

**SPEECH AND LANGUAGE BEHAVIOUR  
OF THE  
CEREBRAL PALSIED**

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THESIS SUBMITTED TO THE UNIVERSITY OF MYSORE  
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN  
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A Thesis submitted to the University of Mysore  
for the degree of Doctor of Philosophy in  
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To  
The Memory  
of my Father

## D E C L A R A T I O N

I do hereby declare that the thesis Speech and Language Behaviour of the Cerebral Palsied, which I am submitting for the degree of Doctor of Philosophy in Speech and Hearing of the University of Mysore is the result of the work carried out by me under the guidance of Dr.M.S.Thirumalai, Professor-cum-Deputy Director, Central Institute of Indian Languages, Mysore.

I further declare that this work has not been previously submitted for any degree either in this or any other University.

CANDIDATE

C E R T I F I C A T E

I hereby certify that the research for the thesis entitled Speech and Language Behaviour of the Cerebral Palsied submitted by Miss Shyamala K.C. for the award of the degree of Doctor of Philosophy in Speech and Hearing of the University of Mysore was carried out at the Central Institute of Indian Languages, Manasagangotri, Mysore 570 006, under my guidance and supervision during the period from February 1982 to April 1987.

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Candidate

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## CHAPTER I

### INTRODUCTION

#### **1.1. Cerebral Palsy**

Cerebral Palsy includes a group of disorders constituting mainly motor dysfunction due to damage to the central nervous system during pre-natal, para-natal or early post-natal period. This childhood group of disorders is presented with a variety of clinical entities. The disorder creates a puzzling plethora of encounters in terms of physical (motor), self help, cognitive and speech and language skills, hindering and/or arresting the normal development of the child. This is often debilitating the parents and educators as well. In the clinical set up, this symptom complex creates a set of problems to the speech pathologist in terms of the management of the patient's speech such as the articulation, voice, prosody and fluency aspects of speech and linguistic ability including phonology, morphology and syntax. No clinician can ignore the tremendous influence these defects have on the communication ability as also on the all round growth of the child. However, the extent of the problems posed by this group and the exact nature of these deficits are still obscure. Only very few efforts have been made (almost none in terms of speech and language), so far in the Indian context to explore the communicative ability of these children.

## 1.2. Need for the Study-

As will be seen in the review of literature in Chapter 2, there is very little description of the language of the Cerebral Palsied while there are only a few studies on their speech characteristics. There are also a number of evaluative tools which aim at the assessment of characteristics of Cerebral Palsy including speech and language. All the studies, however, have implied on the certainty of the presence of speech and language impairment in Cerebral Palsy. It appears from the survey that the language characteristics of the Cerebral Palsied child have not received much independent attention. The few studies on the speech of Cerebral Palsied child focus more on the dysarthria and intelligibility than on the specific characteristics of individual languages at all their levels. In other words, studies such as those dealing with the phonological characteristics (a few studies found in this regard are not detailed enough to deal comprehensively with the phonology of the language of the Cerebral Palsied), morphological characteristics, syntactic characteristics, etc., are conspicuous by their absence. This is more obvious when we consider the need for cross-cultural information that will not only enhance the validity of findings of studies in English and other European languages but give greater insight into the intricacy of the disorder vis-a-vis languages involved. There are only very few such studies on Cerebral Palsy and these works are by Irwin (1955, 1956, 1966, and 1967), Myers (1965) and Singer (1976).

In contrast, the language of the aphasic child, autistic or the schizophrenic child has received more pointed attention. Study of the speech and language in the Cerebral Palsied as applied to Indian languages is practically absent.

The present study is intended to investigate the phonological, morphological and syntactic aspects of the speech and language of the Kannada (a Dravidian language of south India) speaking Cerebral Palsied children.

### **1.3. The Present Study and its Organization**

The present study is the first investigation of speech and language deficits of Cerebral Palsied children in the Indian context. Nine Cerebral Palsied children under two categories of Cerebral Palsy, namely, Spasticity and Athetosis, were selected. All these children spoke Kannada as mother tongue and lived in a Kannada speaking environment (Mysore or Bangalore cities of Karnataka State, India). This study investigates the speech proficiency of the Cerebral Palsied children in terms of certain linguistic and para linguistic features in terms of phonology, morphology and syntax. The age, sex, intelligence, type of neuromuscular disability and severity were duly considered. Thus, the subjects were from two categories of Cerebral Palsy, namely, Spasticity and Athetosis. The topographical factor, namely, quadriplegia, was maintained common for both the groups. Six Spastic and three Athetoid children ranging in age from four to ten years were studied (mean age 7 years). There was one female in each group. The

degree of severity was 'moderate' as rated by the neurophysician. All the children belonged to middle socioeconomic group. All the subjects had normal hearing and were of average intelligence as tested by an audiologist and a psychologist respectively.

The present thesis is organized as follows:

### **Chapter I Introduction**

The present chapter gives a brief essay on the nature of the childhood disorder, its implications for the study, the need for the study, and its organization.

### **Chapter II Review of Literature**

This chapter gives a detailed and critical review of available literature including a variety of topics relevant to the present study. A summary of findings from literature and the hypothesis for the present study are also presented.

### **Chapter III Methodology**

A description of the procedures adopted for the selection of subjects, collection of data and tests, methods of study and the steps used in analysis of the subject data are given in this chapter.

### **Chapter IV Results and Discussion**

The data is analyzed and the results are discussed under three parts. Part I gives the description of the linguistic and paralinguistic features found in each of the nine

patients studied. Part II consists of two sections. Section I presents the general speech and language characteristics of spastic subjects as found in the study and Section II presents the general speech and language characteristics of athetoid subjects of the study. Part III gives a comparison of speech and language of the two patient groups, namely, Spastics and Athetoids, as found in the study. Thus, in this chapter, an attempt is made to describe the individual speech and language behaviour of the Cerebral Palsied children and to present the intra and inter-group comparison in terms of speech and language patterns of the subjects studied.

#### **Chapter V Summary and Conclusion**

This chapter gives a summary of the results of the study.

These chapters of the dissertation are followed by References and an Appendix.

## CHAPTER II

### REVIEW OF LITERATURE

#### 2.1. Introduction

Cerebral Palsy is a complex and multidimensional childhood disorder. The multidimensional nature of the disorder is glanced at in the following review of literature. Our intention here is to give an introduction to the disorder, focusing more on the speech and language characteristics of the Cerebral Palsied that have a direct relevance to the present study. Brief but direct reports of the research studies available in the literature are presented below. This chapter includes the various definitions of Cerebral Palsy found in the literature, classifications of Cerebral Palsy, diagnostic aspects, associated problems, speech and language assessment, and description of speech and language characteristics of the Cerebral Palsied. In addition, this chapter also presents a brief note on the associated problems in Cerebral Palsy and the oral vegetative activities in Cerebral Palsy.

There are very few Indian studies available on this topic; linguistic studies are almost non-existent compared to the magnitude and diversity of the problem and its wide prevalence in India. However, an attempt is made here to cite these studies and discuss them if only to focus upon the need for intensive studies on Cerebral Palsy in India.



