant difference between the subgroups. However, other age groups did not show any significant difference between tasks observed in table 22.

Table.22: mean and SD of each task across ages in MR

	5-6yrs		6-7yrs		7-8yrs		8-9yrs		9-10yrs		total	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Present	28.8	3.00	41.98	16.45	43.10	18.51	70.03	27.2	61.85	22.55	49.16	22.94
Past	.0000	.0000	9.89	14.24	14.06	16.97	33.07	21.1	28.64	17.97	17.13	18.84
Nouns	31.51	7.38	29.42	3.93	30.98	3.11	40.10	6.61	40.62	11.56	34.53	8.06
Adj/adv	34.37	8.73	42.70	7.96	38.88	9.48	46.18	14.3	54.51	18.47	43.33	13.10

4.3: Comparison of performance between normal & clinical population (HI&MR): with respect to the chronological age

This study has been taken up with the aim of comparing a sample of typically developing children and the sample of children with HI and MR matched for markedness skills in the chronological age group of 5 to 10 years. Kruskal Wallis Test showed significant difference between groups at 5% level of significance. The scores indicated

that our subjects in clinical population performed at a much lower level when compared to normal children. On statistical analysis using Mann Whitney test, it was observed that there was a significant difference in performance of normal and HI and also normal and MR. The performance of both HI and MR showed no significant difference between each other and the mean score of HI is better compared with MR; as depicted in table 25. These results of clinical population were quite unlike the typically developing children who had obtained high scores in all four tasks. The graphical representation of the same is given in the figure.4.

Table 25: comparison of overall scores of normal, HI & MR

Group	N	Mean	Std. Deviation
HI	20	179.3500	55.2890
MR	20	157.0000	68.2148
Normal	75	343.9600	41.5772

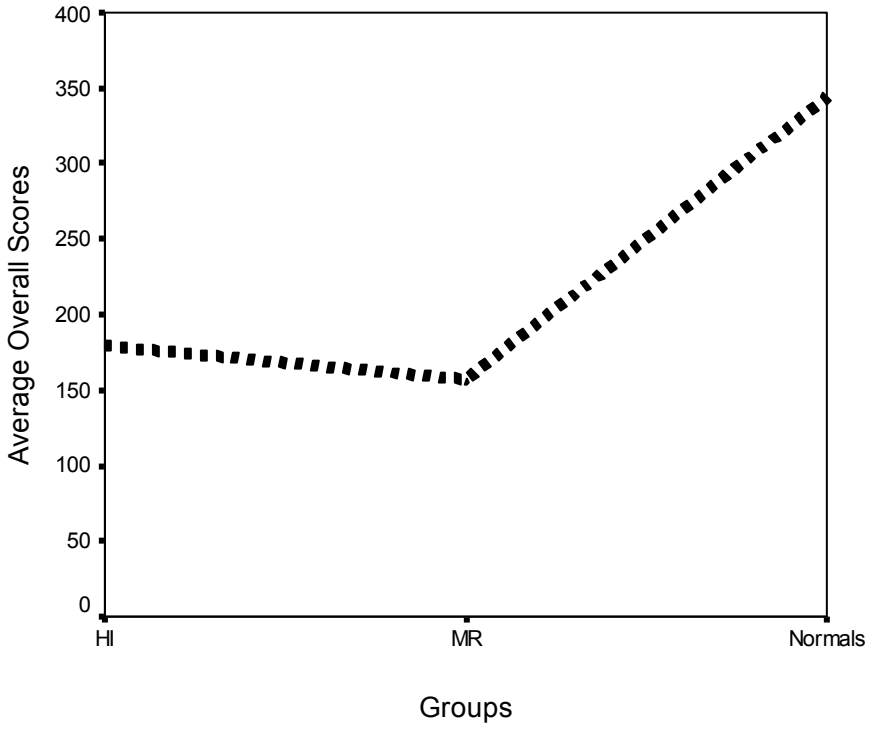

Figure 4: Graphical representation for the comparison of overall mean scores of normal, HI & MR

Table 26: comparison total scores of each age group in normal, HI & MR

Group	Age range	Mean	Std. Deviation
HI	5-6	156.5000	41.0650
	6-7	141.2500	62.6811
	7-8	186.5000	74.9111
	8-9	195.0000	34.9762
	9-10	217.5000	44.0795
MR	5-6	100.0000	15.6418
	6-7	134.0000	43.6654
	7-8	138.2500	50.7765
	8-9	214.7500	76.9475
	9-10	198.0000	81.4002
Normal	5-6	295.4000	37.6654
	6-7	321.0000	27.8875
	7-8	344.5333	14.9612
	8-9	363.7333	14.9211
	9-10	395.1333	13.3410

The performance of each group were compared with their same chronological age match using Kruskal Wallis Test; and the statistical results showed that there was a significant difference between the normal and clinical population (HI &MR) and also there is no significant difference between HI and MR in all ages at 5% level of significance. As seen from the table 26, the average score obtained by HI and MR were found to be least. None of the subjects in clinical population performed anywhere near their chronologically expected level of performance which is evident from the markedly reduced scores in all the age groups.

Graphical representation of mean of scores in HI and MR children compared with typically developing children is shown in the figure 5. As expected, it was observed that the scores were better for older subjects than the younger subjects. The performance on all the tasks was found to be greatly condensed in these HI and MR children. The performance of both clinical populations was varied across their chronological age group, perhaps there is similarity in the performance of MR children within their mental age match peers and it is seen in HI children also within their language age match normal.

As mentioned above, the graph indicates that subjects in clinical population performed at a much lower level when compared to normal children. The results obtained

indicate that HI children performed better than MR children in all the age groups except 8 to 9 years of age group. Clues which were used to obtain the correct response also were more for MR children as compared with HI children.

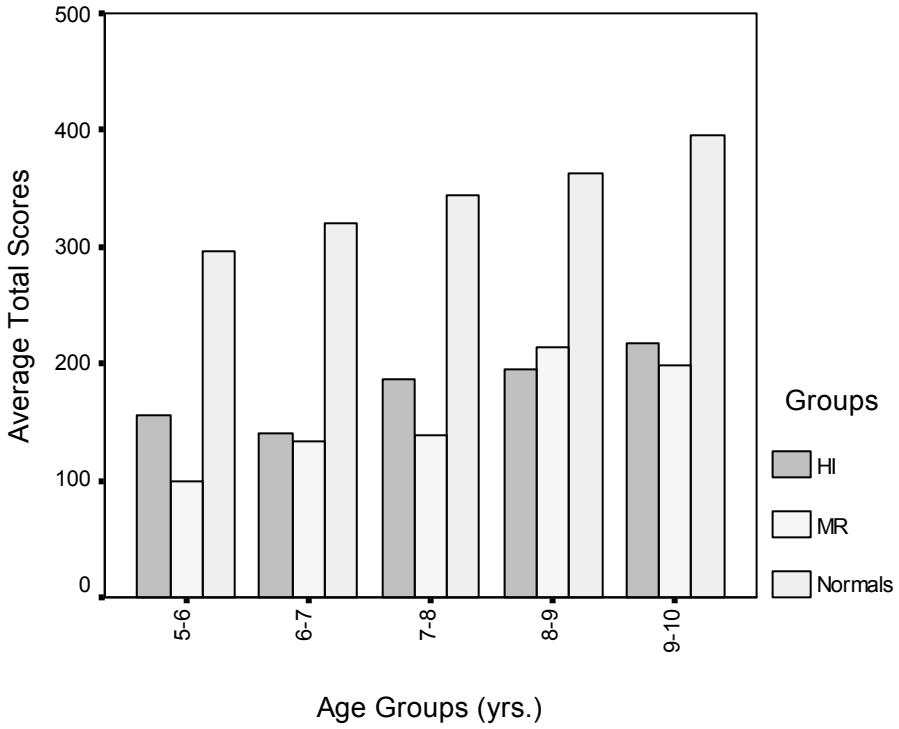

Figure.5: comparison of performance of normal, HI &MR with their chronological age match.

Using Kruskal-Wallis Test, both the normal and clinical population (HI& MR) data were compared within each group. Data was compared in each group within their chronological match group. It indicated that there was a significant difference between the results of typically developing children with HI and MR. The performance of normal children indicated significantly higher scores as they are having normal language acquisition but in HI and MR there is a delay in language acquisition and it results in poor performance in all the tasks. The results showed poor performance in the clinical population suggesting poor vocabulary, semantic representation and naming skills in children with HI and MR. It was found that *semantic error* and *indeterminate errors* were the most common type of errors seen during naming tasks in both groups of clinical population.

The performance of HI and MR was individually compared with typically developing children and also between each other. Mann Whitney Test was used to compare between the normal with HI and normal with MR and also HI with MR and it showed a significant difference between normal and HI, and also normal and MR but there was no significant difference between the HI and MR.

The language acquisition in HI follows normal acquisition sequence but it is acquired at a very slower pace. The performance of HI compared with normal indicates that scores remained low for all the age groups and a gradual increase in the performance was observed with increase in age. In HI also scores increased as a function of age, it was evident even in normal. The performance of MR children indicated overall reduction in scores for all subjects across the age range. It was found that these children had performed quite poorly when compared to the normal children. The effect of reduction in the cognitive skills affected the areas of performance in MR children.

Graphical representation of the comparison of each sub group i.e., present tense, past tense, nouns, and adjectives/adverbs are given the following figures:

In Figure.6, the performance for present tense shows that there is an increase in the performance across the age group for all tasks. The mean scores of each group for present tense was calculated and compared. By the age of 6+ years onwards typically developing children showed a better performance. It was observed that children obtained full scores from8 + years onwards but in children with HI and MR, maximum score was not reached even at the higher age group of 9 to 10 years. HI performed better than MR in all the age group except 8 to 9 years. Delay in language acquisition for both HI and MR leads to the poor performance on tasks.

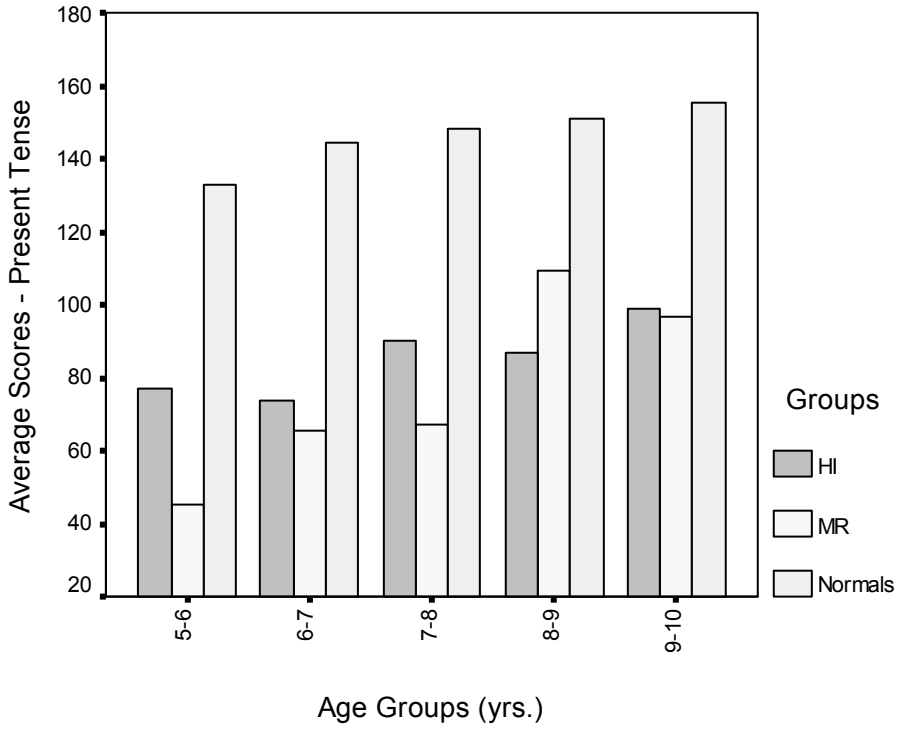

Figure.6: comparison of performance for present tense in normal, HI & MR

Past tense showed a poor performance in the lower age group and a linear increment towards the higher age group for normal and clinical population. Better scores were observed in the higher age group. In MR and HI poor scores were obtained till 8 years and a little improvement was observed with increase in age. HI and MR children showed difficulty to understand the pictures depicting past tense and most of them interpreted it as present tense. They needed more clues to respond it in a correct way. Graphical representation of comparison of past tense between normal and clinical population is shown in the following figure.7.

