MEAN LENGTH OF UTTERANCE AND SYNTACTIC COMPLEXITY IN THE SPEECH

OF THE CEREBRAL PALSIED

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To

Ma and Baba

        who   loaned   me their faith.

        borrowed my troubles,

        shared Rood   times   and bad

        and gave me the love and patience

        only a parent can bestow on their child

CERTIFICATE

This is to certify that the Dissertation entitled- "MEAN LENGTH OF UTTERANCE AND SYNTACTIC COMPLEXITY IN THE SPEECH OF THE CEREBRAL PALSIED" *is the bonafide work done in part fulfilment for Second year M.Sc, (Speech and Hearing) of the student with* Reg.No.M 9007.

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CERTIFICATE

This is to certify that the Dissertation entitled: "MEAN LENGTH OF UTTERANCE AND SYNTACTIC COMPLEXITY IN THE SPEECH OF THE CEREBRAL PALSIED" *has heen prepared under my supervision and guidance.*

MYSORE
1992

Dr.SHYAMALA K.C.
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DECLARATION

I hereby declare that this Dissertation entitled "MEAN LENGTH OF UTTERANCE AND SYNTACTIC COMPLEXITY IN THE SPEECH OF THE CEREBRAL PALSIED" *is the result of my own study, undertaken under the guidance of* Dr.SHYAMALA.K.C, *Lecturer Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.*

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INTRODUCTION

Mankind has seen progres in many a sphere. From mere iconic, pictographic representation of his thoughts, to use of the most sophisticated alphabetical objects, to the use of the most powerful tool of speech to convey his needs; the progress has indeed been made by leaps and bounds. Diagnostic procedures to measure language, on the other hand, has shown a slower rate of development. So, slow is the development that speech and language clinicians has been frustrated with efforts to determine the 'language level in a person be it a child or an adult.

For a long time, ever since the 'test movement' formal language tests had ursurped the place of informal measures of language assessment. However, with the advent of linguistics in speech and hearing and with the focus on single subject studies, informal procedures proved to be an invaluable tool.

The question that then arises is 'why testing ?'. It is because before developing assessment protocols it is mandatory to know how language is developed or acquired to such levels of sophistication when words are combined into larger units, such as phrases and sentences. These

combinations are not random but are rule governed and is specific to a particular language. A child passes from the stage of pre-speech vocalisations, cooing and onto the stage of babbling in a brief period of 6 months. He then goes through the stages of lalling, echolalia and soon utters his first meaningful word around his first birthday. From then on, he begins to combine words present in his lexical stock to arrive at newer sentences and within a short span, the child approximates his adult counterpart in the level of proficiency of language usage.

Once this was established the dilemma that then arose was the inability to accurately capture this rapid rate of language development. One view was to group children according to commonalities seen in their verbal output and then study the acquisition patterns across that age group. It was assumed that the children of the same age show similar linguistic structures and that the acquisition patterns follow a certain trend which is unchanging for that particular age group. However, more and more evidence from literature pointed to differences in acquisition patterns in children of the same age. With this' finding came the belief that linguistic development in a child should be assessed without any attmepts to group the child with this age-matched peers.

More recently, the eclectic approach prevails which recognises the differences and commonalities in a child when compared to his age-matched

In an attempt to describe the language production of children several quantitative and quantitative procedures were adopted. One particular measure the mean length of utterance has evoked a lot of interest and sustained the interest of the professionals for long. The reason for its popularity has been its relative ease of use and the precision with which it measures syntactic development in a child. MLU measures and evaluation of syntactic complexity have often been used in conjunction with each other. Where the former gives a quantitative measure of linguistic acquisition, the latter affords a qualitative analysis of these linguistic units.

Owing to its success as a measure of linguistic complexity, MLU is also increasingly being used with language disordered population as it serves as a tool for identifying language delay and deviances.

Cerebral palsy includes a group of disorders the symptoms of which arise primarily due to motor dysfunction. This motor dysfunction is directly attributable to CNS damage during prenatal, perinatal or early post-natal period. A wide spectrum of disorders are seen in the cerebral palsied population, ranging from deficits in cognition, speech and language skills, self-help skills and motor skills. Of prime interest to the speech and language pathologist are the effects of these symptom complexes to the child's communicative ablility. Documented from earlier times are the findings that the neuromuscular involvement of the muscles of respiration, phonation. articulation and resonance does lead to faculty speech output. However, there is some evidence though meagre to show that the brain damage perse and/or involvement of the speech mechanism prove detrimental to normal linguistic development in children with cerebral palsy. The extent and nature of these linguistic deficit are still obscure. To study language impairment in this population, which has so far evoked interest only due to the vast break-down of speech, would provide valuable information to the small pool of literature.

NEED FOR THE PRESENT STUDY

A review of literature reveals the lack of information about studies regarding language characteristics of the cerebral palsied population in the Indian context barring one or two. The linguistic repertoire of the cerebral palsied children as compared to age matched normals, would enable one to determine the nature and extent of these linguistic deficits. It would also help one to establish the effectiveness of quantitative and qualitative measures of syntactic and the morphological development in these children. In India, the efficacy of standardizing language tests in all the Indian language has not been estalished as yet. Most existing formal language tests in India are mere replications or translations of their western counterparts and these have to be used with caution. The present study could demonstrate the effectiveness of using quantitative and qualitative analysis of language samples obtained from normal and language disordered children. With special reference to Indian contexts where bilingualism is a rule rather than exception, such studies will also facilitate to unearth the intricacies of the disorder as a function of the languages spoken or used. It is more practical to rely on language sampling to arrive at details of linguistic proficiences of normals and language disordered population which will be possible only through similar studies.

PURPOSE OF THE STUDY:-

The present study was aimed at studying :-

1. Speech, output in terms of length of utterance in a small sample of normals and cerebral palsied population.

2. Differences, if any, in MLU morphemes and words between the cerebral palsied population and normal age-matched subJects.

3. Variation, if any, in sentence structure and complexity between these two groups.

REVIEW OF LITERATURE

With the advent and incorporation of descriptive linguistics and behaviourism in the field of speech and language and a quest to quantitatively describe a child's verbal output, speech and language pathalogists have increasingly turned to MLU as a tool for measurement. HLU enjoys an important place in child language assessment primarily because it is believed to be an index of grammatical competence (MC Carthy 1954, Brown 1973). Ever since its usage as early as 1925 by Mice, researchers have looked for factors influencing MLU, the methods of elicting a representative sample for MLU counts, ways of computing MLU and its relationship with MLR another measure believed to be indicative of grammatical competence. These factors have been studied to evaluate the reliability and validity of MLU as a measure of grammatical competence.

Brown (1973) first found that at comparable MLU's children used the same grammatical structures, upto the MLU of about 4. He observed that CA was not a good predictor of language development; this he did after analysing longitudinally, the speech samples of 3 children - Adam, Eve and Sarah.

He found that they varied widely on the age at which they acquired specific linguistic features and in their general rate of language acquisition. MLU in terms of morphemes was believed to provide a satisfactory index for comparison between children and a sensitive measure of a child's language development over time. Points on the MLU distribution at which the children were compared then developed into intervals and finally into stages that characterized a facet of language learning which was specific to that stage. Brown's stages are designated with Roman numberals and are as follows:-

Stage I - Semantic roles and syntactic relations

(MLU 1.0 - 2.0 morphemes or 1.75 morphemes) here the child is starting to put noun-verb sequences together such as "Car go"

Stage II :- Grammatical morphemes and modulation meaning

(MLU = 2.0 - 2.5 with average of 2.25 morphemes)The child starts to change word endings to potray grammar as in 'Cars going'.

Stage III :- Modalities of simple sentences (MLU = 2.5 - 3.25 with average of 2.75 morphemes) The child begins to use questions and imperatives for instance, "that's a car ?"

Stage IV :- Embedding (MLU = 3.25 - 3.75 with average of 3.5 morphemes) the child begins to use complex sentences for eg. "where is the car going now ?"