## 2.2. Definitions of Cerebral Palsy

Cerebral Palsy is one of the well attested impairments in human history. It was first described more elaborately by Little in 1862. Phelps coined the term Cerebral Palsy in 1936. The word 'Cerebral' indicates a condition related to the head and the word 'Palsy' refers to a disturbance of the muscles and joints. An individual with Cerebral Palsy is physically disabled, primarily because of faulty links between the brain and parts of the body. Characterization of Cerebral Palsy (or "Little's disease" as known previously) comes from diverse disciplines such as physiotherapy, occupational therapy, speech therapy, neurology, orthopaedics and the like. Some of the definitions are as follows.

Bobaths (1954) viewed Cerebral Palsy as a sensorimotor disorder which was not one condition, but a group of conditions occurring as a result of abnormal brain development or brain damage. Cruickshank and Raus (1955) regarded Cerebral Palsy as one component of a broader brain damage syndrome comprised of neuromotor dysfunction, psychological dysfunction convulsions and behaviour disorders of organic origin. Abbott (1956) defined Cerebral Palsy as a disorder of neurological disability caused by a lesion in the motor centres of the Brain. This brain damage resulted not only in a loss of functional muscular control but also in sensory disturbances. For Perlstein (1961) the term Cerebral Palsy had no specific meaning but it generally indicated some injury or damage to a

person's brain which resulted in a difficulty in control of movements. He defined CP (Cerebral Palsy, hereafter referred to as CP frequently) as a condition characterized by paralysis, weakness or non-coordination or other aberration of motor function due to pathology in the motor control centres of the brain. According to Westlake (1961) CP was not a single type of neuromuscular disorder but a group of disturbances occurring as a result of involvement of cortical or subcortical motor control areas. Boone (1972) defined Cp as a motor dysfunction secondary to central nervous system damage to the organism before, during or shortly after birth. (To a physiotherapist, Cerebral Palsy is a neuromuscular disability caused by non-progressive lesions in the motor centres of the brain Chainani, **1971**)

These definitions of Cerebral Palsy generally agree with each other and share three common features: the cause of the disorder is brain pathology, the brain damage occurring early in life in young or yet to develop central nervous system; the disorder is a complex set of symptomatology and not a, single disability; and the major symptoms are those of motor dysfunction.

In addition, definitions of CP should account for the extreme variability of the disorder in that some Cerebral palsied individuals may present a very mild single disability while many others may suffer from any combination of disabilities of physical and psycho-behavioural nature. The

improvement may be detected only as a mild loss of fine muscular control or as a severe multifacet problem involving head and trunk ability, limbs, hearing, vision and speech. This neurological disability can affect the overall behaviour including both receptive and expressive abilities (Berry and Eisenson, 1962). The neuromuscular manifestations may be regarded as the most obvious symptom of CP, but other symptoms of mental retardation, abnormal speech and language development, disorders in sensory perception (auditory, visual, etc.) and behavioural manifestations such as distractibility, hyperactivity, etc., must also be taken into account by a clinician (Berry and Eisenson, 1962; Boone, 1972). Thus complexities of the problem include all the basic and higher functions, namely, neuromuscular, psychological, sensorimotor and behavioural abilities.

### **2.3. Classification**

To classify the various manifestations of CP into watertight categories is rather extremely unrealistic since, generally speaking, manifestations share more than one definite feature. Generally based on the type of neuromuscular disability, three major categories are identified: (Berry and Eisenson, 1962).

Spasticity

Athetosis

Ataxia

The details of these are given later.

There is also a great deal of evidence that neurological characteristics may change as the nervous system matures from birth to adolescence (Denhoff and Robinault, 1960). Considering these the nomenclature and classification committee of the American Academy of Cerebral Palsy (AACP) formulated the following classification and descriptions. The classification includes physical characteristics, topography, etiology as well as supplemental handicaps and the functional capacity of the patients (Denhoff and Robinault, 1960):

### **1. Physiologic (Motor) Classification**

- A. Spasticity
- B. Athetosis
  - (i) Tension Athetosis
  - (ii) Non-tension Athetosis
  - (iii) Dystonia
  - (iv) Tremor
- C. Rigidity
- D. Ataxia
- E. Tremor
- F. Atonia (rare)
- G. Mixed
- H. Unclassified

This categorization is based on neuromuscular symptoms of the disorder. A brief description of the above

categories as given by AACCP is given below.

#### A. Spasticity

Spasticity is characterized by a lower threshold of the stretch reflex, an enlarged reflexogenic area, augmented responses with clonus and an abnormal electromyographic record. The pathologic stretch reflex must be present to make a diagnosis of spasticity. There is a tendency towards greater involvement of contractures, affecting the antigravity muscles.

#### B. Athetosis

Athetosis is characterized by an abnormal type and amount of involuntary motion, normal reflexes, normal electromyographic findings, uncontrolled, involuntary and non-coordinate motions with varying degree of tension. Several clinical types are also identified and a few of them are described below: -

##### (i) Tension Athetosis

This is a state of in-constant muscular straining, hiding the true nature of athetosis which could be of the rotary, remor or dystonic type.

##### (ii) Non-tension Athetosis

Non-tension athetosis is a transient state which in infancy is often mistaken for the rare atonic type of athetosis

(both tension and non-tension categories are highly tentative classifications).

**(iii) Dystonic Athetosis**

Dystonic Athetosis is a state in which distorted positions involving neck, trunk and limbs are held involuntarily for periods varying from a few seconds to a few minutes

-It

**(iv) Tremor Athetosis**

Tremor Athetosis involves irregular and uneven involuntary contraction and relaxation which involves flexor and extensor, adductor and abductor mechanisms ( which is usually tremor like and not a true tremor).

There are several clinical types of Athetosis which are not wholly acceptable to all the members of the AACP. Some of these clinical types are Rotary Athetosis, Shudder Athetosis, Flailing Athetosis, Hemiathetosis, Deaf Athetosis, Balance-release Athetosis and Emotional-release Athetosis types. For a description of these, see Denhoff and Robinault (1960).

**C. Rigidity**

This is a disturbance of the agonist and antagonist relations with resistance to slow-passive movement of both muscle groups. If the resistance to passive motion is

continuous, it is referred to as the lead-pipe rigidity; if discontinuous, as cog-wheel rigidity. The resistance is offered in greater proportion to slow rather than rapid motion, whereas, in Spasticity there is greater resistance to rapid motion. In rigidity, total motion may be decreased. The main characteristic is hypertonicity, normal or diminished reflexes, no clonus, no stretch reflexes and no involuntary motion.

#### **D. Ataxia**

Ataxia is primary incoordination due to disturbance of kinesthetic or balance sense or both. Characterized by disturbance in the sense of equilibrium, dyssynergias, asteriognosis and disturbance of depth perception. Atonia or hypotonia (reduced tone of the muscles) may be present.

#### **E. Tremor**

Uncontrollable, involuntary motions of a rhythmic, alternating or pendular pattern due to alternate agonist and antagonist contractions. These tremors may be intentional, non-intentional or constant.