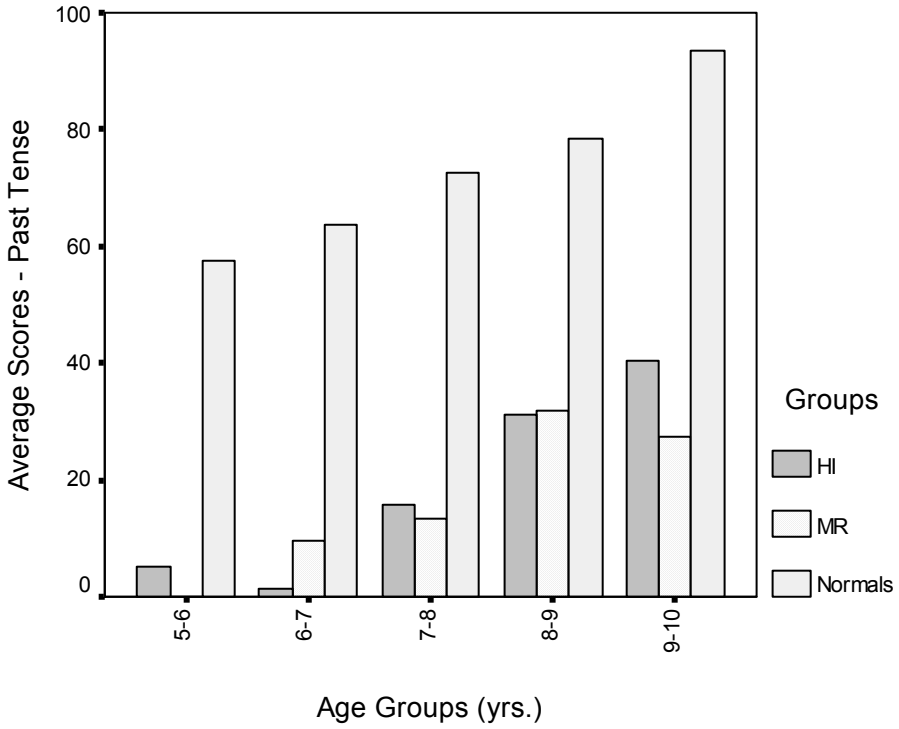

Figure.7: comparison of performance for past tense in normal, HI & MR

Graphical representation of comparison between the performance of normal and clinical population in nouns is shown in the following figure 8. The responses for the nouns are not varied much in across the age group for clinical population but for normal there was a gradual and consistent increase in the performance across the age group. However, maximum score was not reached even at higher age group of 9 to 10 years in normal, nouns especially marked nouns such as /*sarenge/, /simhani*/ etc were not in the vocabulary of 10 years normals also. It was found those nouns which are common, were there in the vocabulary of HI and MR but not the uncommon ones.

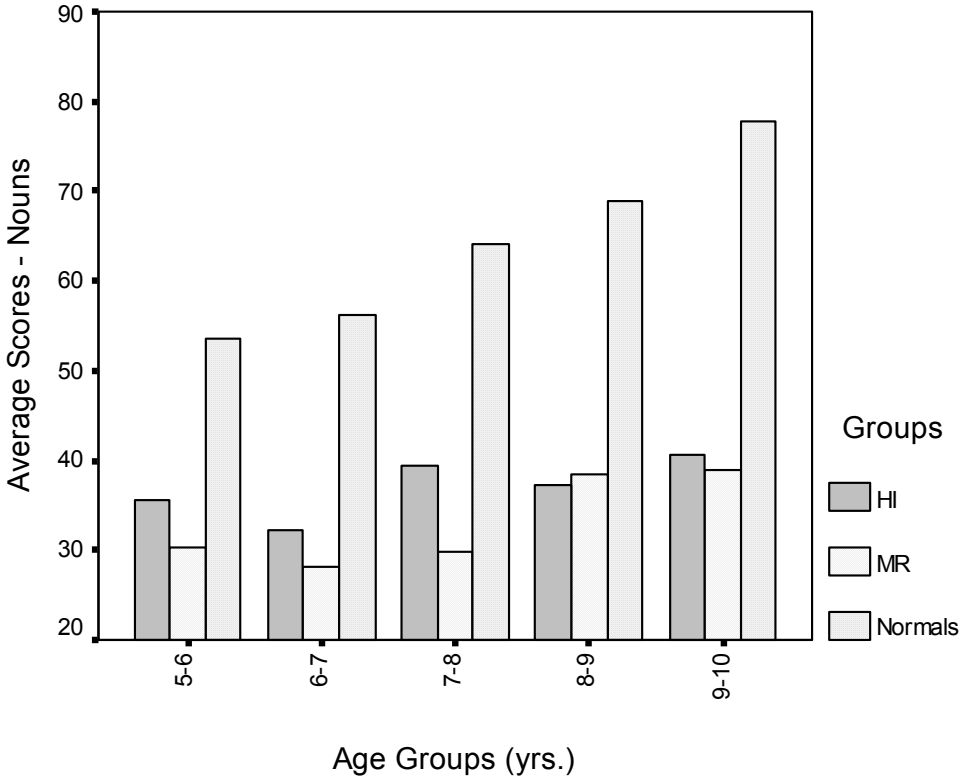

Figure.8: comparison of performance for nouns in normal, HI & MR

Graphical representation of comparison between normal and clinical population for adjectives/adverbs is shown in the following figure 9. Under the adjectives/adverbs section, the overall performance on all the items improved as age level increased. Even clinical population also performed better in these tasks. Responses of HI were better than MR in this task across all the age group.

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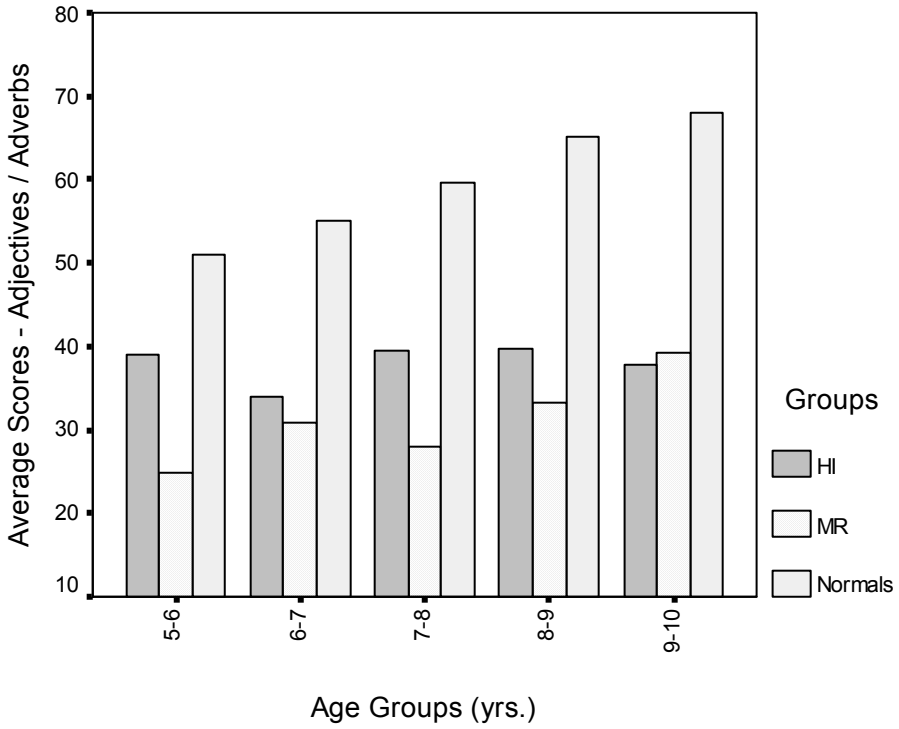

Figure.9: comparison of performance for adjectives/adverbs in normal, HI & MR

On scrutinizing the results, one can see the acquisition of markedness features with advancement in age. There is a significant difference in the acquisition of markedness in typically developing children and the clinical population (HI & MR) studied. Tasks which were studied here showed a difference across each tasks performed by the children. Typically developing children were able to respond for the all four tasks by the age of 10 years. However, maximum scores were not reached for the nouns at the higher age group of 10 years also. Both HI & MR population found a difficulty to learn marked words which are less common in their vocabulary.

4.4: <u>Comparison of performance between normal &clinical population (HI&MR): with respect to the mental age:</u>

In section 1, comparison of results obtained between HI & MR with normal shows that there is a significant difference in the performance of the clinical population as compared with normal. In this study, children with the age range of 5-10

years were considered and all the five age groups were compared with the same chronological age group of clinical population and normal. Both HI & MR children showed a delay in the language acquisition, and they also found a greater difficulty to acquire marked words when compared with unmarked ones.

In the section 2, comparisons of normal and clinical population (HI & MR) are given based on their mental age. For comparison with in the mental age, three age groups were considered 3 to 4 yrs, 4 to 5 yrs and 5 to 6 yrs. Normal children within the age group of 3 to 6 years were taken for comparison. Mann -Whitney Test was used to compare between each groups, (5% level of significance). Each age group of 3-4, 4-5 and 5-6yrs of typically developing children were compared with HI and MR children of the similar mental age.

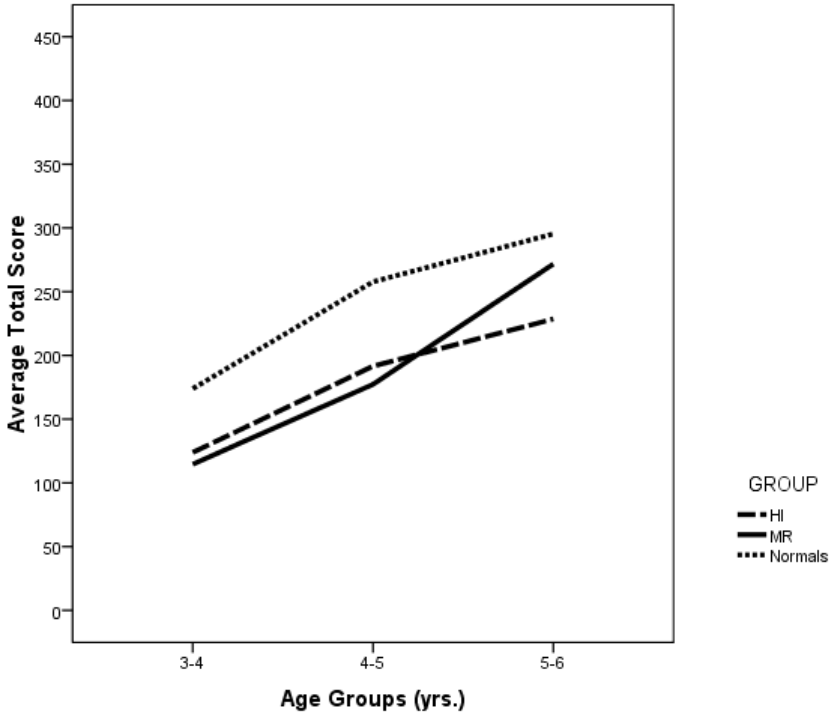

Figure 10: comparison of performance of normal children and clinical population based on the mental age.