Stage V :- Co-ordination (MLU = 3.75 - 4.25 with average of 4 morphemes) The child may use connectors and more functions as in "MOM's in the car".

Brown did not imply that the stages are discrete, but rather that the linquistic development is continuous and that the stages allow comparison and characterizations at different levels of language proficiency.

De Villiers and De Villiers (1973) smoothed the original MLU interval to 0.5 morphemes while retaining Brown's stage of 1973. These smaller stages were useful in characterizing advances, especially in inflection for the 3-4 MLU range. In Brown's stages, the 3-4 range was too wide to capture the rapid development during this age. In support to Brown's works several authors have agreed that MLU is the best measure for language sophistication (Fors and Hakes 1978, Peterson 1990, Shriner and Sherman, 1967)

Given that present trend is to study individual differences in language development rather than similarities, same authors believe that MLU will lose its popularity as a measure of linguistic maturity (De Villiers and De Villiers, 1982). However, we cannot make judgements about normalcy of individual differences until a comparison is made and MLU could be one of the index by which the grammatical competencies of 2 or more children are comparable.

MLU has been found to be sensitive to several intra individual and extra individual difference. These differences have been explored by various researchers. Some of the intra individual variables include age, interest in the topic, familiarity with the topic.

The important extra-individual variables include demographic and cultural variables, situational variables, methods of elicting MLU, conversational role of the examiner, etc. (Cowan, Weber, Haddinott and Klein (1967), Shriner (1969), Sharf (1972).

AGE AND MLU :- MLU has been found to be significantly influenced by age (Braine (1963), Miller and Erwin (1965), Bloom (1968), Bowerman (1973), Miller and Chapman (1981), Brown (1970) purports that 2 children having the same MLU need not have the same CA. They vary greatly in rapidity with which they progress grammatically and for that reason CA is poor index of linguistic level.

Miller and Chapman (1981) conducted a study on 230 children and tried to correlate predicted MLU values and obtained MLU values. He discovered that the variation between predicted MLU values and obtained MLU values was very small (statistically - not significant). However, as age increased this variability' increased due to large inter subject variation. The match between observed MLU and predicted MLU was seen upto the age of 5 years.

EXTRA INDIVUDAL VARIABLES :-

a. SITUATIONAL VARIABLES :- Kramer, James and Saxman (1979) found that there was a significant difference in MLU in scores of language samples collected at home and in the clinics with MLU-M at home being higher. This was as reported by Scott and Taylor (1978).

Kuczaj (1983) found considerable differences in relation to crib-speech MLU as compared to social context speech with the latter showing more stability. Those findings point to the fact that situational variables do influence MLU values.

b. ELICITOR VARIABLES:

Martlew, Connoly & Mc Clead (1978) studied the speech of a boy of 5-6 years in 3 different conditions - playing alone, playing with one or two friends and playing with his mother. The MLU was found to be lowest when alone (3.5), slightly higher when playing with friend (3.7) and highest when playing with his mother (4.3).

Oswang and Carpenter (1978) compared language samples collected by mother and by clinician for young language impaired children. They reported that mother generated more utterances that 2 elicitors within the restricted time period.

Tomasello, Farrar & Diner (1984) correlated the MLU of children at 2 stages - Stage I (1.7 MLU, meanage = 24 months) and II stage (MLU - 2.8; mean age - 25 of months). While interacting with familiar and unfamiliar adults. Results indicated that the MLU for Stage II

children did not change for both familiar and unfamiliar interactors whereas stage I children produced utterances with higher MLU's with familiar interactions. The reason for this was attributed to the possibility that the Stage I child may have been less aware of the conversational cues and hence relied as general social cues like familiarity of the interactor.

c. METHODS OF EVOKING LANGUAGE SAMPLE AS A VARIABLE :

Barrie Blackley et al (1978) reported published studies by Musselwhite and Rogister in which the variability of MLU was examined. Musselwhite compared language samples obtained with 3 variations of a conversation method, whereas Rogister used a story-telling task to obtain the samples. They concluded that MLU-M seemed to be essentially stable with speaking tasks. However, as comparing the results of these two experiments, the results of MLU-M matched subjects showed great disparity, suggesting that the disparity could be due to two different methods of diciting a language samples.

James & Button (1978) conducted a study on 7 children with language disorders with 3 different stimulus

conditions - the children talked about toys brought from home, takem from clinic stock and in the third condition, no toys were provided. Results indicated that stimulus condition had no significant effect as children's MLU scores. The familiar toy and no toy conditions were more efficient in eliciting scorable utterances for MLU measures than clinic toys.

d.   LANGUAGE   AS   A   VARIABLE:-

Kuaal   et   al (1988) divided 15 Spanish speaking children into   groups   according   to MLU and found that MLU values derived   from   15   Spanish   children were higher than MLU derived   from   comparable   English   children.   This   was attributed   morphological   difference   in   Spanish, and English.

[1]

Other   variables   found   to influence MLU includes social economic   status,   time   of   the   day. emotional state of child,   the   practise   effect dialects, sex and physical conditions of the child.

A review of the literature thus reveals that the reports on MLU as a measure of grammatical competence is ambiguous as best, due to methodological variables and criterion adopted to score the language samples.

MLU was initially studied as a production variation within a given person. It is however, an established fact that linguistic output will depend to a large extent an liguistic input.

It thus follows that if the linguistic input provided to a child varies in terms of MLU, the output would also show a concurrent variation (Lieven 1978). Research focus thus shifted to establish how the MLU of mothers or fathers influenced the MLU values in the child's production. Brown and Bellugi (1964) pointed out that the utterances of parents to young children were short syntactically and simple semantically. The parents frequently repeated these well formed utterances. This view was also supported by Hoff (1990).

Most studies report that MLU of adults measured in adult-child interactions considerably shorter than in adult-adult speech CDrach 1969, Newport, 1975). In fact, a mother's utterances became even shorter when her child first began producing intelligible words (Philips 1973, Lord 1975)

De Villiers and De Villiers (1982) reported that mother's MLU was longer when speaking to 8 months and 28 months old children as compared to 18 month old children. This could be due to the fact that 18 month old children starts to respond with a word or 2 words, hence the mother's focus would be to elicit verbal response. For the other age groups, mother's focus would be to catch and maintain attention.

Murray et al (1990) however opines that the mother's ability to fine tune her early linguistic input occured earlier-more specifically during the 2nd half of the 1st year of development and could be predictive of her childs' later receptive language functioning.

FACTORS CONSIDERED FOR CALCULATION OF MLU/MLR

1. Computation of. MLU /MLR

Computation of MLU is done by analysing the language samples from the child either spontaneously by repitition or by directing him to answer the question asked regarding story. It could also be accomplished from conversation sample.

Author differ in their view regarding the sample size to be collected for analysis. It ranges from as low as 15 sentences to as high as 1000 sentences per child. Schneiderman (1955), Griffith and Miner 1969 suggested that as few as 15 sentences could serve to provide enough data for reliable estimates of MLR and a length complexity index.

Majority of authors agree to the use of 50 spontaneous utterances for measuring MLU (McCarthy 1930, Templin 1957. Darley and Moll, 1960, Minifie, 1963, Shriner 1967, Bruce et al 1989, Cole 1989, Ezell and Goldstein 1969, Scherer & Olswang 1989)

Bruce 1989 believed reliable MLU score could be got by analysing 5 consecutive intelligible utterance. Darleyu and Moll (1960) collected 50 responses from 150 children and calculated the MLR from 5,10,15,20,25,35 and 50 responses. They concluded that 25 responses were adequate for most descriptive purposes, although the highest reliability was obtained from the 50 responses.

According to Minifie et al (1963) 50 utterances 3 times within less than 3 weeks period should be considered and mean of 5 long utterance. This would also take into account day to day variations within a speaker.

Brown 1973 and Niechuys et al 1984 are of the opinion that atleast 100 utterances should be taken and then mean of 5 long and 10 long utterances respectively should be taken. However, Lackner (1968) suggests the use of 1000 spontaneous utterances per child in both normals and language impaired population and then compare their grammar and determine their complexity.