#### **F. Atonia**

Lack of tone and failure of muscles to respond to volitional stimulation. The muscle lacks the firmness of the normal relaxed muscle. Weak stretch reflex may be obtained as also the increased deep reflexes. The absence of involuntary movements differentiates this type from non-tension Athetosis.-

A scrutiny of these motoric categories alone reveals that these categories are not definitive either with respect to the behavioural manifestations or the loci of the neural aberration. One needs to go into the other types of classification as well.

## **2. Topographic Classification**

This is a categorization system based on morphology of the parts of the body involved, limbs in particular. This is also based on the manner in which the symptoms are distributed throughout the body. According to this type we have the following.

- (i) Monoplegia where the motor symptoms (spasticity or athetosis, or any other) are present in only one limb.
- (ii) Paraplegia which includes involvement of legs only (spastic or rigid types usually).
- (iii) Hemiplegia where one side of the body is affected, usually spastic, and occasionally athetoid.
- (iv) Triplegia including involvement of three extremities, more often both legs and one arm, Usually spastic.
- (v) Quadriplegia (tetraplegia) involves all four limbs where legs are most involved, usually spastic; with greatest involvement in arms, usually dyskinetic including athetoid.



- (vi) Diplegia referring to paralysis affecting like parts on either side of the body, i.e., bilateral paralysis.
- (vii) Double Hemiplegia where arms are more involved than the legs. Usually spastic in type.

### **3. Etiological Classification**

Etiological classification is based on the time of the occurrence of brain damage to the young child. The classification is done along three stages: Prenatal factor, Paranatal (during birth) and Postnatal factors. Provision for both hereditary and acquired brain lesions are made. Under each of these three categories the syndromes of cerebral dysfunction are identified. Prenatal factors include hazards occurring in early states of embryonic development. Some of these frequent causes include infections and metabolic diseases like toxoplasmosis, severe anaemia, and German measles. Paranatal causes are those conditions that result directly from the process of birth delivery. Cerebral anoxia, subdural haemorrhage are two of these. Post natal factors include one mechanical injury, circulatory defects, infectious diseases, toxic states and neoplasms. For a detailed description of these see Denhoff and Robinault (1960).

### **4. Supplemental Handicaps**

The supplemental categorization includes the excerpts of psychologic evaluation, description of physical status, convulsive seizures, posture and locomotive behaviour patterns,

eye-hand coordination patterns, description of visual and auditory statuses. The details are not dealt with here.

## **5. Functional Capacity**

The categorization based on the functional capacity of the patient deals with the severity of the problems. It includes the following:

Class I Patients with CP with no practical limitation of activity.

Class II Patients with CP with slight to moderate limitation of activity.

Class III Patients with CP with moderate to great limitations of activity.

Class IV Patients with CP unable to carry on any activity of physical nature.

## **6. Therapeutic Categorization**

The therapeutic categorization considers the extent of therapeutic efforts required.

Class I Patients with CP who do not require any treatment,

Class II. Patients with CP who need minimal bracing and minimal therapy.

Class III Patients with CP who need bracing and require the services of a CP team.

Class IV Patients with CP with the severity to such a degree that they require long term institutionalization and nurture.

Although it is not clear as to how specifically and narrowly a CP individual can be categorized along these, it is understood that a patient can be evaluated against all these classifications and a profile and a descriptive classification obtained.

While this classification given by the American Academy of Cerebral Palsy is widely accepted, there are other classifications reported. Two such classifications are given below...

Ingram (1955) classifies Cerebral Palsy into

- (i) Hemiplegia
- (ii) Double Hemiplegia
- (iii) Diplegia - hypotonic, dystonic, rigid and spastic
- (iv) Ataxic Diplegia - hypotonic, spastic
- (v) Ataxia - cerebellar, vestibular, and
- (vi) Dyskinesia - dystonic, choreid, athetoid and tremor.

Another way of classifying the symptomatology is a combined approach of the two systems motoric and topographical. This system classifies CP according to both its distribution and function (Crickmay, 1966). Thus, according to this way of classification, one could have groups such as "Spastic Diplegia"

wherein spasticity is present only in the two upper limbs, "Spastic Quadriplegia" when all the four limbs are affected by spasticity or "Spastic Right Hemiplegia" when the right half of the body is affected by spasticity. Similar to this is also the categorization of Athetosis and Ataxia. This system seems to be an extension of the AACP classification on a smaller scale and appears feasible for functional purposes. While this being so, the earlier classification does not allow a comparison over the other classifications since correspondence in several cases is not achieved.

#### **2.4.        Diagnosis**

Early diagnosis of CP is usually stressed since the all round development of the child is going to be affected if the problem is not detected and the child rehabilitated as early as possible. The diagnosis is the confirmation that the apparent motor symptoms are a result of the damage to central nervous system. The symptoms of motor dysfunction are observed by parents and/or paediatricians in the young infantile stage itself. The confirmation of motor dysfunction due to brain damage is done by the neurologist/neurophysician. The physician places emphasis on obtaining a detailed history of prenatal, paranatal and post natal events that may have contributed or been causal to the disorder. She may require neurological diagnostic tools such as electroencephalogram (EEG) or pneumoencephalogram (PEG) to determine if the child has some kind of a static, non-progressive lesion or not

(Boone, 1972). At present the possibility of the addition of CAT Scan, Dop Scan and the like would be more contributory towards such a diagnosis in the present day context. Attempts are made by the neurologist/physician to locate the site of lesion as determined by the neuromuscular symptoms and by other neurological aids and to classify the type of the problem as CP and as the spastic, athetoid or ataxic type and the like. Additional diagnostic evaluation is made by the diagnostic staff such as the speech-language Pathologist, Audiologist, Psychologist, Physiotherapist, Occupational Therapist, and Otolaryngologist. Various diagnostic tools are employed along With systematic observation to derive the exact picture of the child's auditory comprehension, linguistic competence relative to the child's native language, articulatory ability, vocal and prosodic efficiencies/deficiencies. The audiologist tests the auditory proficiency; the Psychiatrist or the Clinical Psychologist evaluates the child for his abilities for attention, memory, general emotional ability, his/her perceptual abilities and intelligence for both verbal and non-verbal performance. He/She will also recommend the remediation procedures for decreasing the behavioural problems like distractibility, hyperactivity and increasing capacities for memory function, increasing attention span etc.; the Physiotherapist evaluates the patient's posture, stability and locomotion. He/She tests the head and trunk efficiency, walking abilities and comfortable postures. He/She also prescribes adequate physiotherapy for increasing the child's

balancing ability and postural comfort. The occupational therapist examines the patient's abilities along the daily activity skills such as feeding self care, dressing, and the like. The Otolaryngologists and Ophthalmologists evaluate the ear, nose, throat functions and vision respectively and prescribe corrective treatments. The habilitation of a Cerebral Palsied individual necessitates a team action of the various disciplines to enable and restore the afflicted individual to his maximum potential for normalcy.