- **Comparison of age groups separately for HI & MR:**

➢ **Comparison of total scores across mental age in HI children:**

Scores across mental age was tested using Kruskal-Wallis test and $X^2(2) = 13.137$, $p<0.001$. It revealed significant difference between age groups in HI children. The following table 27 gives mean and standard deviation of each age group in HI.

Age grgroup	N	Mean	SD
3-4 years	8	123.875	37.54
4-5 years	5	191.6	31.48
5-6 years	7	228.57	31.55
Total	20	177.45	57.15

Table.27: mean and SD in HI

Mann Whitney U test was administered to see the pair wise difference in age groups. According to this test there was no significant difference between 4-5 and 5-6 age groups, whereas other age pairs are significantly different at 5% level of significance.

➢ **Comparison of total scores across mental age in MR children:**

Scores across mental age was tested using Kruskal-Wallis Test and $x^2(2) = 10.904$, $p<0.001$. It revealed significant difference between age groups in MR children. The following table 28 gives mean and standard deviation of each age group in MR.

Table 28: mean and SD in MR

Age group	N	Mean	SD
3-4 years	11	114.63	29.92
4-5 years	6	177.33	51.25
5-6 years	3	271.67	48.23
Total	20	197.87	43.13

Mann Whitney U Test was administered to see the pair wise difference in age groups. According to this test there was no significant difference between 4-5 and 5-6 age groups, whereas other age pairs are significantly different at 5% level of significance.

- **Comparison of age groups within each task: HI children:**

Kruskal Wallis Test was administered within each task for comparison across age groups. The following table 29 gives the result of this test. Kruskal Wallis Test showed significant difference across age groups in the entire four tasks. The following table 29 gives mean and standard deviation of all age groups within each task.

Table 29: mean and SD for all age groups within each task for **HI children**

Age groups	Present tense		Past tense		Nouns		Adjectives/ adverbs	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
3-4 yrs	63.500	2.47	1.250	3.535	32.625	7.520	31.250	8.013
4-5 yrs	97.600	18.7	13.600	5.41	36.200	5.49	43.000	10.606
5-6 yrs	101.29	1.14	42.57	1.48	42.5714	6.07	42.149	6.46

Mann- Whitney Test was done to figure out the significant difference of each age group when compared with the same mental age of normal and the following table 30 shows the significant difference among each age group in hearing impaired children as compared with the typically developing children.

Table 30: comparison of age groups within each task for **HI children**

Task	X2 (2)	p	Age group identified with significance difference (by Mann-Whitney test) $p< 0.05$
Present tense	10.652	<0.01	3-4 years & 4-5 years,3-4 years & 5-6 years.
Past tense	17.071	<0.001	All the age groups
Nouns	7.593	<0.05	3-4 years & 5-6 years
Adj /adv	7.152	<0.05	3-4 years & 5-6 years, 4-5 years & 5-6 years

- **Comparison of age groups within each task: MR children:**

Kruskal -Wallis Test was administered within each task for comparison across age groups. The following table 31 gives the result of this test. Kruskal -Wallis Test showed

significance difference across age groups in the entire four tasks. The following table 31gives mean and standard deviation of all age groups within each task.

Table 31: mean and SD for all age groups within each task for **MR children**

age groups	Present tense		Past tense		Nouns		Adjectives/ adverbs	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
3-4 yrs	53.18	1.75	4.9091	8.904	29.18	4.686	27.45	5.76
4-5 yrs	92.83	2.79	22.167	1.310	34.1667	5.269	29.667	5.680
5-6 yrs	130.67	2.227	47.333	1.201	45.667	8.082	48.000	9.539

Mann Whitney Test was done to figure out the significant difference of each age group when compared with the same mental age of normal and the following table32 shows the significant difference among each age group in mentally retarded children as compared with the typically developing children.

. Table 32: comparison of age groups within each task for **MR children**

Task	X2 (2)	p	Age group identified with significance difference (Mann Whitney test) $p< 0.05$
Present tense	11.854	<0.01	3-4 years & 4-5 years, 3-4 years & 5-6 years.
Past tense	13.559	<0.001	All the age groups
Nouns	8.363	<0.05	3-4 years & 5-6 years
Adj /adv	7.913	<0.05	3-4 years & 4-5 years, 3-4years & 5-6 years

- **Comparison across task within each age group**
  - **Hearing impaired children:**

Friedman Test was administered to see the difference between tasks within each age group. It showed significant difference between tasks in all the age group. The results of Friedman Test & Wilcoxon's Signed Rank Test are given in Table 33. Pair wise

difference was tested using Wilcoxon's Signed Rank Test. Results revealed that response of most of the tasks is significantly different from each other in the age groups.

Table 33: comparison across tasks within each age group in **HI children**

Age groups	X2 (3)	p	Pairs which are significant from wilcoxon's signed rank test
3-4 years	20.25	<0.01	Present tense & past tense Present tense &adjectives Present tense & nouns Past tense & adjectives Past tense & nouns
4-5 years	14.755	<0.001	All tasks
5-6 years	13.286	<0.001	Present tense & past tense Present tense &adjectives Present tense & nouns

- **Mentally retarded children:**

Friedman test was administered to see the difference between tasks within each age group. It showed significant difference between tasks in all the age group. The results of Friedman Test & Wilcoxon's Signed Rank Test were given below in table 34. Pair wise difference was tested using Wilcoxon's Signed Rank Test. Results revealed that response of most of the tasks is significantly different from each other in the age groups of mentally retarded children.

Table 34: comparison across tasks within each age group in **MR children**

Age groups	X2 (3)	p	Pairs which are significant from Wilcoxon's Signed Rank Test
3-4 years	20.25	<0.01	Present tense & past tense Present tense &adjectives Present tense & nouns Past tense & adjectives Past tense & nouns
4-5 years	14.755	<0.001	Present tense & past tense Present tense &adjectives Present tense & nouns Past tense & nouns
5-6 years	13.286	<0.001	All the tasks

Graphical representation of comparison of normal and clinical population based on the mental age is shown in following figures. Each graph represents the comparison of performance of tasks across the age groups in normal children and clinical population (HI & MR).

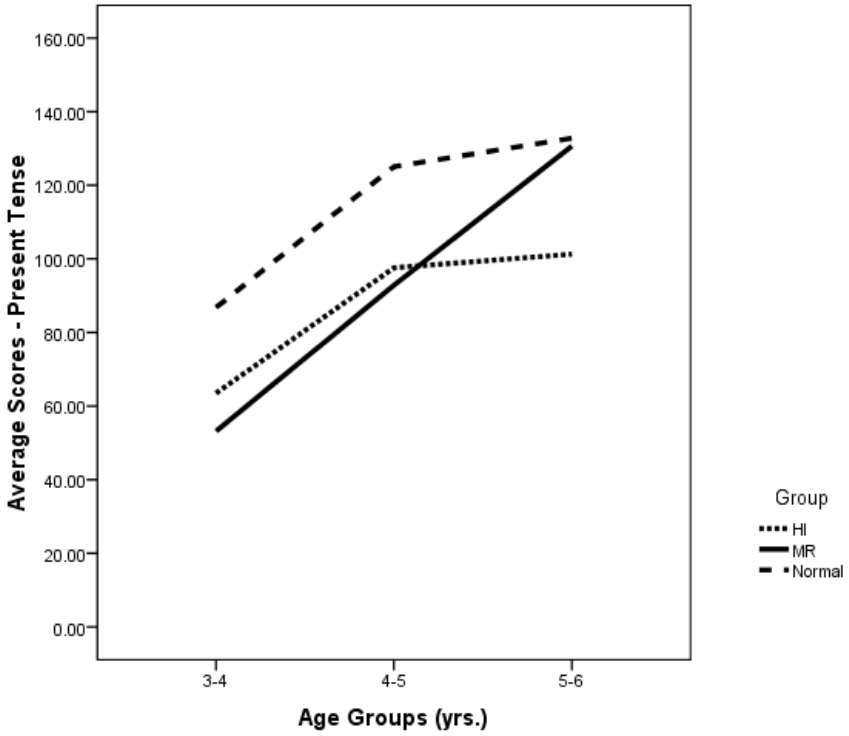

Figure.10: comparison of performance of normal and clinical population for **present tense**

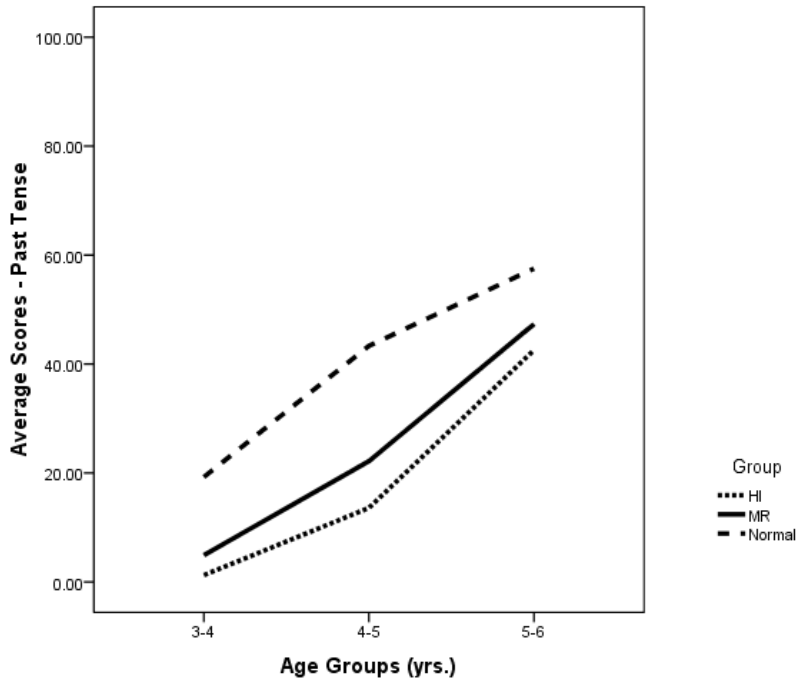

Figure 11: comparison of performance of normal and clinical population for **past tense**