Some other authors do not specify number of utterances:

a. Wellen (1985) A story should be narrated to the child and later while eliciting language sample 30 questions regarding that story should be answered.

b. Klee (1989) says that 20 months monther-child interaction should be sufficient.

c. Wells Gorden(|919) 24 samples of 90 second duration with 20 minutes interval between 2 samples would give reliable MLU measures.

2. <u>Rules for computing MLU</u> :-

Several authors have modified Brown's (1975) rules for computing MLU values.

Brown (1975) counted 100 utterances by omitting the first page of transcription. All proper names, reduplications, etc. were counted as single morphemes. He omitted fillers and stuttered words from his count. As opposed to this Chapman (1981) considered morpheme count from the first page itself and used only 50 utterances. He also counted repetitions as two morphemes instead of one. Moreover he believed that words such as birthday, pocket book, etc.

(which Brown considered as 1 morpheme) should be counted as 2 morphemes, provided the child used the two morphemes separately in a different lexical environment. Lund and Duchan (1988) followed much the same rules as Brown (1975) and Chapman (1981). However, he cautioned against considering utterances which were eliptical and which gave the impression that they would have been longer if the eliciting question had been absent.

Ever since MLU was positively correlated with CA (Spreisterbach 1958 Brown 1974, Miller and Chapman 1981) attempts are continuing to determine such a direct correlation exists in the language disordered population and to what extent.

Spreisterbach (1958) studied children with cleft palate and found their MLU to be decreased as compared to age matched normals. This finding was also replicated in studies conducted by Faircloth 1975 and Pannbacer (1975).

Singer (1976) did a comparative study of grammatical development in age-matched normals and cerebral palsied children and compared them on quantitative and qualitative basis. It was found that cerebral palsied children not only spoke less during a given unit of time but used few age appropriate forms and agrammatical ones than the non-brain injured.

Klee, Shaeffer, May, Membrino and Maugey (1989) studied the relationship in normals and specifically language impaired pre-school children. Results showed that the predicted MLU of the language impaired group was lower than that of the normal group across the age range studied (24-50 months)

As evident from the review of literature, there appears to be a dearth of literature regarding MLU and syntactic complexity in both normals and the language disordered population. Few stray reports on the language disordered population by Singer (1976) and Klee et al (1989) suggests that the MLU and syntactic complexity could serve as important tools to differentially diagnose a group of language disordered children from a group of normals.

Language impairments in the cerebral palsied children were overlooked until recently, because of the very obvious disruption of speech. However, Karlin, Karlin & Curren (1977) reported that the cerebral palsied child may be impaired linguistically and the condition could be so severe that it could be diagnosed or receptive or expressive aphasia an auditory imperception or a central communication disorder, whichever term is applicable. Lehroff (1958) reported 70% of them to have speech and language deficits. Among the speech and language problems found in the group of cerebral palsied, Denhoff & Robinault (1968) reported delayed speech, aphasia, agraphia, anomia, alexia, stuttering and voice disorders. Evidence from literature also suggests that the pattern of language development in this population remains the same as in normals (Denhoff & Holden (1951), Byrne (1959))

Myers (1965) studied the language ability of a large group of spastic and athetoid types of cerebral palsied using ITPA. He found spastic to be superior to athetoids on tasks involving the automatic sequential level whereas the athetoids were superior on language tasks at the representational level.

Irwin (1966) evaluated the length of sentences along with sex differences. It was found that the number of complete declarative sentences was greater than that of incomplete declarative sentences and that the mean for boys on the two types of sentences significantly exceeded that of girls. In contrast to this study, a study by Irwin and Korst (1967) revealed no sex differences. 44 subjects (22 males and 22 females) were shown 3 pictures and were required to describe them. The subjects were matched according to CA and IQ. Responses were taped and sentences were analyzed according to structrual completeness and according to length. The sex difference was not found to be significant.

A comparative study of grammatical development in normals and cerebral palsied children was conducted by Singer (1976) - 29 normals & 29 cerebral palsied childred aged 3-5 and 7-9, matched for age, sex and IQ were compared as qualitative and quantitative assessment of grammatical development. 100 Spontaneous responses were recorded and were categorised using a list of 87 grammatical forms. Each of these forms was scored as being present or absent in each child. A total number of points earned out of 87 was the competence. The data revealed that the cerebral palsied children not only spoke less during a given unit of time but used fewer

age-appropriate and more agrammatical ones than the non-brain injured. Qualitatively also, there were critical differences between the 2 groups. Certain forms were characteristic of the brain-injured group. This was particularly true of the restricted or agrammatical forms. It was felt that certain strategies were essential for the development of progression such as deletion, addition, substitution and permutation and that normal children appeared to know a set of these rules that allowed such a progression. The brain-injured children in this study, it was felt, did not appear to acquire many of grammatical strategies even with advancing age. This limited grammatical competence, remained upto age 8 and was found to be characterized by short phrases joined by 'and'. The study did not examine the difference among the various sub-groups although they were thought to be significant.

Indian studies, as mentioned earlier are few and far in between. Anantha Murthy (1972) found delayed speech was predominant among the cerebral palsied population. He did not go into the details of the speech and language disorder.

The first attempt to explore the speech and language characteristics of the cerebral palsied was made by Shyamala (1987). She studied of cerebral palsied children, 6 Spastic quadruplegics and 3 athetoids using spontaneous and elicited speech and languages samples. These were recorded and analysed to provide linguistic profiles for each of the subject. An attempt was also made to differentiate between the type of cerebral palsy. Speech and language deficits was found to be prevalent in both spastics and athetoids. Poor intelligibility and dysarthria characterized the speech of the cerebral palsied. Although delayed speech and language was characteristic of cerebral palsied, other specific linguistic characteristics were noted such as limited grammatical categories, limited lexicon, deficient phonology and deficient use of previously learned grammatical categories, neologisms, longer reaction times, word finding difficulties, pronominal reversals, disfluency in speech etc. She also found differences in terms of speech and language ability among the spastics and athetoids. These differences were more significant at the phonological level while the significance reduced at the morphological and syntactic

levels.   Speech   and   language   defects   of each subject was found   to   confirm   to   the   overall group pattern in spite of wide   individual   variations.   The   language anamolies of the children   also   appeared to be rectified only partially, both qualitatively and quantitatively.

The   research scope for quantitative and qualitative analysis in the language in cerebral palsy appears to be wide with the sketchy information provided by previous studies.

METHODOLOGY

SUBJECTS:-

20 normal children and 10 cerebral palsied children in the age group of 4-11 years were taken. Two types of CP, namely spasticity and athetosis were considered, since they were the most common types available. Since topographical subgroups would influence the language samples, only one category, namely quadriplegia with the lower limbs more severely affected than the upper limbs, was considered. The 10 cerebral palsied children were divided into 2 groups based on degree of neuromuscular involvement. Hence, 5 children each were considered in two groups - 1 group with children having mild involvement and the 2nd group with moderate involvement. The judgement regarding severity was based on the reports provided by physiotherapists and neurologists.

The age and sex distribution of the normals and cerebral palsied children are provided in Table 1

Table 1 :- Age and sex distribution of the subjects

	Normals		C P.	
Age Group	Male	Female	Male	Female
4-5	1	1	1 *	
5-6	1	1	1	
6-7	2	1	1	
7-8	2	1	1	
8-9	2	1		2
9-10	3	1	2	
10-11	2	1	1 + 1 *	

* - ATHET0ID

Table 2 shows the severity of neuromusscular involvement in the 10 cerebral palsied chilren.

Table 2 : - Age, ,sex, type and severity of the 10 cerebral palsied children

Subject	Age	Sex	Type	Severity
S1	4	M	A	Moderate
S2	5	M	SQ	Mild
S3	6	M	SQ	Mild
S4	7	M	SQ	Mild
S5	8	F	SQ	Moderate
S6	8	F	SQ	Mild
S7	9	F	SQ	Moderate
S8	9	M	SQ	Mild
S9	10	M	A	Moderate
S10	10	M	SQ	Moderate

A - Athetosis

SQ - Spastic Quadriplegia

The children from middle class were chosen as subjects. The subjects were chosen from Bangalore and Mysore and all the children had Kannada as mother tongue.