## **2.5. Associated Physical Problems of Cerebral Palsy**

The problems other than the motor dysfunction are many in a Cerebral Palsied individual. These problems have to be taken into consideration in a comprehensive approach to the rehabilitation of the individual. Some of these problems are the direct consequences of the brain pathology that also cause the basic motor dysfunction and some are the results of abnormal sequence of events which accompany the neuromuscular problems. These problems are briefed from Boone (1972).

### **1. Epileptic Seizures**

These are due to excessive neuronal discharge of the cortex which may then spread to involve the entire cerebrum. The seizures, especially the grand mal and petit mal types are more common among spastic type of Cerebral- Palsy since the abnormal, neuronal gray matter discharge is of higher cortical type. Anticonvulsent drugs are utilized to control the occurrence of seizures.

## **2. Orthopaedic Surgical Problems**

The Cerebral Palsied child will have to undergo several procedures for corrective surgery in his early developmental period. The surgical procedures include those for restoring muscle function (such as lengthening the muscle) and those for bone stabilization (such as fusion of a joint). The surgical procedures may be many, depending on whether the presenting problem could be corrected by physiotherapy and/or bracing.

## **3. Bracing**

Braces are used primarily to correct and prevent posture deformities, to support and reinforce the weak skeletal structures, and to control unwanted competing movements. The child with spasticity may be braced with leg and arm braces to correct and prevent the deformity of excessive contracture as well as keeping the extremities in relative extension. A control brace may be used for an athetoid consisting of a long leg brace with pelvic band, a back brace, and shoulder straps, to maintain postural stability.

## **4. Visual Problems**

Visual defect is a commonly observed problem in the Cerebral Palsied. Various defects such as diplopia, nystagmus, strabismus may be present. Hemianopia may be seen in an hemiplegic. Ophthalmologic evaluation is imperative in the rehabilitation programme since visual problems are commonly seen problems with Cerebral Palsy.

## **5. Hearing Deficits**

Hearing problems are also reported to be found more among Cerebral Palsy than in normal population. According to Rutherford (1945), 40% of Cerebral Palsied suffer from hearing loss. This is more true of the Rh athetoid type ( in which Athetosis is accompanied high frequency hearing loss due to kernicterus, an abnormality due to Rh incompatibility) than any other. However, it is observed that the hearing defects are more of auditory perceptual nature than those of auditory acuity. As is the ophthalmic examination, the otological and audiological evaluations are beneficiary.

## **6. Oral, Nutritional Problems**

Oral feeding control is a problem in most moderate to severely impaired Cerebral Palsied children. Because of their poor oral control, food intake becomes a problem and more food is wasted (they push out or spit out) than they could chew and swallow. Hence malnutrition is a frequently observed problem. Hence oral control in the form of enhancing oral closure, chewing, swallowing, etc., should be worked on to facilitate better feeding habits.

### **2.6. Psychological and Behavioural Problems**

These can also be identified as being direct consequences of brain pathology or acquired psychological deficits due to the pathology itself. These sensori-perceptual deficits and intellectual retardation fall into the former category



whereas the behavioural problems like hyperactivity and distractibility fall into the latter type (Boone, 1972).

### **1. Mental Retardation**

The intelligence tests employed with normal population may be penalizing to the Cerebral Palsy group because of their motor deficits, sensori-perceptual deficits and lack of normal emotional experience. Moreover it is very difficult to control and separate the above factors in order to isolate intellectual effects of cerebral lesion. The Terman-Merrill intelligence scale has been used with modifications to suit the group and it has been found reliable (Schonell 1958). About 25-35% of these children are found to have normal to superior intelligence v/hereas the rest present an IQ of below normal (Boone, 1972). However, the tests have to be administered with caution. Likewise the results have to be also interpreted with caution. The intellectual capacity of a CP child is found to vary across assessments and it should not be viewed as a static predictable entity but as a changing ability requiring continuous assessment over a period of time. This, we feel, could be because of the performance factor and skill involved in the intelligence tests commonly administered. In a CP child the motor performance is found to vary greatly because of the physical disability that is unstable in its symptomatology itself. In India, lately there is greater awareness of this fact and tests like Raven's Progressive Matrices, Leiter International Performance Scale and Columbia Mental Maturity '

Scale (Allen and Collins, 1955) which do not rely on the motor performance of the patient tested are being used in institutions like All India Institute of Speech and Hearing, Mysore, National Institute of Mental Health and Neurosciences, Bangalore.

## **2. Sensori-Perceptual Problems**

The sensory faculties of touch, kinesthesia, proprioception, hearing, vision and olfaction may be impaired in CP. Perception may be viewed as a process of organizing the incoming sensory stimuli into some kind of meaning, an intermediate stage between sensation and cognition. What a CP child perceives may be realistic to him in the sense that his reaction is consistent with his faulty sensory impressions which explain the inappropriate response for the testing. Many Cerebral Palsied patients may present figure-ground problems (problems with differentiating between foreground and background perceptually, and visuomotor problems (inability to perceive visual stimuli and translate it into motor activity). Some of the other problems reported are inability to shift to abstract forms of behaviour, sticking on to more concrete levels with a greater tendency towards stereotyped predictive responses (Cruickshank and Raus 1955, and Boone 1972). These perceptual problems may create many behavioural problems such as distractibility and hyperactivity which are actually results of sensory disorganization of the input and lack of normal perceptual skills. Frostigs Developmental Test of Visual

Perception is found useful with CP children for testing their eye-hand coordination, figure-ground perception, perception of form constancy,- perception of position in space, and perception of spatial relationships (Boone, 1972).

### **3. Poor Self Concept**

Impaired self-concept is one of the serious problems encountered in a CP child who is constantly experiencing physical disability. This comes in the **way** of developing normal interpersonal relationships. Many normal responses like smiling can be interpreted by the handicapped child with a poor self-concept as derogatory. Hence, encouraging normal development of self-concept is an engaging task in the rehabilitation of CP patients.

### **4. Hyperactivity .**

A frequently seen problem of hyperactivity is a gross, random and excessive motor reaction to the environment which is an extreme stress reaction to an inability to achieve selective focus of attention (Mecham, Berko and Berko, 1966). The child is unable to organize his perception of the sensory information and therefore reacts by a constant, aimless motor reaction to all stimuli. . If the child is ambulatory, he is in a constant frenzy of activity with no specific purpose or exploration. If he is non-ambulatory constant wriggling and writhing are seen. Tranquilizers are employed to reduce certain amount of hyperactivity and muscle relaxation techniques are also found useful.

## 5. Distractibility

Distractibility is lack of or poor span of attention towards any one particular stimulus and there is a frequent shifting of attention from one stimulus to the other. Any novel stimulus in spite of its irrelevance may attract the child's attention and therefore he/she is flittering constantly with the attention focus being enormously reduced to a meagre second. This fleeting attention can be due to poor figure-ground perception where the child cannot select one stimulus from a broader array of stimuli which compete with each other for the child's focus of attention. Operant procedures have been found useful in increasing attention span and confusion can be reduced by limiting the number of sensory stimuli in the environment.