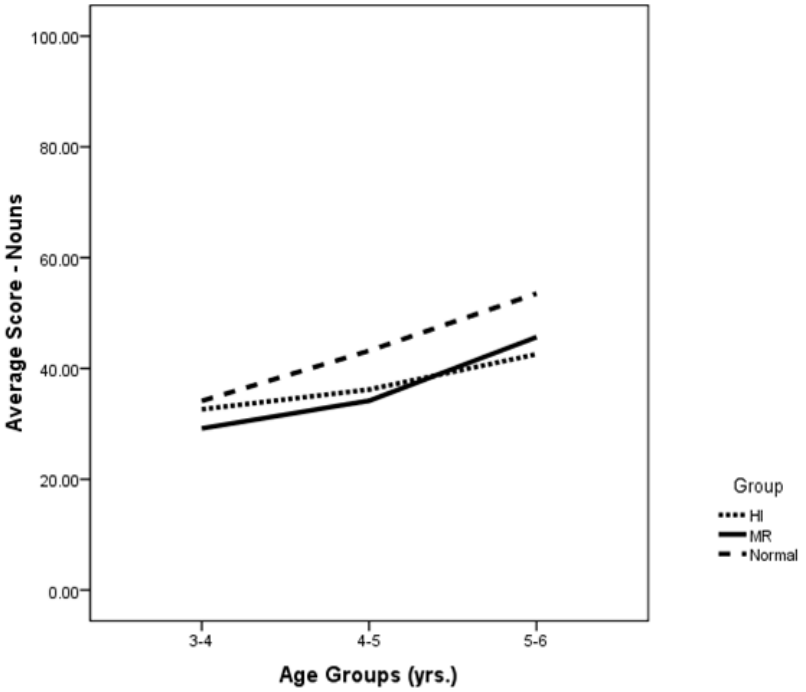

Figure.12: comparison of performance of normal and clinical population for **nouns**

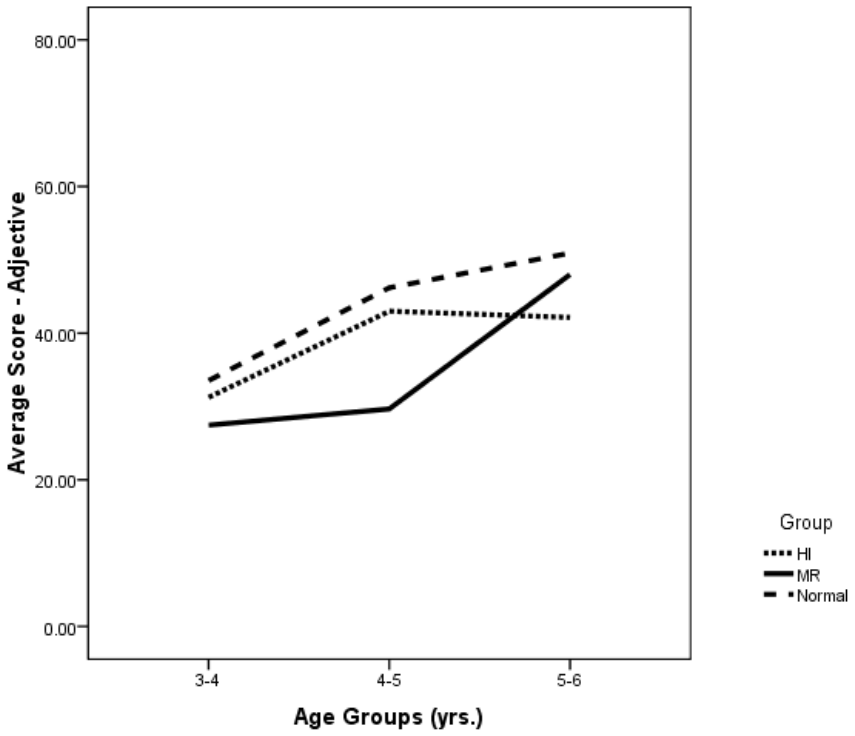

Figure.13: comparison of performance of normal and clinical population for **adjectives/adverbs**

Graphical representation of comparison of performance of each task in normal and clinical population shows that there is a significant difference in the performance between normal and clinical population. However, the study reveals that within mental age group comparison, performance was almost similar in HI&MR children; but it was significantly different with their chronological age match group of normal.

4.5: Descriptive statistics of number of correct response in clinical population:

Detailed analysis of the data was done to find out the response. Different scores were given for each correct response, correct response with clues, and incorrect response. These correct responses were calculated to find out the acquisition of markedness feature in typically developing children and children with hearing impairment and mental retardation as depicted in table 35.

Table 35: mean & SD for all tasks in different age groups

		Mean	Std. Deviation
Present tense	3-4 years	63.5000	24.76172
	4-5 years	97.6000	18.76966
	5-6 years	101.29	14.81794
	Total	85.2500	26.52283
Past tense	3-4 years	63.5000	24.76172
	4-5 years	97.6000	18.76966
	5-6 years	101.29	14.81794
	Total	85.2500	26.52283
Nouns	3-4 years	32.6250	7.52021
	4-5 years	36.2000	5.49545
	5-6 years	42.5714	6.07885
	Total	37.0000	7.65025
Adjectives/ adverbs	3-4 years	31.2500	8.01338
	4-5 years	43.0000	10.60660
	5-6 years	42.1429	6.76827
	Total	38.0000	9.68993

Figures shown below reveal the mean total percentage of correct response in each population in the age group of 3 to 10 years. Obviously typically developing children responded well when compared with the clinical population but still normal children in the lower age groups required some clues to respond correctly to the word list, especially tasks such as past tense and nouns needed more clues than other tasks. This would be because of the fact that the picture cards were not able to indicate explicitly the markedness in case of some nouns (especially, the intra-category ones such as: *simha - simhini*) and past tense markings. So, the restriction of picturisation resulted in increased markedness and poorer performance in case of these children.

The present study supports the statement that, the acquisition progresses from the least marked to relatively more marked structures, which resembles to the Sequential

Markedness Principle of Clements, 1990. This study also supports the Jakobson's (1984) view, where he proposes that unmarked categories tend to be more differentiated than marked ones.

The data analysis of clinical population also reveals that performance of hearing impaired children was better than mentally retarded children. Mentally retarded children required more clues such as prompts, questions and repetition to elicit the correct response when compared with hearing impaired group.

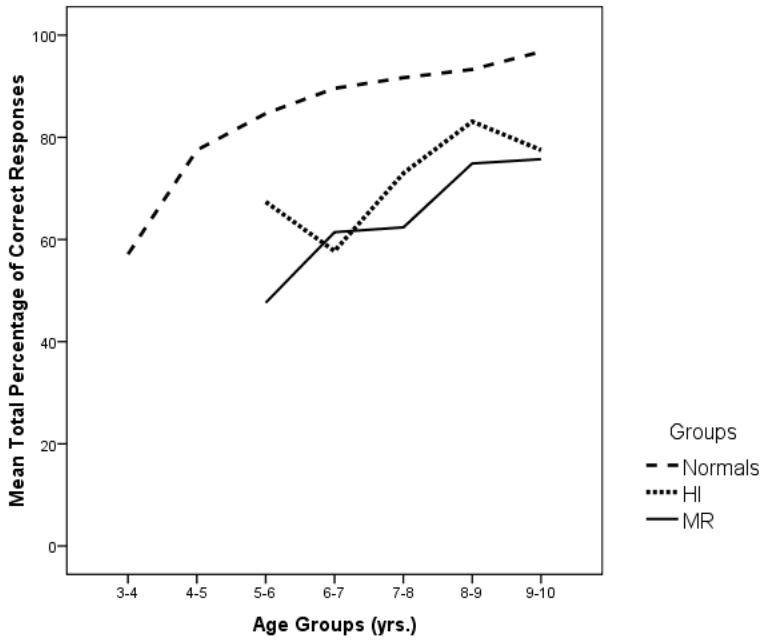

Figure.14: comparison of correct response for **all tasks** across the age groups in normals and clinical population (HI & MR)

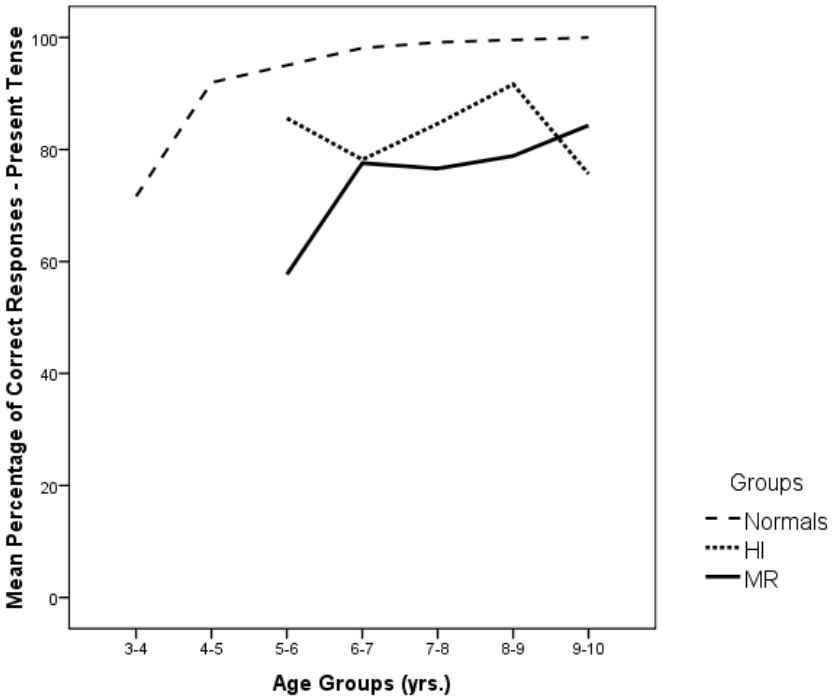

Figure.15: comparison of correct response for **present tense** across the age groups in normals and clinical population (HI & MR)

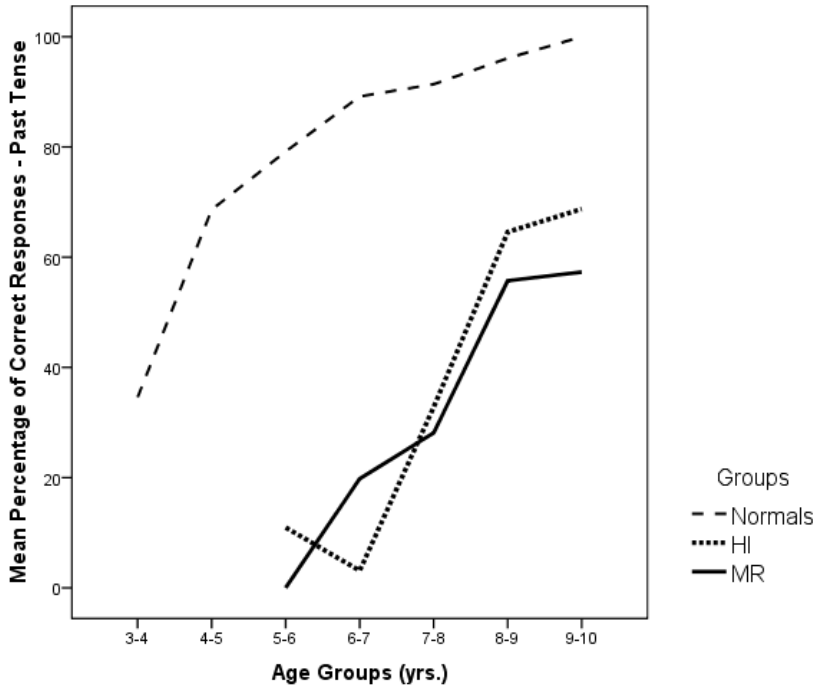

Figure.16: comparison of correct response for **past tense** across the age group in normals and clinical population (HI & MR).