Only subjects with hearing within 20 dBHL were considered.

IQ was another criteria for selection. Children with IQ of 80 and above were chosen.

The cerebral palsied children in the study were chosen such that they had minimal exposure to speech therapy (less than 6 months) or no therapy at the time of study. The primary mode of communication of these children was verbal but gestures and pantomime along with verbal communication was noted.

METHOD OF DATA COLLECTION:- Initially time was spent to build a working rapport with the child. The actual data collection commenced when the child was comfortable and he/she could verbalize freely with the investator.

Spontaneous speech and elicted/narative speech (using toys & pictures) were used to collect the sample of language from each child. Spontaneous speech samples were recorded with the parents or/and investigator around. The child's interaction in natural free play with toys and picture books were also recorded. Narrative/elicited speech included story telling and picture description by the child. The toys and pictures provided remained the same for all the subjects in the study.

Each session with the child lasted 20-30 minutes or longer depending on the child's comfort. Each cerebral palsied child was put in his most comfortable position - either prone, supine, sitting without strapper belts or sitting with strapper belts in the special chair. The comfortable position of each cerebral palsied child was ascertained by the investigator to find out the position in which maximum comfort and fluency were present. Tape recordings and diary keeping of each session of speech interaction were made. The data collection was done when the child was most active, usually in the mornings and when he/she was not drowsy. A language sample consisting of a minimum of 100 utterances were collected during spontaneous and elicited speech. Verbal interactions included interactions between mother-child and mother-child-investigator. The child was reinforced after every session with sweets and pictures.

ANALYSIS:- The 100 utterances elicited from each child was analysed in terms of its mean length of utterances and the syntactic complexity of these utterances. The utterances were broadly transcribed using IPA and were then demarcated based as the pauses in the speech sample. Mean length of utterance for words (MLU(W)) and mean length of utterance for morphemes (MLU(M)) were calculated for each of the 30 subjects. (See appendix for rules to calculate MLU).

Analysis of Syntactic complexity was three fold.

a. Count of the lexical categories in the child's speech.

b. Description of the syntactic pattern

c. Count of the no. of words in each utterances e.g. 1 word
    utterance, 2 word utterance, etc.

The 1st and 3rd were calculated based on all the 100
utterance. The 2nd however was analysed based on the 5
longest utterances (in MLU-M) in a subject's speech sample.

Results obtained are presented in the next section and are
discussed in terms of available literature.

RESULTS & DISCUSSIONS

The present study was aimed at exploring the mean length of utterance and syntactic complexity in a group of 20 normal children and in a group of 10 children with cerebral palsy in the age range of 4-11 years. Spontaneous speech and elicited/narrative speech, using pictures as stimuli, were used to collect language samples. 100 utterances collected from each of these children was the data to be analysed in terms of: -

1.   MLU (w) & MLU (m)

2. Syntactic Complexity

The results are presented below and are discussed with available literature.

RESULTS FOR MLU (Words)& MLU (Morphemes):-

Table 3 shows the distribution of MLU (W) and MLU (M) as a function of age, The mean MLU (W) and MLU (M) for both the groups are also provided.

TABLE 3. - MEANS AND STANDARD DEVIATIONS OF MLU (W) AND MLU (M) IN NORMALS AND CEREBRAL PALSIED AS A FUNCTION OF AGE.

AGE GROUPS IN YEARS	MLU (W)		MLU (M)	
	(N)	CP	(N)	CP
4- 5	2.44 (0.06)	0.93	4.21 (0.09)	1.13
5- 6	1.95 (0.46)	1.95	3.61 (1.28)	3.07
6- 7	2.15 (0.78)	1.47	3.62 (1.27)	2.33
7- 8	2.19 (0.38)	1.91	3.44 (0.83)	2.64
8- 9	3.13 (0.54)	2.19 (0.07)	5.16 (0.17)	3.20 (0.08)
9-10	2.62 (0.49)	2.23 (0.27)	4.25 (1.23)	3.24 (0.60)
10-11	2.80 (0.57)	1.95 (0.92)	4.68 (1.09)	3.24 (1.26)
	2.47	1.80 (0.58)	4.14	2.69 (0.91)

From the table, it was apparent that MLU (W) was always less than MLU (M)

a. <u>MLU (W) & MLU (M) IN NORMALS</u>:- The group of normal children ranging in age from 4.5 - 10.11 yrs, with a mean age of 7.6 years had a MLU (W) of 2.4. The MLU (M) of the normal group was found to 4.14.

It is apparent from Table 3 that MLU did not increase with increase in age. This finding was true for both MLU (W) and MLU (M). The lack of corresponding variation in MLU (M) and MLU (W) with increase in age is also depicted graphically (Graph 1). Moreover, the standard deviations from the mean was found to vary widely across the age groups. This finding shows good agreement with Miller and Chapman's (1981) conclusions that the variability in MLU increases after 5 years of age.

b. <u>MLU (W) AND MLU (M) IN THE CEREBRAL PALSIED GROUP</u>:- The cerebral palsied group had children in the age range of 4.6 and 10.11 years with a mean age of 8.1 years. The MLU (W) in this group was 1.80 and MLU (M) was 2.69.

Table 4 present the MLU (W) and MLU (M) values of the 10 cerebral palsied children.

TABLE 4 - MLU (W) AND MLU (M) OF THE 10 CP
CHILDREN WITH AGE AND SEVERITY

NO.	TYPE	SEVERITY	AGE IN YRS	MLU (W)	MLU (M)
S1	A	Moderate	4	0.97	1.13
S2	SQ	Mild	5	1.95	3.07
S3	SQ	Mild	6	1.47	2.33
S4	SQ	Mild	7	1.91	2.64
S5	SQ	Moderate	8	2.12	3.12
S6	SQ	Mild	8	2.25	3.28
S7	SQ	Moderate	9	1.96	2.64
S8	SQ	Mild	9	2.49	3.83
S9	A	Moderate	10	1.03	1.98
S10	SQ	Moderate	10	2.87	4.5