### 2.7. Common Clinical Types of Cerebral Palsy

Among the various sub-categories of CP, the three most common and frequently found in their order of occurrence are Spasticity, Athetosis and Ataxia (Berry and Eisenson, 1962). In the following pages, a detailed description of these three clinical types is made since they are directly relevant to the research presented here. The description is based on an appraisal of several works such as Crickmay (1966), Berry and Eisenson (1962), Boone (1972), Pohl (1950), McDonald and Chance (1964) and many others. The description concentrates on the localization of brain pathology, the major motor and

neuromuscular symptoms. The speech characteristics, as they are found in the literature, will be described in a later section.

### **1. Spasticity**

Spasticity results from a lesion in the pyramidal tracts arising from the primary motor area in the frontal lobe of the cerebral cortex. The later research (Berry and Eisenson, 1962) indicates that the pathology for this defect can occur at other sites as well, viz., the extrapyramidal region, the pre-motor area, the striate bodies, basal nuclei, midbrain and pons, on the extrapyramidal circuit.

In spasticity, there is a release of the postural stretch reflexes from central inhibition and exaggerated muscle tone due to increased excitation from other neural areas and there is an interruption of normal phasic muscle responses. The alternative contraction and relaxation is emphasized by the disturbed sequence of tensor and flexor responses of muscles. When a movement is attempted, the resistance to movement by the antagonists which are normally inhibited increases enormously and prolonged involuntary muscular spasms are created. Normally the central governors in the CNS select, time and grade contraction of muscles and in spasticity this ability is lost and therefore there is an exaggerated responses to all stimuli (Magoun and Rath, 1947).

Typically this syndrome is characterized by exaggerated contractions of muscles subjected to stretch (stretch reflex),

. clonic movements constituting alternating contractions and relaxations and increased resistance to movement. The muscle tone may vary from a mild degree to an extreme rigidity depending on the exact site of lesion and the extent of the involvement of the extrapyramidal system. There is a loss of voluntary movements along with a return to a lower level of integration with primitive synergistic patterns of movement. Bobaths (1950) point out that basically all spastic patients show same abnormal postural patterns. For instance, if they are in a supine position they show strong extensor spasticity and if they lie in a prone position, a flexor spasticity is seen. In a spastic, the normal patterns of movement are replaced by a mass reflex action of muscles of either flexor or extensor type.

The spasticity may be mild, moderate or severe. In a typical picture of severe spasticity, the patient walks with a dysrhythmic, jerky gait, the legs turned inward, the knees adducted, the heel lifted from the ground, the arm flexed against gravity and the wrist and fingers flexed. In some mild cases the symptoms may be limited to strabismus droopy, hyperactivity and distractibility. In very mild cases the only diagnostic sign may be the 'extended' appearance of the fingers and rotation of the wrists in reaching for objects.

## **2. Athetosis**

Generally the extrapyramidal system is considered as the site of lesion in the athetoids. Some consider it to be

the basal ganglia. The areas and tracts covering the extrapyramidal system are, however, still undetermined and controversial (Berry and Eisenson 1962; McDonald and Chance 1964). Some authorities consider extrapyramidal system to be consisting of the extrapyramidal zone in the cerebral cortex, nuclei in the thalamus, midbrain, pons, and the fiber tracts connecting these areas and to join fibers with the pyramidal tracts mediating voluntary responses. Some add even cerebellum to these. The authorities (Ford, 1952; Berry and Eisenson, 1962; Denhoff and Robinault, 1960) conclude that the site and degree of damage to the extrapyramidal system would determine the specific characteristics of the motor behaviour of the athetoid. Hence the several sub-types previously mentioned.

Like spasties, athetoids also show the same abnormal postural patterns. They have involuntary movements which appear as a series of twisting and writhing movements progressing from proximal (in parts closest to the midline of the body) to distal (parts farther away from the midline of the body). They alternate abrupt and misdirected movements with the rigid postures of the spastic but the athetoid maintains these postures only fleetingly. These constantly changing postures, however, recur quite frequently and regularly. The fingers are generally hyperextended and abducted, the wrists flexed, the forearm bent forward so that the palm of the hand is down, the plantar part of the sole of the foot flexed and inverted. And the slow writhing movements are seen emphasized in hands and arms. These movements get aggravated by voluntary attempts

and when emotional. Bobath (1960) described three categories of these involuntary movements in athetosis, viz., (i) intermittent tonic spasms, (ii) mobile spasms and (iii) fleeting localized contractions. These are reported to be absent at sleep and minimized at rest. Athetoids exhibit a fluctuating muscle tone varying from hypotonicity to hypertonicity (range from extreme muscle flaccidity to extreme muscle tension).

Typically this syndrome is characterized by abnormal, slow and writhing, involuntary movements involving skeletal musculature. The muscle tone is usually increased but it is not constant and the muscles may have normal tone or may be even flaccid. Because of the varying muscle tone and type of involuntary movements, different clinical types of athetosis such as tension athetosis, dystonic athetosis, shudder athetosis etc., are produced. Hence a single clinical picture of athetosis is difficult to be formed and it is extremely unrealistic to do so (Karlin and Karlin and Curren, 1970).

### **3. Ataxia**

This kind of motor deficit is ascribed to lesions in the cerebellum and/or to the pathways which conjoin it with the cerebral cortex and brainstem. However, it has been found that it cannot always be ascribed to damage to one neurological area since athetoids can also be ataxic or ataxics can also have athetosis. Hence it is speculated that multiple lesions scattered over the cortex and the brainstem may involve the extrapyramidal system including cerebellum at many different



points (Berry and Eisenson 1962).

In terms of neuromuscular abilities, the symptoms constitute lack of equilibrium and coordination in voluntary muscle activity. The incoordination is found to result from an inability to integrate the components of direction, rate and force in the muscular synergy. In pure ataxia (which is, however rare) muscle tone is permanently reduced. In practice, ataxies fluctuate from hypotonicity to hypertonicity since they also share features of athetosis.

The localization of brain lesions is highly varying in all the three types of CP although there is a general opinion that the pyramidal system, the basal ganglia and cerebellum are the common sites of lesion in Spasticity, Athetosis and Ataxia : respectively. This extreme variation in terms of the etiology and consequently, the symptomatology throws light, we feel, on the difficulties to obtain a true clinical picture and that each case should be treated as unique in the clinical set up.

## **2.8. Speech and Language Assessment in Cerebral Palsy**

While the brain damage in CP causes the motor and neuromuscular problems, a variety of other deficits accompany CP, depending, upon the extent of the lesion. These myriad of problems in CP including sensory, perceptual, conceptual and behavioural systems hinder, delay or arrest the development of language, verbal or otherwise. The language problems may vary from mild to severe depending on the neuromuscular, psycho-

sensory and neurosensory impairments. Some of these problems may be due to the brain damage and its sequelae and some may be due to the lack of experience, the lack of interaction and environmental inadequacies with respect to the child's own handicap. In spite of the various kinds of speech and language disorders mentioned to be present in literature in association with cerebral Palsy, no clinical picture of language behaviour essentially characteristic of the disorder per se is reported. This could be attributed, at least partially, to the extreme variability and versatility of the disorder. In the following section a summary of the information pertaining to the verbal language evaluation found in the literature is given.