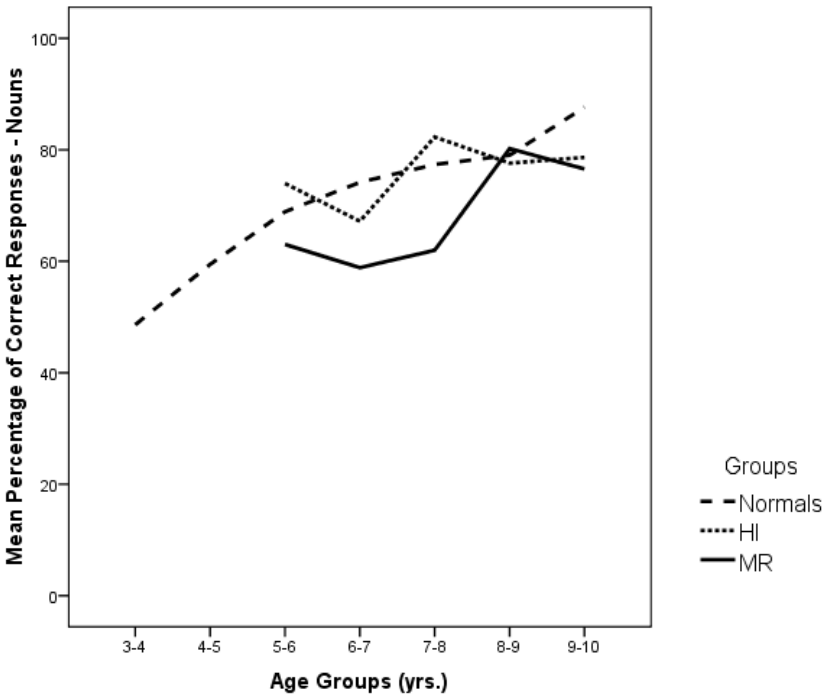

Figure.17: comparison of correct response for **nouns** across the age group in normals and clinical population (HI & MR)

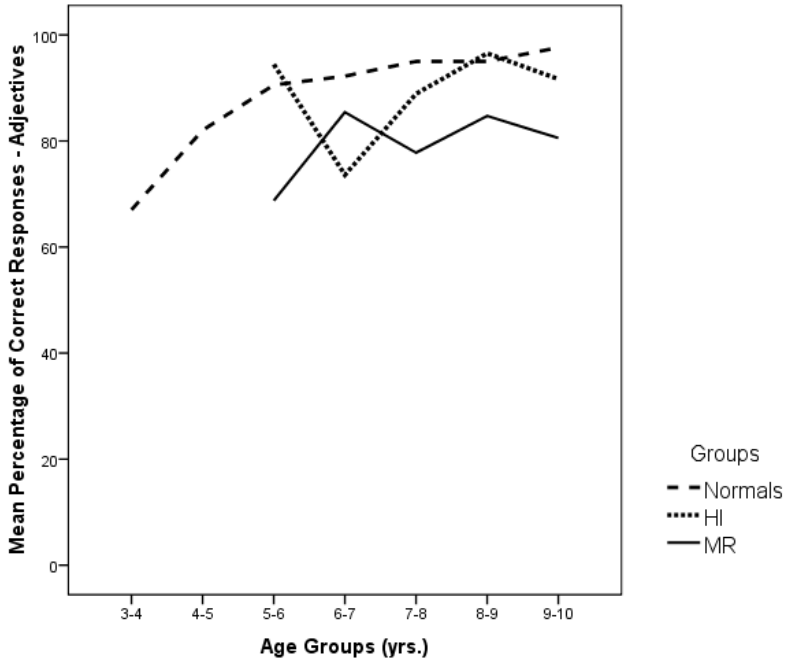

Figure.18: comparison of correct response for **adjectives/adverbs** across the age group in normals and clinical population (HI & MR)

Table 36: percentage of correct response for all the tasks with respect to their chronological age group in 3 different tested population.

age	groups	Present tense		Past tense		Nouns		Adjectives		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
3-4	Normals	71.62	12.97	34.58	10.61	48.61	7.86	67.037	5.833	57.111	8.37
4-5	Normals	91.965	6.6699	68.611	18.8894	59.444	8.2159	82.037	6.6290	77.492	8.30
5-6	Normals	95.04	5.32733	79.16	15.166	68.88	10.15	90.55	4.552	84.66	7.31
	HI	85.57	17.052	10.93	12.65	73.95	16.00	94.44	3.928	67.38	10.78
	MR	57.69	6.013	.000	.000	63.02	14.76	68.75	17.47	47.61	7.448
6-7	Normals	98.11	3.0595	89.1667	13.390	74.16	10.23	92.22	3.814	89.58	5.736
	HI	78.205	35.958	3.1250	6.25	67.18	16.69	73.61	16.11	57.73	20.29
	MR	77.564	25.394	19.7917	28.48	58.85	7.864	85.41	15.93	61.42	18.60
7-8	Normals	99.14	1.341	91.38	7.124	77.361	3.136	95.00	2.151	91.68	2.480
	HI	84.61	21.376	32.81	42.64	82.29	17.47	88.88	12.00	72.97	20.56
	MR	76.6026	20.03654	28.1250	33.95	61.97	6.22	77.77	18.97	62.38	17.12
8-9	Normals	99.5726	1.34171	96.1111	4.64	79.02	4.48	95.00	3.35	93.30	1.614
	HI	91.6667	5.68553	64.5833	29.01	77.60	14.47	96.52	7.30	83.09	11.92
	MR	78.8462	12.92691	55.7292	25.30	80.20	13.23	84.72	16.58	74.88	15.96
9-10	Normals	100.00	.00000	100.00	.00	87.6	8.53	97.59	3.29	96.76	2.20
	HI	75.6410	14.54248	68.75	26.40	78.64	15.25	91.66	6.80	77.50	11.41
	MR	84.2949	13.46154	57.29	35.94	76.56	18.27	80.55	8.78	75.71	14.55
total	Normals	93.6386	11.08996	79.86	23.88	70.73	14.41	88.49	10.86	84.37	13.83
	HI	83.1410	19.86701	36.04	36.34	75.93	15.16	89.02	12.30	71.73	16.51
	MR	75.0000	17.66941	32.18	33.44	68.12	14.41	79.44	15.46	64.40	17.19

4.6: Duration of intervention and the clinical groups of HI & MR:

- **Comparison across HI children based on the years of intervention**

The data obtained from 20 children with hearing impairment, ranging in age from 5 to 10 years, were categorized based on their intervention period from 1 to 5 years and the data obtained in each period was statistically analyzed. The mean and standard deviation

of total scores obtained for each intervention period was were calculated and it was observed that the mean scores increased with years of intervention. Table.37 shows the mean and standard deviation across each period of intervention. Non parametric tests were used for the statistical analysis, since sample size is small. Using Kruskal Wallis test, ($p>0.05$) it was observed that there was a significant difference between the each intervention period and as age increased there was an improvement in performance observed.

- **Comparison of total scores in HI children based on the years of intervention**

Kruskal-Wallis Test was used to compare the total scores obtained in each intervention period, $^{X2}(2) = 13.137$, $p<0.001$. It revealed significant difference between each intervention period in HI children. The following table gives mean and standard deviation based on the years of intervention in HI.

Table.37: Mean and SD of total scores in HI population based on the years of intervention

Years of intervention	N	Mean	Std. Deviation
1-2 yrs	5	111.2000	37.9170
2-3 yrs	4	152.7500	5.6789
3-4 yrs	6	206.0000	38.9615
4-5 yrs	5	229.2000	26.3002
Total	20	177.4500	55.6639

Mann Whitney Test was done to figure out the significant difference between each years of intervention. According to this test each years of intervention are significantly different at 5% level of significance, except 3-4 years and 4-5years. It indicates that performance improves with increase with years of intervention though not steadily.

Intervention

- **Comparison of years of intervention within each tasks: HI children**

Kruskal Wallis Test was administered within each task for comparison across each intervention period. It indicates a significance difference across each intervention period

in the entire four tasks. The following table.38 gives mean and standard deviation of all intervention periods within each task. Graphical representation of comparison of each intervention period based on the tasks in the study is given below.

Table.38. Mean and SD for each years of intervention within each tasks for HI children

Years of intervention	N	Present tense		Past tense		Nouns		adjectives	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1-2 yrs	5	53.60	26.86	2.00	4.47	27.80	4.32	27.80	6.41
2-3 yrs	4	85.75	16.07	5.75	8.01	36.75	5.50	39.75	12.94
3-4 yrs	6	99.16	18.70	16.00	15.16	39.33	5.88	45.50	9.31
4-5 yrs	5	99.00	12.72	46.60	8.32	43.20	5.40	40.40	6.34
Total	20	85.05	26.33	18.10	20.12	36.90	7.62	38.65	10.64

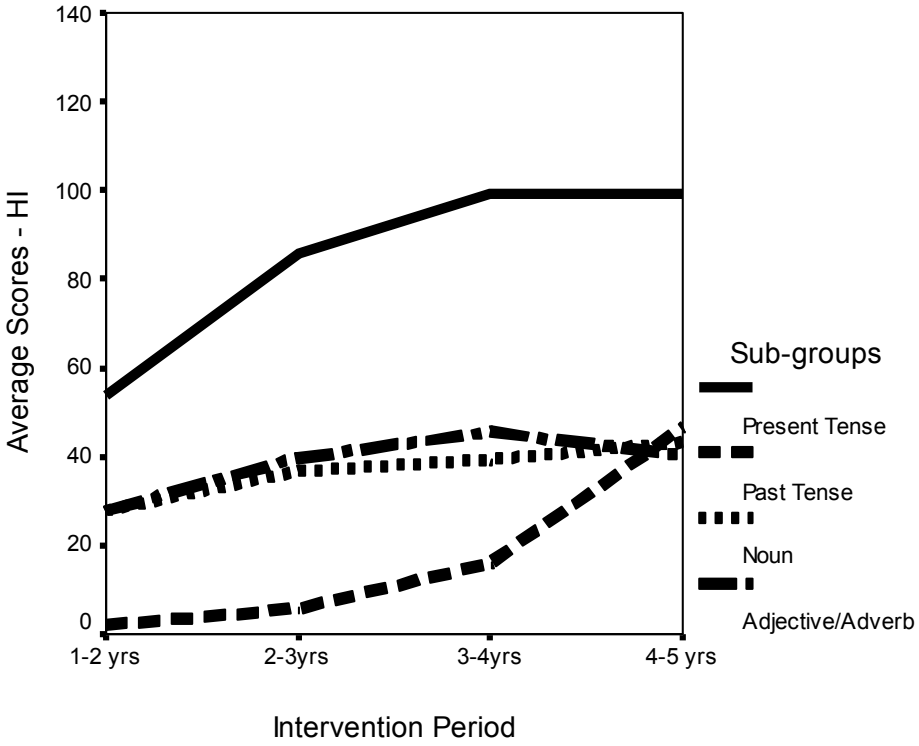

Figure.1: comparison of performance of each years of intervention within each tasks for HI children

Mann Whitney Test was done to figure out the significant difference of each period of intervention and it was found out that in hearing impaired children there is a significant difference between each period of intervention along with which the significant difference is seen on each task also. The following table gives the description of significant difference between each period of intervention with respect to the tasks taken up for the study.