GRAPH-1: Mean MLU(W) and MLU(M) values in normals and cerebral palsied children on a function of age.
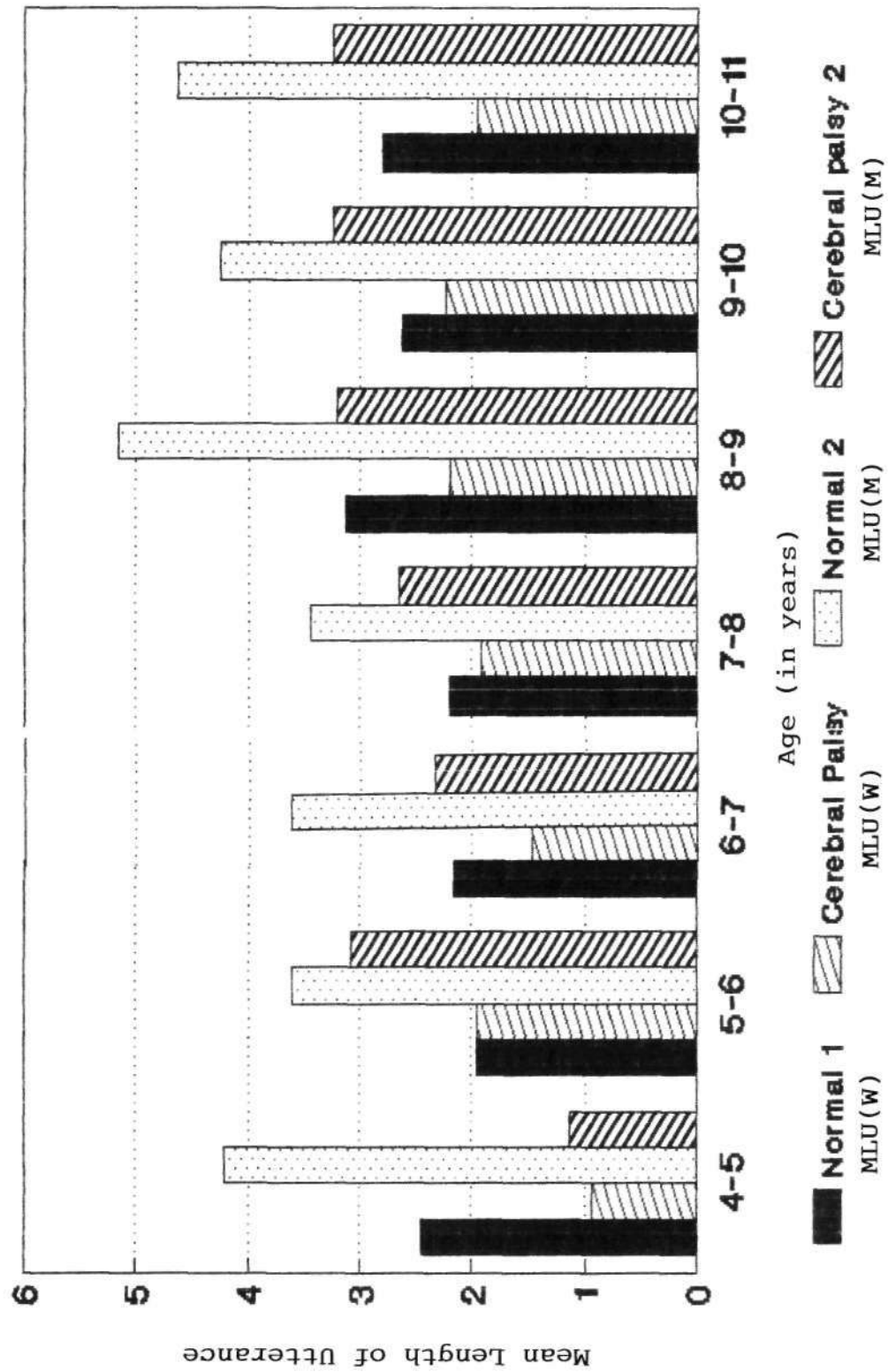
From the table one can see that when the cerebral palsied children are ordered into a group in terms of their ages, age does not emerge as a definite variable for language skills. MLU values of S1, S3, S4, S5, S6, S7, S8 and S10 show a parallel increase with increase in age (i.e.) as the age increases, the HLU values were also seen to increase. The same did not hold good for S2 and S9. S2 showed a greated HLU value when compared to S3. S9 had an MLU value (1.98) which is the least among the group. In S1 and S9, the MLU (M) and MLU (W) varied only fractionally despite a large difference in age.

Comparison of the cerebral palsied children on 2 other variable, severity and type of cerebral palsy were possible only in three of higher age groups which had 2 subjects each. As seen from table 4, the subjects with milder involvement of the neuromuscular systems (S6 and S8) showed higher MLU (W) and MLU (M) values when compared to S5 and S7 who had moderate involvement of the neuromuscular system.

Also, when the types of cerebral palsy (athetoid vs.Spastic) were compared in the 10-11 years age group, S10 with spastic cerebral palsy showed a higher MLU value (both for words and morphemes) as compared to the S9 (athethoid cerebral palsy)

RESULTS COMPARING NORMALS AND CEREBRAL PALSIED :

A comparision was then made between the normal group and cerebral palsied group on the MLU criterion and it was found that MLU for words and morphemes was reduced in the cerebral palsy population when compared to the normal group. This was true even when they were compared with age-matched normals.

The t-test was done to test the significance of difference between the mean MLU values of the two groups. The difference was found to be significant at 0.01 level. The above finding is in consonance with previous findings of Klee et al (1987) where predicted MLU of the language-impaired group was lower than normals across the age-range studied. Note however that MLU had not been specifically studied in the cerebral palsied children in the above mentioned study.

In summary, results in the normal and cerebral palsied group on MLU values suggests:-

1. MLU (W) is always less than MLU(M) in both groups.

2. Normals do not show a corresponding increase in MLU (W) and MLU (M) with increase in age beyond 4 years.

3. Results obtained with age as a variable in the cerebral
    palsied group presents a confusing picture and age does
    not emerge as a variable for attainment of grammatical
    complexity as measured by MLU.

4. Severity of neuromuscular involvement and type of
    cerebral palsy are other variables probably affecting
    MLU values. However, the aspect needs to be further
    explored with a larger sample.

RESULTS OF SYNTACTIC COMPLEXITY:- The second purpose of the
study was to determine if the normals and cerebral palsied
children varied in terms of syntactic complexity. Results
obtained were analyzed under 3 sub-categories which are
believed to reflect the syntactic complexity. They are :-

a. The order and frequency of lexical/grammatical categories
    in the sample analyzed.

b. The arrangement of these lexical/grammatical categories
    within an utterance.

c. The number of single words or multiple words utterances.

A. THE ORDER AND FREQUENCY OF LEXICAL CATEGORIES
IN THE SAMPLE: -

The total percentage of syntactic categories in normals and cerebral palsied are presented in table (5)

RESULTS IN NORMALS: -

In the normals, nouns were always produced more frequently than verbs; verbs were more frequently produced than pronouns. The normals exhibited the following order arranged in decreasing frequency of occurence in the sample.

Nouns, verbs, pronouns, adjectives, adverbs, kinship terms, conjunction, negation, quotatives interrogation, reduplication, affirmation and onamatopoiea.

RESULTS IN CEREBRAL PALSIED:-

In the cerebral palsied children also the nouns were produced more frequently than verbs and verbs were more abundant than pronouns.

The order the lexical categories in the cerebral palsied children arranged in decreasing frequency of production is Nouns, verbs, pronouns, adjectives, kinship terms, adverbs, negation interrogation, conjunction, onamatopoiea, quotation, affirmation and reduplication.

- 4 2 -

TABLE 5 - DISTRIBUTION OF LEXICAL CAIEGORIES ACROSS AGES

CATEGORY	AGE IN YEARS														GROUP MEAN	
	4 - 5		5-6		6 - 7		7 - 8		8 - 9		9 - 10		10 - 11			
	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP
Nouns	35.00	37.11	43.07	29.51	40.95	42.53	43.39	32.65	28.35	34.32	36.32	35.56	35.99	30.93	37.58	34.66
Verbs	32.78	14.43	30.71	25.68	22.29	28.56	25.69	29.95	20.94	32.17	25.03	26.81	28.11	25.54	26.25	26.10
Pronouns	12.68	7.22	6.49	19.67	11.35	12.69	6.48	15.65	17.31	12.90	11.48	14.64	11.15	13.38	11.06	13.74
Adverbs	2.95	3.09	5.27	2.19	8.50	2.99	5.65	4.77	4.45	4.57	9.23	4.43	8.77	7.24	6.40	4.18
Adjectives	4.03	8.25	5.61	3.83	7.84	2.24	6.37	1.20	10.88	7.29	9.13	10.38	9.09	10.47	7.57	7.52
Kinshio	4.11	11.34	2.09	7.10	3.38	4.48	3.63	2.04	0.53	3.44	6.15	4.48	1.46	2.47	3.06	5.05
Conjunction	1.74	1.03	1.12	1.09	1.75	-	3.16		5.25	1.85	2.54	0.79	1.14	5.59	2.10	1.19
Quatative	1.38	1.03	2.47	1.64	1.56	-	1.76	0.68	1.17	0.67	0.83	1.40	0.62		1.40	0.77
Neoative	2.54	4.12	2.23	2.75	1.31	2.99	2.24	2.04	1.02	3.72	1.00	2.86	3.16	2.85	1.93	3.04
Interrooative	0.19	2.06	0.20	6.56	0.65	2.99	1.14	1.36	0.64	0.24	0.27	0.68	0.31	2.62	0.49	2.56
Affimastion	9.?6	3.09	0.39	-	-	0.75	-		0.09	0.45	0.35		0.21	0.18	0.35	0.64
Onamtoooiea	1.31	7.22	0.00	-	-	-	-		0.18	-	-			0.49	0.17	1.10
Reduplication	1.11		0.37	-	0.22	-	0.61	-	0.63	0.92	-		-		0.42	0.13

Comparison of subjects S5 & S6, S7 & S8, S9 & S10 were not possible as they showed highly individualistic patterns in the frequency of occurance of individual lexical categories. Also, individual qualitative differences were also observed in the use of some lexical categories with reduced frequency of occurance among these 6 subjects. For eg. In 4-5 years, SI, the following order was found in terms of frequency of usuage of lexical categories. Nouns, verbs, kinship terms, adjectives, pronouns, onamatopoiea, negation, adverbs, affirmation, interrogation, conjunction and quotatives. In S10 the following order was found Nouns, verbs, pronouns, adjectives, adverbs, interrogation, conjunction, negation, kinship terms and affirmation, quotatives, reuplicative and onamatopoiea utterances were not used.