The multiphasic problem of CP necessitates the detailed and broader objectives for testing the language and speech proficiency than any other single pathology. The sequential, ontogenetic progression of anatomical, physiological and behavioural signs in normal children is a constant model against which a Cerebral Palsied child is compared. Thus, a knowledge of the normal development of speech and language is essential for a comparison at each level of the speech and language rehabilitation. The speech development in normal children from the undifferentiated vocalization to well constructed sentences and discourses is a widely documented area and we will not go into the details here. With several qualifications, one may say that normal speech and language develops by a step by step process and basically similarly in all normal children. In a CP child it is essential to investigate the stages of

. verbal development that the child has mastered, the stages that are not acquired, the probable causative factors leading on to the problem to delineate the processes and functions that need to be initiated and strengthened and to suggest the types and kinds of therapeutic interventions to improve the picture of speech and language proficiency (Lencione, 1966).

In the following section on evaluation of verbal language in Cp children, a general format based on the available works on the topic is adapted and references will be cited wherever they are absolutely necessary, otherwise a general consensus is indicated. It is worthwhile to note also that these basic evaluative procedures are the same as used in other pathological groups for speech and language.

### **2.8.1. Speech Assessment**

The evaluation of the child's performance in terms of speech, the verbal modality of language, is conducted by the following in the child's most comfortable position. If the child is moderately affected the assessment starts with the patient in a position in which he/she is comfortable or if he is severely affected, a side-lying position. The following are the important aspects tested (Crickmay 1966):

- (i) An assessment of the ability of the body parts associated with speech organs for movement. Generally the head, neck and shoulders are evaluated.
- (ii) Evaluation of the respiratory mechanism.

- (iii) Evaluation of the oral vegetative activities, viz., sucking, swallowing, biting and chewing which are the primary activities for speech production.
- (iv) Assessment of the speech organs in terms of the movement and purposeful function, namely, jaw, lips and tongue, i.e., articulation.
- (v) Evaluation of the ability to vocalize and produce speech, i.e., phonation.

Both the voluntary and involuntary movements with and without stimulation have to be tested along with an assessment of whether the responses are normal, pathological or primitive but normal. The above points are given in details below:

**(i) Head and Shoulder Movements**

One generally opts for an evaluation of head and shoulder movements in terms of whether they can be dissociated from each other. Voluntary dissociation of movement of the head from shoulders and that of shoulders from that of the head are checked. Shrugging of the shoulders, flexing of the shoulders (both on right and left side) raising and lowering the head, both in supine and prone positions, will have to be checked.

**(ii) Breathing or Respiration**

Since the ability to vocalize depends essentially on breathing patterns, the evaluation of breathing patterns is a :

'necessity. The brain damage that caused the neuromuscular deficiency affecting the oral, laryngeal and pharyngeal , muscles will have affected centres of respiratory regulation also. In normal quiet breathing inhalation and exhalation are alternating. But, for normal speech production, exhalation is greatly prolonged in relation to inhalation. This rapid inhalation and prolonged exhalation pattern is usually found to be disturbed in Cerebral Palsy. Such a deficit would produce a lack of synchronization of the diaphragm, abdomen and thoracic muscles.

Breathing patterns change over age and maturity. The breathing rates of young infants are extremely variable and they vary from 20-40 inhalations and exhalations per minute. And a child of 2 years will have this rate around 20. A rate of 30CPs would be considered abnormal for a child of this age (Boone, 1972). Besides, very young infants have predominantly abdominal breathing till 3 years of age when it changes over to thoracic breathing and thereafter it becomes a combined pattern of thoracic and abdominal pattern. The breathing rate reduces with age normally. Achilles (1955) reported several breathing abnormalities, viz., irregular cycling, ribflaring, thoracic-abdominal opposition (reversed breathing), shallow breathing, breathing interfered by athetosis and stertorous breathing. Among these irregular cycling, rib-flaring and reversed breathing are found in all types of CP but most commonly in athetoids. Reversed breathing' (depression of the upper chest during inhalation which is normal in first few months of life only)

is a common problem with CP children. This problem is seen to decrease when not talking and seen absent during sleep in such children. Besides the breathing pattern, the breathing rate also has to be considered for an appraisal. In CP children the breathing patterns and abnormal rate of breathing may be a cause for poor speech production. Too rapid a rate may preclude or distort vocalization and intelligibility in young and older children respectively. The CP child's ability to hold breath voluntarily, to dissociate head and bodily movements during breathing, whether it is a noisy or non-noisy breathing and the like have to be observed to discover his vocal potential.

### **(iii) Vegetative Activities**

#### **(a) Sucking and Swallowing**

The rationale for testing these is that such vegetative and voluntary functions are considered to be determinants of the physiological readiness for speech when these functions can be initiated voluntarily it is assumed that these movements can be learned for use in speech production.

Sucking is a reflex activity seen at birth and it can be inhibited by 4 months of life. In a CP child sucking has to be evaluated to find whether it is present as a reflex activity or whether it can be inhibited or initiated voluntarily. This is important since the more matured chewing reflex will not develop unless the child develops the inhibition of primitive sucking reflex. The most comfortable position to suck easily also has to be determined along with the presence

. . or absence of associated facial grimaces during sucking.

Swallowing and sucking are closely related. Feeding habits during infancy should be explored to determine the efficiency of swallowing. If the child thrusts his tongue during swallowing he may develop tongue lisps while speaking.

Along with an account of the feeding habits, the voluntary initiation of swallowing carefully should be identified. Drooling is a common problem seen in a CP child which may partly be due to poor swallowing.

#### **(b) Biting and Chewing**

The biting reflex which consists of a continuous opening and closing of the jaw is seen in normal newborn and it is inhibited by the age of 7-11 months with the development of chewing reflex. This biting reflex might be pronounced in a CP child. If it is left unchecked it might preclude the development of chewing reflex. The presence of this reflex as well as the strength of this reflex should be identified.

The chewing reflex consists in the mature and coordinated movements of the lips, jaw and the tongue which serve as the basic organs for speech production. The ability of the child to chew voluntarily and to inhibit it should be determined. The ability to chew soft and hard food items (solids) should be investigated. Intake of only soft food might preclude the better ability of chewing hard food using jaw and tongue.

(c) Laughing, Crying and Coughing

In addition to the basic vegetative functions, the activities that are more closely related to speech such as laughing, crying and coughing are also evaluated. Since vocalization is present in all these activities, the manner in which the CP child vocalizes in such activities will demonstrate his ability for speech production.

Laughing is associated with a relaxed and pleasant feeling and may be more easier than the other two activities. The child with a spontaneous and normal laughter might be better on vocalization for speech production than a child with a laughter initiated with difficulty and associated with bodily movements.