Table.39: Mean and SD for all the tasks in HI children based on their years of intervention

Task	X2 (2)	p	Age group identified with significance difference (Mann Whitney test) p< 0.05
Present tense	9.507	<0.05	1-2 years&3-4years, 1-2 years&4-5years
Past tense	12.943	<0.05	1-2 years&3-4years 2-3 years&3-4years 2-3 years&4-5years 3-4years&4-5years
Nouns	11.869	<0.05	1-2 years &2-3years 1-2 years&3-4years 2-3 years&3-4years 2-3 years&4-5years 3-4 years&4-5years
Adj /adv	8.516	<0.05	1-2 years&2-3years 1-2 years&3-4years 2-3 years&3-4years

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Comparison across MR children based on the years of intervention

The data obtained for 20 children with mental retardation, ranging in age from 5 to 10 years, were categorized based on their intervention period from 0 to 5 years; data obtained in each period was statistically analyzed. The mean and standard deviation of total scores obtained for each intervention period was found out and it was observed that the mean scores increased with years of intervention. Table.40 shows the mean and

standard deviation across each period of intervention. On statistical analysis, using Kruskal Wallis Test, ($p>0.05$) it is observed that there is a significant difference between the each intervention period and as age increases there is an improvement in performance is observed.

- **Comparison of total scores in MR children based on the years of intervention**

Kruskal-Wallis Test was used to compare the total scores obtained in each intervention period, $^{X2}(2) = 11.361$, $p<0.001$. It revealed significant difference between each intervention period in MR children. The following table gives mean and standard deviation based on the years of intervention in MR.

Table.40: Mean and SD of total scores in MR population based on the years of intervention.

Years of intervention	N	Mean	SD
0-1yrs	2	85.5000	.7071
1-2 yrs	3	105.0000	14.7309
2-3 yrs	7	128.4286	29.9714
3-4 yrs	3	163.6667	50.5404
4-5 yrs	5	252.8000	43.0314
Total	20	157.0000	68.2148

Mann Whitney Test was done to figure out the significant difference between each years of intervention. It reveals that each year of intervention was significantly different at 5% level of significance. The test results suggest that performance improved with increase in years of intervention.

- **Comparison of years of intervention within each tasks: MR children**

Kruskal Wallis Test was administered within each task for comparison across each intervention period in MR children. It indicates a significant difference across each intervention period in the entire four tasks. The following table.41 gives mean and standard deviation of all intervention periods within each task. Graphical representation of comparison of each intervention period based on the tasks in the study is also given below.

Table.41: Mean and SD for each periods of intervention within each tasks for HI children

Years of intervention	N	Present tense		Past tense		Nouns		adjectives	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
	2	38.0000	5.6569	.0000	.0000	24.0000	.0000	23.5000	6.3640
1-2 yrs	3	46.0000	5.1962	.0000	.0000	32.3333	7.0238	26.6667	6.1101
2-3 yrs	7	64.4286	16.8212	9.2857	9.7931	28.7143	2.6277	28.5714	6.0238
3-4 yrs	3	77.6667	30.0056	21.3333	14.0119	35.0000	4.3589	29.6667	6.8069
4-5 yrs	5	127.2000	16.8285	40.0000	13.1719	42.4000	7.3348	41.6000	11.0589
Total	20	76.7000	35.7978	16.4500	18.0918	33.1500	7.7410	31.2000	9.4345

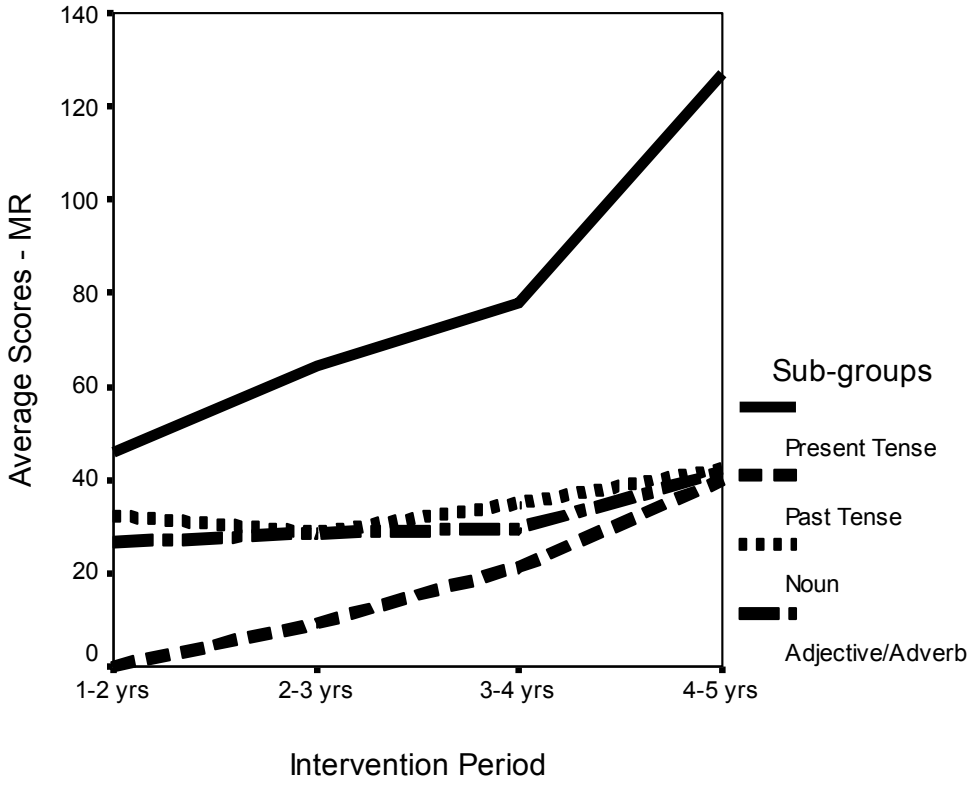

Figure.1: comparison of performance of each years of intervention within each tasks for MR children

Mann Whitney Test was done to figure out the significant difference of each period of intervention and it was found out that in MR children there is a significant difference between each period of intervention along with which there is a significant difference on each task also. The following table gives the description of significant difference between each period of intervention with respect to the tasks taken for the study.

Table.42. Mean and SD for all the tasks in MR children based on their years of intervention.

Task	X2 (2)	p	Age group identified with significance difference (Mann Whitney test) p< 0.05
Present tense	9.507	<0.05	0-1 years&4-5years 1-2 years&3-4years, 1-2 years&4-5years 3-4 years&4-5years
Past tense	12.943	<0.05	0-1 years&3-4years 0-1 years&4-5years 1-2 years&4-5years
Nouns	11.869	<0.05	1-2 years&3-4years 1-2 years&4-5years
Adj /adv	8.516	<0.05	0-1 years&4-5years 1-2 years&2-3years 1-2 years&4-5years

Comparison of performance of HI versus MR with respect to their intervention period

The data obtained for both HI and MR based on their intervention period was compared with each other to find out difference between each population. Independent- T Test for equality of means was applied to find out the significant difference between each clinical group. Mann Whitney Test was done to figure out the difference between each clinical group in various intervention periods and the results showed that the performance on nouns are significantly different in both MR & HI groups in the 2-3 years of intervention period, the adjectives are different in the intervention period of 3-4 years, and present tense also showed a different pattern of acquisition in 4-5 years of intervention period, however performance on past tense was similar in both the clinical

groups in different periods of intervention. The following table 43 gives mean and SD of both HI and MR for each task.

Table.43: Mean and SD for all the tasks in HI and MR children with respect to the tasks

Task	GROUP	N	Mean	SD
Present tense	HI		85.0500	26.3328
	MR		76.7000	35.7978
Past tense	HI		18.1000	20.1230
	MR		16.4500	18.0918
Nouns	HI		36.9000	7.6220
	MR		33.1500	7.7410
Adj/adv	HI		38.6500	10.6439
	MR		31.2000	9.4345

Overall, although the performance of both the groups increased with number of years of intervention, the HI benefitted greatly from intervention compared to the Mentally Retarded as a group, as can be seen from the higher means on all tasks. Thus it is evident that intervention is a necessity rather than on option for both HI & MR groups. Intervention started early and for longer periods specifically focusing on tasks such as nouns, adjectives, adverbs and tense markers would be greatly beneficial.

4.7: Qualitative Analysis:

The recordings of subject's responses were played back and transcribed for the detailed analysis. Once the IPA transcription was completed, the responses were analyzed to profile the consonant and vowel errors of both hearing impaired children and mentally retarded children in terms of substitution, omission, distortion and addition.

It is well known that articulatory abilities of an individual play a major role in speech intelligibility. One of the main factors that affect the speech intelligibility of children with hearing impairment and mental retardation is articulation. Articulatory errors are classified in terms of substitution, omission, distortion and addition of phonemes.

Hearing impaired children exhibited both consonant and vowel errors. It is clear that omission errors were predominant in most of the hearing-impaired individuals. The omission of final consonants could be due to reduced force of articulation of final consonants and lack of co-articulation effect according to the study of Oller, Jensen & Lafayette (1978). It was also evident that substitution errors were more common on bilabial sounds when compared to other sounds in terms of place of articulation among all the age groups. This could be because of greater chance of occurrence of nasalization and voicing error in bilabials. The errors of distortion and addition were found to be very negligible when compared to other errors. Articulatory errors are predominant in consonants rather than in vowels. It could be due to the fact that articulation of consonants requires greater vocal tract constriction and synchrony in control of tongue movement. It was also observed that all hearing impaired children had higher percentage of correct production of front consonants when compared to mid and back consonants. This could be because of greater visibility of front sounds than mid or back consonants. The repetition of same words lead to the correct production and it implies that proper training can increase the percentage of correct production.

In terms of correct production, stops, nasals, laterals and glides had better articulation than fricatives, affricates in most children with hearing impairment. It could be because of ease in production of those speech sounds, and its acquisition is earlier than fricatives and affricates.

Substitution errors also were more in the speech of children with hearing impairment. It may be seen that substitution of voiceless sounds for voiced sounds was more. Devoicing was seen predominantly in bilabials when compared with other categories such as dental, palatal and alveolar. It is assumed that voicing errors could be due to inadequate coordination of voicing and articulation, inappropriate force of articulation, inappropriate duration of vowel preceding the consonant.

Speech of the mentally retarded children is unintelligible because of their articulatory errors. Substitution and omission were more in their speech and also distorted speech is seen in most of the mentally retarded children. Neutralization is also seen in the speech sample of mentally retarded children especially in the lower age groups. Misarticulation seen in children with mental retardation is highly dependent on their mental age and language age.

In general, vowel errors were less when compared with consonant errors. This could be because vowel production is much easier as it requires less vocal tract constriction. The omission of back and front vowels was frequent and more substitution errors were noticed in the front vowels in the age group of 5-6 years. As the age increased some reduction were seen in the articulatory errors observed in these children

CHAPTER 5

CONCLUSION

Not much of research has focused in markedness features in lexical semantics of typically developing children and clinical population. No studies were conducted to assess and compare the markedness skills in normal and clinical population. In the absence of a particular markedness feature study in Indian context this study can be utilized as a tool to assess the markedness features in normal, children with hearing impairment and children with mental retardation.