COMPARING NORMALS AND CEREBRAL PALSIED: -

When the normal group was compared with the cerebral palsied group, there was a qualitative and quantitative difference observed. The qualitative difference was exhibited in terms of the hierachical order of the lexical categories which underwent slight modifications in the cerebral palsied. The quantitative difference was in terms of frequency of

occurance of these lexical categories in the speech of cerebral palsied , as compared to the normal group. This is evident in Table 5

For eg.: in the age group of 4-5, 6-7 and 8-9 years the cerebral palsied children produced more nouns when compared to their age matched normals. In the age group of 6-7, 7-8, 8-9, 9-10, the percentage of verbs in the cerebral palsied population increased when compared to the age matched normals. In 4-5 years, kinship terms took a precedence over production of pronouns.

The cerebral palsied group showed less frequent occurance as seen in reduced number of nouns, adverbs, conjunctions, quotatives and reduplication. The frequency of occurance of verbs and adjectives were also slightly lowered when compared to the normal group. This is evidenced in Table 5 depicting the group means for normals and cerebral palsied.

The cerebral palsied group, on the other hand ,showed a greater frequency of occurance of pronouns, kinship terms, negation, interrogation, affirmation and onamatopoiea as compared to a normal group. The distribution of the lexical categories in normals and cerebral palsied across the age-groups showed that there were individual differences observed

in both the groups. Subjects in the normals and cerebral palsied group did not always follow the same hierarchical ordering of lexical categories. However, the general trend in both the groups remained unchanged. Percentage of nouns figured first in the list in terms of frequency of production followed by verbs and then pronouns. The individual variations were observed only for lexical categories occuring less frequently in their speech.

These qualitative and quantitative differences were plotted graphically (Graph 2) to highlight the differences. The qualitative difference is evidenced by the fact that the two curves drawn in normals and cerebral palsy do not parallel each other. The quantitative difference is documented by the fact that the curve depicting the lexical categories in cerebral palsied does dip below that of normals in most instance, while in others, it rises above the normal curve.

In this sub-category, the following results were obtained:-

1. There is a quantitative and qualitative difference between normals and cerebral palsied population and the latter (i.e) qualitative differences may be subtle.

GRAPH-2: Distribution of lexical categories in normals and cerebral palsied children.
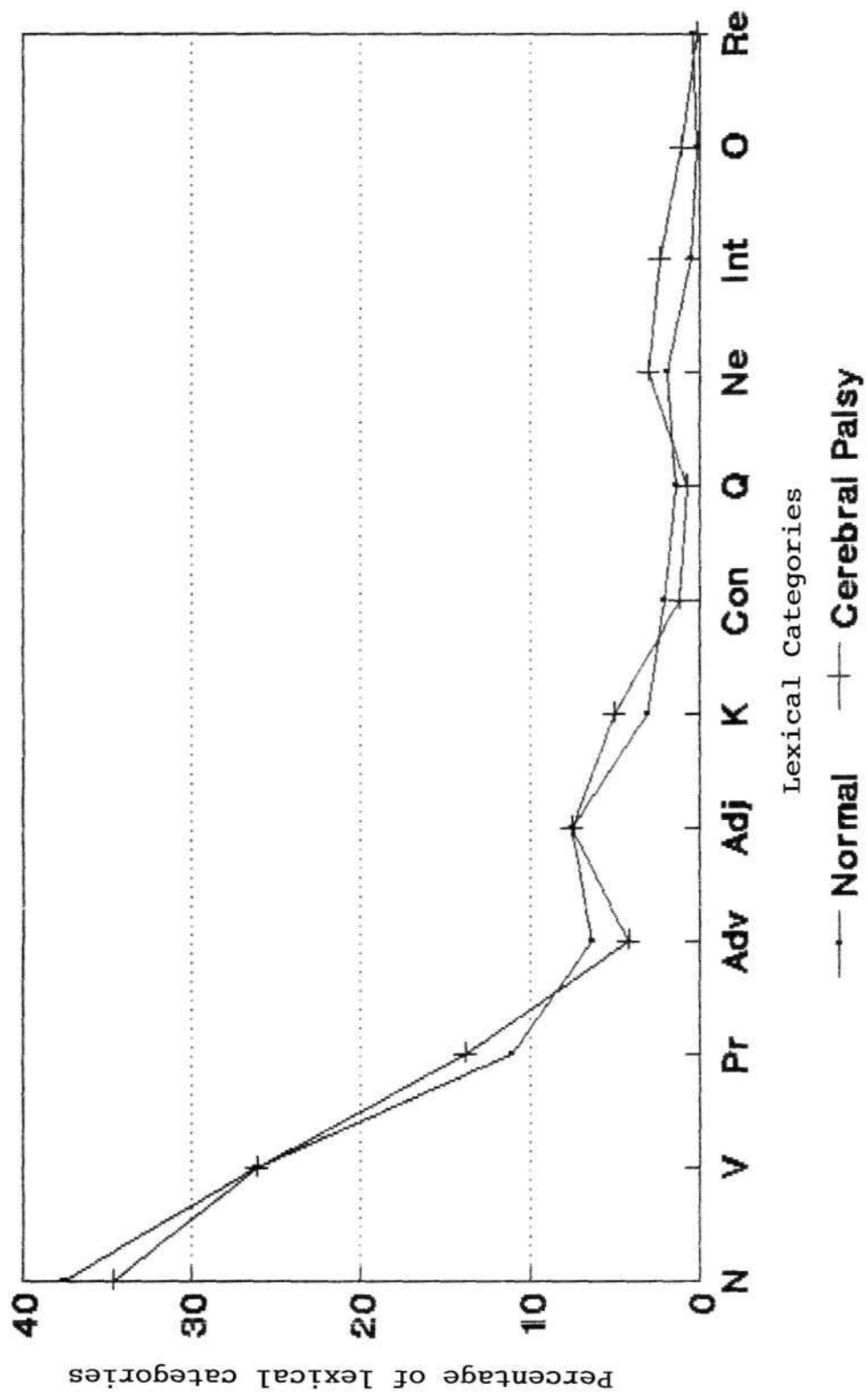
2.   Individual variation was observed for both normals and cerebral palsied children in terms of the ordering and frequency of lexical categories.

B. ARRANGEMENT QE LEXICAL CATEGORIES IN AN UTTERANCE

As mentioned earlier, a minimum of five longest utterance in terms of MLU - M was analysed for the ordering of lexical categories. The results are presented according to the pattern in these longest utterances in both cerebal palsied and normals. Other patterns observed are also discussed below:-

RESULTS IR NORMALS:-   The most common patterns seen in the normals was as follows:-

Pronoun/noon + adjective/adverb + compound verb.
la huduga mnradamele kutkondu i huduginna
nodutaidanel

The use of single word utterance were rare compared to multiple word utterance. The single word utterances were usually nouns or verb. Small percentages of negatives affirmatives, adverb and adjectives were also used.

No particular trend in lexical ordering was noted when age was considered as a variable.