Similarly a child who cries normally can have a more normal vocalization than a child who holds breath while crying or a child who cries with great deal of tension and force. The abnormalities in crying should be identified to determine the prognosis for speech production.

Likewise coughing is another activity on which the Cerebral Palsied children might differ from normals. Such children may have difficulty with coughing which may partly be due to upper respiratory infections. The presence of the reflex of coughing, the ability to cough voluntarily or involuntarily should be checked.



Although the evaluation of laughing, crying and coughing are well justified for the speech and language therapy, the evaluation of feeding skills such as biting, sucking, swallowing, chewing, etc., have not met with consistent support in the literature.

Some authorities have reported findings that indicate that there may not be a direct relationship between non-speech articulatory activities such as the vegetative ones and actual speech production. Miller and Hardy (1962) suggested that the evaluation of dysarthria in CP children cannot be limited to the non-speech movements of the articulators, based on radiographic and photographic data of the articulators. Hixon and Hardy (1964) observed that speech and non-speech activities may be semi-dependent functions so that one did not precisely predict the other. They evaluated the repetitive speech and non-speech articulatory movements of 50 spastic and athetoid quadriplegics. They observed that the neurophysiological mechanisms of speech movements would be different from those of non-speech movements of the same structures.

More recently Love, et al (1980) evaluated the adequacy of biting, sucking, swallowing and chewing (both soft and firm food) and presence or absence of nine infantile oral reflexes in sixty CP individuals (aged 3-26 years). They found that there was a trend for subjects with more adequate feeding skills to achieve higher levels of overall speech proficiency and articulatory competence but this trend was not found to be

systematic. These findings supported the existing mode of therapy, viz., the prescription of improved feeding skills in pre-speech period to reduce future dysarthria although this improvement could not be totally assured.

#### **(iv) Phonation**

Producing voice on prompting may not be possible for a severely impaired child. But, in mild and moderately severe disorders, it can be tested in the child's first clinical situation itself. The laryngeal blocks that are encountered are a part of the general neuromuscular dysfunction and laryngeal dysfunctions are in accordance with the speech-breathing patterns. When the CP child begins to phonate, he may do so for a very short time. A child should be able to phonate at least for ten seconds to be able to produce connected speech (Westlake and Rutherford, 1961). Or when the child attempts to produce controlled exhalation he may develop muscular spasms which spreads to the laryngeal musculature causing laryngeal spasms. There can be

- (a) Adductor spasms in which the vocal cords are held together when phonation may be initiated with difficulty.
- (b) Abductor spasms where the vocal cords are held slightly apart on phonation leading on to a breathy voice production.
- (c) Sudden variation in tension of laryngeal muscles which leads on to corresponding variations in pitch, intensity and quality (McDonald and Chance, 1964).

In addition, in less severe cases, a speech therapist can look for the presence (or absence) of nasality in voice, ability to voluntarily change the pitch, interrupt voice and to sustain it (Boone, 1972).

### **(v) Articulation**

In the testing of articulatory mechanism the function of lips, tongue, teeth and jaw, and the soft palate are usually tested. The functions in terms of movements of each of these structures are separately tested and also in coordination with each other.

#### **1. Lips**

It is important for a speech therapist to observe the basic lip position at rest since speech production starts with the movement of lips from this basic position. Severe spastics might have their lips drawn back ("spastic grin") which might be associated with extensor spasticity of the whole body. Or the lips can be kept in pursed up position. Both the tongue and lips may move forward everytime when the child swallows which is indicative of a facial grimace, the 'tongue-thrust'.

The ability of the child to smack his lips to purse and to spread, are tested to evaluate the ability for movements.

#### **2. Tongue**

In terms of appearance, one must see whether the tongue is kept in between the teeth (tongue thrust swallow) For the evaluation of the mobility of the tongue, some voluntary

activities should be checked if the child is old enough to cooperate. Some of these activities include protruding, touching the corners of the mouth with the tongue, touching the upper lip and lower lip with the mouth open, to touch up behind the upper and lower teeth, etc. The pointedness of the tongue tip, the ability to dissociate tongue movements from the head and shoulder movements and facial grimaces are also functions that should be evaluated. The Diadochokinetic rate, the ability of the tongue to move rapidly is a good measure of the mobility of the tongue. Hedges (1956) tested the rate of repetition of the syllable 'pa' 'ta' and 'ka' to observe the ability to open and close the mouth, and to raise the tongue.

The movements of the tongue in comparison with the lips and jaw should be evaluated since a faster movement of tongue, rather than of lips and jaw, is required in speech production. The tongue moves with far greater precision and speed than the jaw for articulation of speech sounds. If the tongue has a speed that matches that of the jaw, then, his articulation is slow and clumsy thereby affecting the intelligibility.

### **3. Soft Palate**

The abnormal nasality in the voice of the Cerebral Palsied child is an important indication that the soft palate is not functioning properly. If the child is cooperative he can be asked to, open his mouth widely and phonate a lengthy /a/ when the action of the soft palate can be observed. The

nasality of the voice is due to the inability of the soft palate to raise and close off the nasal cavity during oral speech production.

#### 4. Jaw

Unlike its habitual position, the jaw is usually found deviated to the side that shows the greatest spasticity. This deviation would still be present even on opening the mouth. The severely impaired Cerebral Palsied child would hold the jaw tightly clenched and it is very difficult to get him to open the jaw.

With respect to mobility, both the voluntary and involuntary movements should be checked. The opening and closing of the jaw as well its dissociation from the head and tongue position during these tasks should be evaluated.

When examining the dental structure, one must look for the presence of all the required number of teeth. Teeth function for voluntary biting and chewing (front and back teeth respectively) should be checked. Dental abnormalities should be identified. A tongue thrust swallow might be responsible for an abnormal bite. Orthodontic treatment would be warranted for the dental abnormalities.

#### **2.9. Evaluation of Language Abilities**

The work of a speech therapist as regards the CP was at first entirely concerned with dysarthria. In more recent

recent years it has taken note of the language disorder prevailing in this brain damage syndrome as well. Quite an amount of information is available that indicates that the Cerebral Palsied child may be impaired linguistically. The progression through sensory motor, perceptual and conceptual levels may be delayed, distorted, retarded or arrested in varying degrees of severity (Lencione, 1968). In some children the abnormality could be so pronounced that the condition could be diagnosed as receptive or expressive aphasia, an auditory imperception or a central communication disorder whichever term is applicable (Karlin, Karlin and Curren, 1977) Both the comprehension and execution of language may be disturbed, not attributable to the motor disorder (Lencione, 1968). It is very difficult to separate the effects of environmental or the organic causes, on the language problems.

Lencione (1968) gives a resume of a number of tests and evaluation scales to evaluate the Cerebral Palsied child designed in the two decades preceding his publication in the United States. Since not all these tests are accessible a survey of Lencione's work has been presented below. Mecham (1958) designed and standardized a "verbal language developmental scale" to appraise the language readiness level in five major communicative skills, listening (6 items), speaking (3 items), reading (5 items), writing (8 items) and general verbal communication. The scoring provides for full, partial and no credit for items depending upon whether the behaviour is a routine, or is in a transitory, state or cursory or

entirely absent. The therapist's interaction with the child and the parent interview enables the collection of the responses to the test. The age levels assessed are from birth to 0:12 and at year levels from age 1:0 to 16:0.