The results indicated that there exists significant difference in markedness skills of typically developing children and clinical population. Normal children have better markedness, skills than in children with hearing impairment and children with mental retardation. Within normal children, there exists a significant difference between the performances across the age group. As age increases, there is a consistent improvement in the performance of children. However, this improvement is not much evident in both HI and MR children. It may be because there is not much improvement in the language skills in children with hearing impairment and children with mental retardation as there is increase in their chronological age.

This study is an initial overall assessment of markedness features in lexical semantics. Further research is needed into detailed in-depth study of markedness in all aspects of language. Acquisition of language in children is a complex process because language is a multifaceted; with many areas, many modalities, and that it involves an interaction of several systems. If there is any deficit in interconnections among these systems, it will affect the normal pattern of acquisition. The present study also indicates that there is a significant difference in markedness skills of HI and MR compared with normal children. As per the study, markedness features acquisition improves as the age increases.

This study revealed a significant difference in markedness abilities between normal children and in children with HI and children with MR. As the results suggests, mastery of markedness abilities is not yet completely achieved by normal children of 5 to 10 years age and they exhibited difficulties in markedness abilities in spite of good language exposure. This is been depicted in table 37. Probably this could be attributed to lesser use of marked words in the common every day, colloquial context. The performance of children with HI was very poor when compared to normal children but still better than MR children. This can be attributed to the overall delay in language development that these children have. For markedness abilities in lexical semantics, knowledge of semantics and the vocabulary is very much required. It is alarming that children with HI and children with MR lag behind in lexical semantics in spite of the fact that the acquisition of vocabulary and semantics are the easiest and chronologically earliest with respect to language development. The same therefore, needs to be focused in therapy.

Table 44: comparison total scores of each age group in normal, HI & MR

Group	Age range	Mean
HI	5-6	156.5000
	6-7	141.2500
	7-8	186.5000
	8-9	195.0000
	9-10	217.5000
MR	5-6	100.0000
	6-7	134.0000
	7-8	138.2500
	8-9	214.7500
	9-10	198.0000
Normal	5-6	295.4000
	6-7	321.0000
	7-8	344.5333
	8-9	363.7333
	9-10	395.1333

The developmental trend was seen in normal children, confining the fact that markedness occurs with growth and development of language. However, children with MR as well as hearing impaired groups shown a trend that is not exactly similar with the normal acquisition pattern and in mental age ways there is almost similar acquisition pattern of markedness is seen. The normal children also showed deficits indicating deficits in input and usage in that marked words are less used in common everyday

colloquial context. The extremely poor performance of children with HI and children with MR on marked words indicates greater emphasis that is needed on enhancement of vocabulary and semantics during therapeutic intervention. Future research is needed in terms of finding the markedness abilities in different clinical populations with communication disorders, various linguistic levels viz., phonological, morphological, syntactic and pragmatic and also this markedness abilities needs to be studied in different Indian languages in both normal and clinical population.

This study gives an idea about the development of markedness abilities in normal children, children with HI and children with MR. These markedness abilities give an overview of development of semantics in these children. Therefore, markedness abilities can be used as an assessment procedure for semantic development in children and same hierarchy of unmarked to marked features can be used in therapeutic management of children with semantic deficits.

5.1: Guidelines for clinical management:

1. The assessment or test protocols would make a provision for the inclusion of markedness features especially with respect to the given language. For example, training on nouns – intra category extensions can be taught.
2. The markedness features are to be taken up at the later phase of therapy where substantial language acquisition has taken place.
3. A hierarchical list of marked items may be prepared (like the list enclosed as appendix) and can be used in both assessment and intervention.
4. The frequency count for the listed items can be obtained/prepared in such a way, that the least marked (i.e. the common and the easiest) forms can be taken up for the language training in the beginning; and the most marked (i.e. uncommon) forms can be taken up later in the process.

5.2: Implications of the study

It is hoped that the present study will add to the clinical-research field of the SLP professionals in the following ways:

- Establishing the clinical relevance of Markedness theory
- Contributing to the knowledge and understanding of linguistic behavior
- The results of the present study can be utilized:-
  (a) to develop diagnostic test materials for DSL with HI as well as DSL with MR children
  (b) to prepare therapy materials to teach lexical items in a hierarchical manner starting from the unmarked ones to the marked ones
  (c) To compare the sequence of typical lexical development in terms of marked/unmarked semantic features, versus the loss of lexical abilities in adulthood disorders like aphasia.
- The markedness features can be taken up at a juncture where substantial language is acquired by these clinical groups.
- Assessment/test protocols should make a provision for the inclusion of markedness features specific to the given language. For e.g. while training nouns, the intra category expansions can be taught like /ettu/ vs /hasu/ (ox vs cow), /simha/ vs /simhini/ (lion vs lioness).
- There can be hierarchical list be prepared like that in the present study and used both for assessment as well as therapy.

5.3: Scope for further research:

Based on the present study, further investigations may be carried out for

- Different clinical populations with communication disorders.
- Various linguistic levels viz., phonological, morphological, syntactic and pragmatic
- Different Indian languages.
- The frequency count for the listed linguistic items on markedness protocol may be prepared for each Indian language.

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APPENDIX

WORD LIST

Section.1: Present tense

Sl.no	Word in kannada	IPA	Glossary
W1	ತಿನ್ನುತ್ತಿದ್ದಾಳೆ	tinnuttiddALe	She is eating
W2	ತಿನ್ನುತ್ತಿದ್ದಾನೆ	tinnuttiddAne	He is eating
W3	ತಿನ್ನುತ್ತಿದೆ	tinnuttide	It is eating
W4	ಮಲಗುತ್ತಿದ್ದಾಳೆ	malaguttiddALe	She is sleeping
W5	ಮಲಗುತ್ತಿದ್ದಾನೆ	malaguttiddAne	He is sleeping
W6	ಮಲಗುತ್ತಿದೆ	malaguttide	It is sleeping
W7	ಓದುತ್ತಿದ್ದಾಳೆ	OduttiddALe	She is reading
W8	ಓದುತ್ತಿದ್ದಾನೆ	OduttiddAne	He is reading
W9	ಓದುತ್ತಿದೆ	Oduttide	It is reading
W10	ನಡೆಯುತ್ತಿದ್ದಾಳೆ	nadeyuttiddALe	She is walking
W11	ನಡೆಯುತ್ತಿದ್ದಾನೆ	nadeyuttiddAne	He is walking
W12	ನಡೆಯುತ್ತಿದೆ	nadeyuttide	It is walking
W13	ಇಳಿಯುತ್ತಿದ್ದಾಳೆ	iLiyuttiddALe	She is coming down
W14	ಇಳಿಯುತ್ತಿದ್ದಾನೆ	iLiyuttiddAne	He is coming down
W15	ಇಳಿಯುತ್ತಿದೆ	iLiyuttide	It is coming down
W16	ಹತ್ತುತ್ತಿದ್ದಾಳೆ	hattuttiddALe	She is climbing (up)

W17	ಹತ್ತುತ್ತಿದ್ದಾನೆ	hattuttiddAne	He is climbing (up)
W18	ಹತ್ತುತ್ತಿದೆ	hattuttide	It is climbing (up)
W19	ನೆಗೆಯುತ್ತಿದ್ದಾಳೆ	negeyuttiddALe	She is jumping
W20	ನೆಗೆಯುತ್ತಿದ್ದಾನೆ	negeyuttiddAne	He is jumping
W21	ನೆಗೆಯುತ್ತಿದೆ	negeyuttide	It is jumping
W22	ಆಡುತ್ತಿದ್ದಾಳೆ	ADuttiddALe	She is playing
W23	ಆಡುತ್ತಿದ್ದಾನೆ	ADuttiddAne	He is playing
W24	ಆಡುತ್ತಿದೆ	ADuttide	It is playing
W25	ನಿಂತಿದ್ದಾಳೆ	nintiddALe	She is standing
W26	ನಿಂತಿದ್ದಾನೆ	nintiddAne	He is standing
W27	ನಿಂತಿದೆ	nintide	It is standing
W28	ಕುಳಿತ್ತಿದ್ದಾಳೆ	kuLittiddALe	She is sitting
W29	ಕುಳಿತ್ತಿದ್ದಾನೆ	kuLittiddAne	He is sitting
W30	ಕುಳಿತ್ತಿದೆ	kuLittide	It is sitting
W31	ಈಜುತ್ತಿದ್ದಾಳೆ	IdzuttiddALe	She is swimming
W32	ಈಜುತ್ತಿದ್ದಾನೆ	IdzuttiddAne	He is swimming
W33	ಈಜುತ್ತಿದೆ	Idzuttide	It is swimming
W34	ಓಡುತ್ತಿದ್ದಾಳೆ	ODutiddALe	She is running
W35	ಓಡುತ್ತಿದ್ದಾನೆ	ODutiddAne	He is running
W36	ಓಡುತ್ತಿದೆ	ODutide	It is running
W37	ಹಾಡುತ್ತಿದ್ದಾಳೆ	hAduttiddALe	She is singing
W38	ಹಾಡುತ್ತಿದ್ದಾನೆ	hAduttiddAne	He is singing
W39	ಹಾಡುತ್ತಿದೆ	hAduttide	It is singing
W40	ಹರಿಯುತ್ತಿದ್ದಾಳೆ	hariyuttiddALe	She is tearing
W41	ಹರಿಯುತ್ತಿದ್ದಾನೆ	hariyuttiddAne	He is tearing
W42	ಹರಿಯುತ್ತಿದೆ	hariyuttide	It is tearing

W43	ನೋಡುತ್ತಿದ್ದಾಳೆ	nODuttiddALe	She is watching
W44	ನೋಡುತ್ತಿದ್ದಾನೆ	nODuttiddAne	He is watching
W45	ನೋಡುತ್ತಿದೆ	nODuttide	It is watching
W46	ಅಳುತ್ತಿದ್ದಾಳೆ	aLuttiddALe	She is crying
W47	ಅಳುತ್ತಿದ್ದಾನೆ	aLuttiddAne	He is crying
W48	ಅಳುತ್ತಿದೆ	aLuttide	It is crying
W49	ಕುಡಿಯುತ್ತಿದ್ದಾಳೆ	kuDiyuttiddALe	She is drinking
W50	ಕುಡಿಯುತ್ತಿದ್ದಾನೆ	kuDiyuttiddAne	He is drinking
W51	ಕುಡಿಯುತ್ತಿದೆ	kuDiyuttide	It is drinking
W52	ತುಳಿಯುತ್ತಿದ್ದಾಳೆ	tuLiyuttiddALe	She is cycling
W53	ತುಳಿಯುತ್ತಿದ್ದಾನೆ	tuLiyuttiddAne	He is cycling
W54	ತುಳಿಯುತ್ತಿದೆ	tuLiyuttide	It is cycling
W55	ಉಜ್ಜುತ್ತಿದ್ದಾಳೆ	udzuttiddALe	She is brushing
W56	ಉಜ್ಜುತ್ತಿದ್ದಾನೆ	udzuttiddAne	He is brushing
W57	ಉಜ್ಜುತ್ತಿದೆ	udzuttide	It is brushing
W58	ಎಸೆಯುತ್ತಿದ್ದಾಳೆ	eseyuttiddALe	She is throwing (the ball)
W59	ಎಸೆಯುತ್ತಿದ್ದಾನೆ	eseyuttiddAne	He is throwing (the ball)
W60	ಎಸೆಯುತ್ತಿದೆ	eseyuttide	It is throwing (the ball)
W61	ಹಚ್ಚುತ್ತಿದ್ದಾಳೆ	hachchuttiddALe	She is lighting (the lamp)
W62	ಹಚ್ಚುತ್ತಿದ್ದಾನೆ	hachchuttiddAne	He is lighting (the lamp)
W63	ಹಚ್ಚುತ್ತಿದೆ	hachchuttide	It is lighting (the lamp)
W64	ಕಟ್ಟುತ್ತಿದ್ದಾಳೆ	kattuttiddALe	She is tying
W65	ಕಟ್ಟುತ್ತಿದ್ದಾನೆ	kattuttiddAne	He is tying