RESULTS IN THE CEREBRAL PALSIED:-

In the cerebral palsied group, the sentence pattern observed differed minimally when compared to normals.

1] Noun + noun + noun + adjective + verb.

|biskitu tSkletu keku ella tintini|

2] Pronoun + noun + verb.

|nanu ∧mmandӡotte hogutini|

3] Pronoun/nqun + adjective/adverb + verb.

|n∧n∧ge keku tumba ıSta|

The last pattern was seen sparsely in the cerebral palsied group. Single word utterances predominated and these were primarily nouns. Verbs were rarely used as single utterance. A small percentage of negatives, affirmatives and kinship terms constituted some part of the single word utterances.

No particular trend was noted when age was considered as a variable.

A further comparison on lexical ordering was made in terms of severity and type of cerebral palsy among cerebral palsied children in 3 of the older age groups. No specific pattern was characteristic of mild neuromuscular involement when compared to moderate involvement.

When subjects S9   and   S10   in   10-11   years   were   compared however,   some   difference   was   noted.   S9 used   the   following pattern   in   the   lexical   ordering   of   sentences.

Pronoun/noun + verb.
|n ʌnnge   torsi|
|ʌmma   karitare|

No   compound   verb   were   noted   in   the   language   sample   of   S9. Some   of   the   verbs   in   S9's   speech   sample   remained   uninflected eg. /odu/ /adu/ etc. The   single   word   utterances   followed   the pattern   demonstrated   by   the   cerebral   palsied   children   as   a group.   S10   showed   higher   frequency   of   use   of   syntactic patterns   analogous   to   the   normal   group.

Pronoun /noun   + adverb /adjective + compound   verb.
|obba   laiyon   dina   nidde   madta irrotte|

Some   other   observations   made   about   the   lexical   ordering   of sentences   and   the   use   of   different   lexical   categories   were:-

1.   The   ordering   of   lexical   categories   in   both   the   groups
     were   in   keeping   with   the   basic   positional   characteristic
     (SOV pattern) of the Kannada language (Schiffman 19   )

2.   The compound verbs which were used by the cerebral
palsied group consisted of fewer morphemes than the
normal group

In the cerebral palsied group the compound verb used
were
|kʌrkond bʌrtale| ; |tinnʌkke hogʌtte|

In Normals:-
|etti kondu idutairtale|; | togolʌkke hogtairtale|

3.   The cerebral palsied children use conjunctions with 2
simple sentence whereas normals use complex verb forms.
One such eg. seen was

   1. Snana madbittu skulge hogtini (n)
   2. Snana madtini amele skulge hogtini (CP)

4.   There was a greater tendency not to inflect a verb with
affixes for tenses, number, person gender or other
categories in the cerebral palsied which was never seen
in the speech samples of normals.
eg.: Cerebral palsied used verbs stems like /odu/ /adu/
etc where as similar verbs were used with inflections
like /odoudu/ /adoudu/ in normals.

4 out of 10 cerebral palsied subject did not use uninflected verbs in their speech (S2, S6, S8, S10) at all.

5. The verbs used were often simplified in 3 of the cerebral palsied children

> eg.: 1. njappa /njappnkka
>
>   2. toltane/togoltane

Interestingly, 2 of the 3 children using these simplified forms were the two children with athetosis in the cerebral palsied group.

5. The spontaneous speech in the cerebral palsied children consisted primarily of single words whereas utterances were generally longer in elicited or narrative speech. The reverse was seen in the normal children.

The above mentioned findings concur with findings reported by Shyamala (1987)

The most important result observed in syntactic ordering as follows:

1. The cerebral palsied children use patterns which are simplified as compared to the normal children.

2. Evidence from 2 subjects in 10-11 years show that type of cerebral palsy could affect the lexical ordering.

3. Age and severity do not appear to influence the ordering of the lexical categories.

   C. <u>THE DISTRIBUTION OF SINGLE OR MULTIPLE WORD</u>

<u>UTTERANCES</u> :-

Table 6 shows a distribution of single and multiple word utterance in both the normals and cerebral palsied population.

TABLE 6 - DISTRIBUTION OF WORDS PER UTTERANCE IN NORMALS AND CEREBRAL PALSIED

	(N)	(CP)
1 WORD	28	38
2 WORD	24	39
3 WORD	19	15
4 WORD	15	6
5 WORD	7	2
6 WORD	4	-
7 WORD	2	-
8 WORD	2	-

RESULTS IN NORMALS:-

Results obtained in normals reveal that though normals use a large number of single and two word utterances, their language sample also contain 3,4,5 word utterances. 6,7,8 word utterances are also produced though infrequently. The 3-4 word utterances was found to increase with age in the normals with the frequency of 1-2 word utterances reducing with increasing age as seen in table 7.

TABLE 7
DISTRIBUTION OF THE WORDS PER UTTERANCE ACROSS
AGE GROUPS IN BOTH (n) AND CP

| | A G E   IN   Y E A R S | | | | | | | | | | | | |
| WORD | 4-5 | | 5-6 | | 6-7 | | 7-8 | | 8-9 | | 9-10 | | 10-11 | |
	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP	(n)	CP
1	19	99	40	30	42	36	38	26	4	25	28	17	22	34
2	27	1	24	45	21	49	27	51	18	50	27	45	27	31
3	27		15	20	12	14	18	14	26	16	19	27	18	16
4	18		14	4	12	1	9	8	23	9	13	9	17	10
5	7		4	1	8		3	3	14		9	2	9	6
8	2		1		6		3		9		1		3	3
7	2		1		1		1		3		1		2	
8			1				7		4		1		2	
9									1		1			

RESULTS IN CEREBRAL PALSIED:-

In the cerebral palsied population, pre-dominantly 1 & 2 word utterances prevailed with reduced production of 3, 4 & 5 word utterances. Even with increasing age, however, the cerebral palsied children very rarely used utterances containing more than 4 words.

As with MLU a comparison was made within the 3 higher age groups (Table 8). A distribution of the number of words in utterance used by these 6 subjects provided in table 8. Subjects S6 and S8 with mild muscular involvement showed a greater frequency of usage of 4 word utterances as compared to S5 and S7 with moderate muscular involvement. Thus, frequency of occurance of single and multiple words was found to vary depending on severity.

TABLE. 8. - DISTRIBUTION OF WORDS PER UTTERANCE IN CEREBRAL PALSIED. SUBJECTS S5-S10

	S5	S6	S7	S8	S9	S10
1 WORD	21	31	21	12	57	11
2 WORD	56	43	55	35	41	20
3 WORD	19	12	20	33	2	29
4 WORD	5	14	3	15	-	20
5 WORD	1	-	1	4	-	11
6 WORD	-	-	-	1	-	7
7 WORD	-	-	-	-	-	1
8 WORD	-	-	-	-	-	1

A similar finding was observed in the age range of 10-11 years when comparisons were made between S9 and S10. S9 typically showed increased frequency of occurance of singlewords (57 in 100) when compared to S10 (11 in 100). The longest utterances produced by S9 had 3 words only, whereas S10 produced utterances which contained 5-6 words also.

COMPARING NORMALS AND CEREBRAL PALSIED: -

The normals and cerebral palsied group were compared in terms of single and multiple word uterances. The comparisons are presented graphically (Graph 3). As observed from the graph, the frequency of usage of multiple word utterances in normals show slow decline, whereas in the cerebral palsied population, there was abrupt fall in Usage of multiple word utterances. This trend is seen across ages also, although number of multiple word utterance appear to increase at the later ages. The frequency of production of these utterances remains poor in the cerebral palsied as compared to the age-matched normals. This in consonance with Singer's (1981) finding that cerebral palsied children spoke less during a given unit of time. The same was also reported by Shyamala (1987).