W66	ಕಟ್ಟುತ್ತಿದೆ	kattuttidde	It is tying
W67	ಬರೆಯುತ್ತಿದ್ದಾಳೆ	bareyuttiddALe	She is writing
W68	ಬರೆಯುತ್ತಿದ್ದಾನೆ	bareyuttiddAne	He is writing
W69	ಬರೆಯುತ್ತಿದೆ	bareyuttide	It is writing
W70	ಹೊಲಿಯುತ್ತಿದ್ದಾಳೆ	holiyuttiddALe	She is stitching
W71	ಹೊಲಿಯುತ್ತಿದ್ದಾನೆ	holiyuttiddAne	He is stitching
W72	ಹೊಲಿಯುತ್ತಿದೆ	holiyuttide	It is stitching
W73	ಬಾಚುತ್ತಿದ್ದಾಳೆ	bAchuttiddALe	She is combing
W74	ಬಾಚುತ್ತಿದ್ದಾನೆ	bAchuttiddAne	He is combing
W75	ಬಾಚುತ್ತಿದೆ	bAchuttide	It is combing
W76	ಕತ್ತರಿಸುತ್ತಿದ್ದಾಳೆ	kattarisuttiddALe	She is cutting
W77	ಕತ್ತರಿಸುತ್ತಿದ್ದಾನೆ	kattarisuttiddAne	He is cutting
W78	ಕತ್ತರಿಸುತ್ತಿದೆ	kattarisuttide	It is cutting

Section.2: Past tense

Sl.no	Word in kannada	IPA	Glossary
W79	ತಿಂದಳು	tindaLu	She ate
W80	ತಿಂದನು	tindanu	He ate
W81	ತಿಂದಿತು	tinditu	It ate
W82	ಮಲಗಿದಳು	malagidaLu	She slept
W83	ಮಲಗಿದನು	malagidanu	He slept
W84	ಮಲಗಿತು	malagitu	It slept
W85	ಓಡಿದಳು	ODidaLu	She ran
W86	ಓಡಿದನು	ODidanu	He ran
W87	ಓಡಿತು	ODitu	It ran

W88	ಇಳಿದಳು	iLidaLu	She came down
W89	ಇಳಿದನು	iLidanu	He came down
W90	ಇಳಿಯಿತು	iLiyitu	It came down
W91	ಹತ್ತಿದಳು	hattidaLu	She climbed up
W92	ಹತ್ತಿದನು	hattidanu	He climbed up
W93	ಹತ್ತಿತು	hattitu	It climbed up
W94	ಹಾರಿದಳು	hAridaLu	She jumped
W95	ಹಾರಿದನು	hAridanu	He jumped
W96	ಹಾರಿತು	hAritu	It jumped
W97	ಆಡಿದಳು	ADidaLu	She played
W98	ಆಡಿದನು	ADidanu	He played
W99	ಆಡಿತು	ADidtu	It played
W100	ತಟ್ಟಿದಳು	taTTidaLu	She patted
W101	ತಟ್ಟಿದನು	taTTidanu	He patted
W102	ತಟ್ಟಿತು	taTTitu	It patted
W103	ತಳ್ಳಿದಳು	taLLidaLu	She pushed
W104	ತಳ್ಳಿದನು	taLLidanu	He pushed
W105	ತಳ್ಳಿತು	taLLitu	It pushed
W106	ಕುಳಿತಳು	kuLitaLu	She sat
W107	ಕುಳಿತನು	kuLitanu	He sat
W108	ಕುಳಿತಿತು	kuLititu	It sat
W109	ಕೂಗಿದಳು	kUgidaLu	She screamed
W110	ಕೂಗಿದನು	kUgidanu	He screamed
W111	ಕೂಗಿತು	kUgitu	It screamed
W112	ಬರೆದಳು	baredaLu	She wrote
W113	ಬರೆದನು	baredanu	He wrote
W114	ಬರೆಯಿತು	bareyitu	It wrote
W115	ತೆಗೆದಳು	tegedaLu	She opened the

			door
W116	ತೆಗೆದನು	tegedanu	He opened the door
W117	ತೆಗೆಯಿತು	tegeyitu	It opened the door
W118	ಎಸೆದಳು	esedaLu	She has thrown (the ball)
W119	ಎಸೆದನು	esedanu	He has thrown (the ball)
W120	ಎಸೆಯಿತು	eseyitu	It has thrown (the ball)
W121	ಕಟ್ಟಿದಳು	kaTTidaLu	She tied
W122	ಕಟ್ಟಿದನು	kaTTidanu	He tied
W123	ಕಟ್ಟಿತು	kaTTitu	It tied
W124	ಹಚ್ಚಿದಳು	hachchidaLu	She lit (the lamp)
W125	ಹಚ್ಚಿದನು	hachchidanu	He lit (the lamp)
W126	ಹಚ್ಚಿತು	hachchitu	It lit (the lamp)

Section.3: Nouns

W127	ಸಿಂಹ	simha	Lion
W128	ಸಿಂಹಿಣಿ	simhiNi	Lioness
W129	ಗೆಳೆಯ	geLeya	Boy friend
W130	ಗೆಳತಿ	geLati	Girl friend
W131	ಎತ್ತು	ettu	Ox
W132	ಹಸು	hasu	Cow
W133	ಟೀಚರ್	TIchar/mAster	Sir
W134	ಟೀಚರಮ್ಮ	TIcharamma	Lady Teacher
W135	ಡಾಕ್ಟರ್	DActar	Doctor
W136	ಡಾಕ್ಟರಮ್ಮ	DActaramma	Lady doctor
W137	ಸಾರಂಗ	sAranga	Deer
W138	ಜಿಂಕೆ	jinke	Female Deer
W139	ಕೆಲಸಗಾರ	kelasagAra	Worker
W140	ಕೆಲಸಗಾರ್ತಿ	kelasagArthi	Lady worker
W141	ನರ್ತಕ	nartaka	Dancer
W142	ನರ್ತಕಿ	nartaki	Lady dancer
W143	ನವಿಲು	navilu	Peacock
W144	ಹೆಣ್ಣುನವಿಲು	heNNu navilu	Peahen
W145	ರಾಜ	rAja	King
W146	ರಾಣಿ	rAni	Queen
W147	ದೇವರು	dEvaru	God
W148	ದೇವತೆ	dEvate	Goddess
W149	ಅಡಿಗೆಯವನು	aDigeyavanu	Cook
W150	ಅಡಿಗೆಯವಳು	aDigeyavaLu	Lady cook
W151	ಕೋಳಿ	kOLi	Hen

W152	ಹುಂಜ	hunja	Cock
W153	ಕಳ್ಳ	kaLLa	Robber
W154	ಕಳ್ಳಿ	kaLLi	Woman robber
W155	ನಾಯಿ	nAyi	Dog
W156	ಹೆಣ್ಣುನಾಯಿ	heNNunAyi	Bitch
W157	ಮೀನುಗಾರ	mInugAra	Fisherman
W158	ಮೀನುಗಾರ್ತಿ	mInugarti	Lady Fisher
W159	ತೋಟಗಾರ	tOTagAra	Gardner
W160	ತೋಟಗಾರ್ತಿ	tOTagArti	Lady Gardner
W161	ಕ್ಷೌರಿಕ	kshourika	Hairdresser
W162	ಕ್ಷೌರಿಕಿ	kshouriki	Lady hairdresser
W163	ಹಾಲುಮಾರುವವನು	hAlumAruvavanu	Milkman
W164	ಹಾಲುಮಾರುವವಳು	hAlumAruvavaLu	Milkmaid
W165	ಉಳುವವನು/ರೈತ	uLuvavanu/raita	Farmer
W166	ಉಳುವವಳು/ ರೈತ	uLuvavalu	Lady Farmer
W167	ಪೋಲಿಸಿನವನು	pOlicinavanu	Policeman
W168	ಪೋಲಿಸಿನವಳು	pOlicinavaLu	Policewoman
W169	ಕುರುಬ	kuruba	Shepherd
W170	ಕುರಿಕಾಯುವವಳು	kurikayavaLu	Lady shepherd
W171	ಮಾರುವವನು	mAruvavanu	Merchant
W172	ಮಾರುವವಳು	mAruvavaLu	Lady merchant
W173	ಮಳೆ	maLe	Rain
W174	ಬಿಸಿಲು	bisilu	Sun

Section.4: Adjectives/Adverbs

W175	ಮೇಲೆ	mEle	Up
W176	ಕೆಳಗೆ	keLage	Down
W177	ಮುಂದೆ	munde	Front
W178	ಹಿಂದೆ	hinde	Back
W179	ಹೊರಗೆ	horage	Outside
W180	ಒಳಗೆ	olage	Inside
W181	ದಪ್ಪ	dappa	Fat
W182	ಸಣ್ಣ	saNNa	Thin
W183	ಕೆಂಪು	kempu	Red
W184	ಕಪ್ಪು	kappu	Black
W185	ಉದ್ದ	udda	Tall
W186	ಚಿಕ್ಕ	chikka	Short
W187	ಬೇಗ	bEga	Fast
W188	ನಿಧಾನ	nidAna	Slow
W189	ಬಿಸಿ	bisi	Hot
W190	ತಣ್ಣಗೆ	taNNage	Cold
W191	ದೊಡ್ಡವನು	doDDavanu	Elderly man
W192	ದೊಡ್ಡವಳು	doDDavaLu	Elderly woman
W193	ದೂರ	dUra	Far
W194	ಹತ್ತಿರ	hattira	Near
W195	ತುಂಬಾ	tumbA	Full
W196	ಖಾಲಿ	k^hAli	Empty
W197	ದುರ್ಬಲ	durbala	Weak
W198	ಬಲ	bala	Strong
W199	ಉದ್ದಕ್ಕಿರುವವಳು	uddakkiruvavalu	Tall woman

W200	ಕುಳ್ಳಕ್ಕಿರುವವಳು	kuLLakkiruvavalu/ kuLLi	Short woman
W201	ಸ್ವಲ್ಪ	swalpa	Little
W202	ಜಾಸ್ತಿ	dzAsti	More
W203	ಚಿಕ್ಕಹುಡುಗ	chikkahuDuga	Small boy
W204	ಚಿಕ್ಕಹುಡುಗಿ	chikkahuDugi	Small girl
W205	ಸಿಹಿ	sihi	Sweet
W206	ಕಹಿ	kahi	Bitter
W207	ಹಗಲು	hagalu	Day
W208	ರಾತ್ರಿ	rAtri	Night
W209	ಮಲಗುತ್ತಿದ್ದಾನೆ	malaguttiddAne	Asleep
W210	ಎದ್ದಿದ್ದಾನೆ	eddiddAne	Awake