GRAPH-3: Distribution of words per utterance in normal and cerebral palsied children.
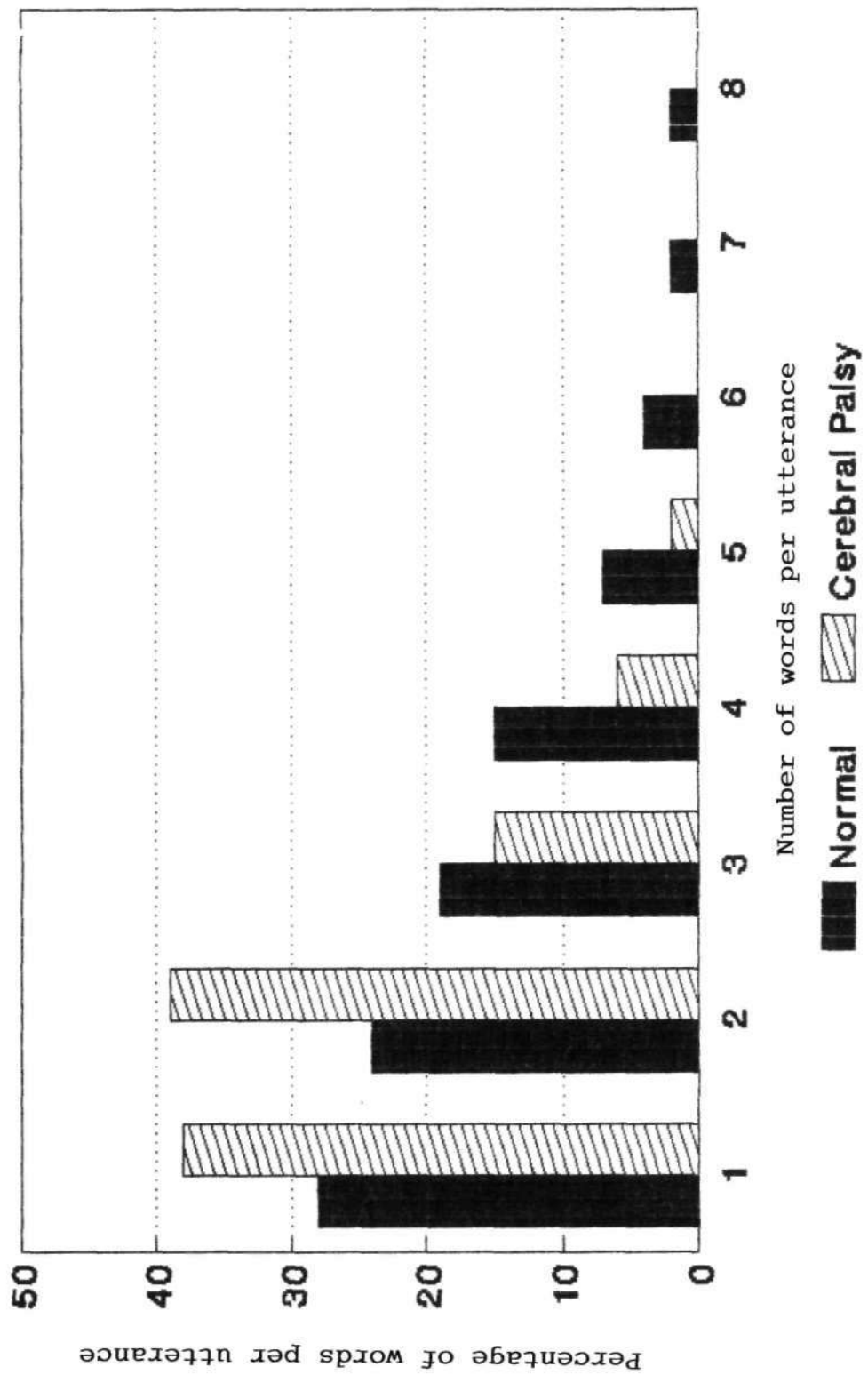
The results in distribution of single and multiple word utterance revealed the following:-

i. The frequency of occurance of multiple words was extremely low in cerebral palsied when compared to normals. This again is marked across all age groups. The cerebral palsied children , by rule, produced shorter (single word- two words) utterances when compared to normals. This was true across all age groups.

Based on the results obtained from the 3 subsections demonstrating syntactic complexity, it is evident that cerebral palsied children do indeed use syntactically simple constructions when compared to the normal group.

SUMMARY AND CONCLUSIONS

The present study was aimed at describing the mean length of utterance and syntactic complexity in the cerebral palsied children, a group of children with neuromuscular involvement due to CNS dysfunction. 20 normal children and 10 cerebral palsied children were considered in the age range of 4-11 years. All the children had average or above average intelligence and normal hearing. They came from a middle socio-economic background. In the cerebral palsy group, 8 spastics and 2 athetoid were studied. A language sample consisting of spontaneous and narrative/elicited utterances was recorded from each of these 30 children. 100 such utterances were transcribed with broad 1PA transcription and analysed for mean length of utterance and syntactic complexity. Mean length of utterance was calculated for both words and marphemes - syntactic complexity was assessed by considering the order and frequency of different lexical categories, arrangements of these lexical categories in the utterances and the number of single and multiple word utterances.

The following conclusions were arrived at from the results:-

1. MLU proved to be useful as a gross indicator of the language disordered group (cerebral palsy) as compared to normals. It was specially useful when supplemented with information regarding syntactic description in both normals and cerebral palsied.

2. MLU for words and marphemes was significantly reduced in the cerebral palsied population when compared to normals.

3. Syntactic complexity in the cerebral palsied population showed a quantitative and qualitative change as compared to a normal group.

4. There appeared to be differences between the two types of cerebral palsied - Spastic and athetoid as is evidenced from comparison in the 10-11 years age group.

5. Severity of the cerebral palsy could have a detrimental influence on language skills of the cerebral palsied children.

6. Age does not emerge as a definite variable for the language skills in the cerebral palsied population. In other words there is no improvement observed in language skills with increasing age.

Limitations of present study: -

1. The number of subjects in the disordered population was limited due to restrictions of time, stringency of criteria specified, lack of adequate subjects in the specified population and descriptive nature of the study.

2. Other variables in the study was not controlled such as type of cerebral palsy, severity, etc. due to the same reasons.

Further studies considering larger number of subjects considering variables such as severity, type of cerebral palsy, etc. would yield a greater frame of information. This type of studies are warranted to supplement the dearth of literature regarding language characteristic in this population and also to provide information about the abnormalities of language characteristics when compared to normal group.

SIGNIFICANCE OF THE STUDY

The present study gains significance from the fact that it is the first attempt of its kind to describe language samples of normal and language disordered children qualitatively and quantitatively and to provide estimates of the differences in these two groups. The procedure used in this study does not rely on formalized testing to arrive at the language profiency of the child, rather it does away with overreliance on results of tests for language assessments and uses language sampling procedures to arrive at a linguistic repertoire. It also provides guidelines to assess normals and disordered populations and could aid in developing norms to assess these populations. The present study also adds to findings in literature on the language assessment in cerebral palsied children.

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APPENDIX

RULES FOR COMPUTATION OF MEAN LENGTH OF UTTERANCE [MLU]

(1) The first 100 utterances were transcribed. Utterance during story narration was mandatorily included in the count.

(2) Unintelligible or partially intelligible utterances were omitted from the count.

(3) Stutterings (Mark by repeated effort) at a single word) and all repetitions were counted as one word. Repetition for emphasis should be counted as two words.

(4) Fillers such as mm or oh are not counted, but no, yes etc. were counted as words.

(5) All compound words were counted as two words if the child used the constituent morphemes separately in two different linguistic context - Eg.Birthday.

(6) All inflections (possession, plural, tenses) were counted as separate morphemes.

(7) Imitations and elliptical answers to questions which gave the impression that the utterance would have been more complete if there had been no eliciting questions (Eg.   What is that? 'My box'
were counted.

(8) Rote passages such as nursery rhymes, songs or prose passages which have been memorized and which may not be fully processed linguistically by the child were omitted.

(9) All partial utterances which are interrupted by outside events or shift in child's focus were excluded.

(10) MLU was calculated using the following formula:

MLU (W/M) = $\dfrac{\text{Number of words/morphemes}}{100}$