D'Asaro and John (1961) standardized a rating scale for the evaluation of receptive, expressive and phonetic language development in the young child. This REP scale is in two parts, depending on the age: 4 weeks-52 weeks, 15 months-72 months. The scale gives profiles of sequential progression of receptive, expressive and pre-linguistic behaviour including a phonetic section and gives norms for each level. This scale is found to give a clear delineation of language development and may serve as a diagnostic as well as a therapeutic tool in the rehabilitation of Cerebral Palsied children. Lefevre (1960) described a diagnostic procedure to explore and determine a child's pre-speech activities and speech readiness from birth to thirtysix months. This test was intended to assess the child's physiological and neurological readiness and comprehension in communication. It includes an evaluation of sucking, swallowing, chewing, phonation, babbling, respiration function, vocabulary growth, visual perception, and auditory perception. This scale is found to serve as a rough scale of speech development through a series of representative items.

Peters (1964) developed a test to measure conceptual development of CP children. The test battery included items for (i) identification of objects, (ii) matching similar objects, (iii) matching similar objects of different size, (iv) matching

similar objects belonging to different colours, (v) similitude of action, (vi) recognition of a part as a whole, (vii) matching an object to its use, (viii) matching a missing part to the whole, (ix) matching an object to an associated use, and (x) matching an action to another similar action. According to the author this test may aid the speech therapist in evaluating the concept formation of a CP child and in deducing such factors as oral motor functioning, hearing, vision and auditory and visual perception.

Based on the developmental patterns of children from infancy to 5 years, Anderson (1964) developed a 'Communicative: evaluation chart'. This scale is reported to give a rough determination of language levels along with parallel levels of physical, perceptual, intellectual and emotional development. The age groups covered included 3 months-36 months and at year levels from 4-5 years. The items included coordination of the speech musculature, hearing acuity, auditory perception, acquisition of vowels and consonants, and the growth of receptive and perceptive language. The parallels included the norms of motor coordination, visual acuity, figure-ground discrimination, visuo-motor perceptual skills, form and spatial relationships. This scale allowed a comparison with normals even during therapy.

The Illinois test of psycholinguistic abilities was developed (Kirk, McCarthy and Kirk, 1967) to identify the nature and degree of defect in the use of primary language by young CP children. This test aims to detect and delineate the



specific abilities and disabilities of the child so that, an appropriate therapy program can be initiated. The test evaluates language acquisition at the (i) representational level (6 sub tests) which is defined as the ability to deal with all meaningful symbols by means of decoding, encoding and association, (ii) the automatic-sequential level (3 sub tests) defined as the ability to deal with non-meaningful uses of symbols mainly long term retention and short term memory of symbol sequences. The test includes nine psycholinguistic abilities. Each test is designed to meet the requirements of a "single ability test" measuring only one ability at a time by control of gradation, psycholinguistic process and channels of communication. This standardized test is applicable to children of 2;2-9 years. This test is reported to be a most comprehensive descriptive test of children's language ability (or disability).

#### **2.10. Description of Speech Characteristics**

Specific features of speech in the three clinical varieties are described as follows in the literature (Berry and Eisenson, 1962).

Spastic speech is recognized by its slow rate, laboured production, grave articulatory problems which arise due to the inability to form fine, synchronous movements of the tongue, lips, palate and jaw; lack of vocal inflection, guttural or breathy quality of voice, uncontrolled volume, abrupt changes in pitch, all in disagreement with the content of expression.

A similar single clinical picture of the speech of athetoids has not been obtained. The speech of the athetoid is found to have a varying gradations of a pattern of irregular, shallow and noisy breathing, whispered, hoarse and ventricular phonation, articulation problems varying from slight dysarthria to extreme case of unintelligible speech.

The speech characteristics of the ataxic include monotonous voice or voice characteristics that change spasmodically in terms of pitch, loudness and quality, poor, imprecise articulations which vary from being moderately intelligible to extremely unintelligible slur.

Even while looking at the basic speech characteristic description, there is a discrepancy as to true demarcations of the three categories of Cerebral Palsy. A scrutiny of the general characteristics is thus highly relevant.

#### **2.11. Description of General Characteristics**

Motor disability in CP as a primary symptom can affect the intelligibility and articulation-voice-prosody of speech, thus hindering the oral communication. Because of the extreme variability of the disorder, however, the speech in CP is severely affected with poor intelligibility and dysarthria (sometimes no speech at all), or the speech can have a little or no deviation from the normal. In most cases, because of the neuromuscular involvement, speech can be affected in over seventy per cent of the Cerebral Palsy population (Lehrhoff,

1958). Dysarthria and poor intelligibility are the marked features of Cerebral Palsy speech. All of these communication problems, except hearing loss and language disorders, could well be considered as symptoms of dysarthria (Boone 1972). The dysarthria may include problems of respiration, phonation, resonance, articulation and prosody. Boone (1972) groups the characteristics along seven dimensions, viz.,

- pitch characteristic variations
- loudness variations
- laryngeal and resonance quality variations
- respiratory variations
- prosody variations
- overall general impression of intelligibility and bizarreness

This approach of categorization offers the clinician a ready description of the patient's speech behaviour while a classification such as spastic speech and athetoid speech may not help to locate the differences and abilities of individual cases (Boone 1972). This position is also in tune with our position that each Cerebral Palsied individual is unique with his own particular abilities for speech production and comprehension (see also the section on Common clinical types). Thus, variability of the disorder from individual to individual is another important factor. The same cerebral lesion may not affect all in the same way in terms of speech and language. The primary motor disability would make normal articulation,

prosody and voice impossible in some whereas it might not' affect similar other cases in any manner.

Emotional factors like distractibility, poor self-concept, etc., may cause excessive spasticity, athetosis or ataxia which would preclude normal speech pattern which would in turn increase the respective tension or the like. Thus the effects are circular in nature.

### 1 . Articulation Disorders

Majority of Cerebral Palsied children present mis-articulations. This dysarthria is caused by poor motor control of oral musculature (which is only a part of the motor handicap involving major parts of the body) which is due basically to the central nervous system lesion. The faulty functioning of the speech mechanism may be compounded when expressive aphasia is present (Boone, 1972). In addition to the motor defects of the articulators, other problems like hearing loss, mental retardation,, and sensory deficits of the oral musculature may complicate the problem. The evaluation of oral peripheral musculature reveals that the rapidity and precision of tongue movement may be affected; mandibular movement may be reduced or exaggerated; palatal movements may be slow, sluggish and imprecise thus leading on to a form of speech through closed mouth affecting voice quality and articulation; excessive jaw movement and.mouth opening causing exaggerated articulation; and palatal sluggishness may lead to nasal emission and nasality. An articulation test (a standard picture test in

children) would reveal omission, distortion, substitution or addition of phonemes in all positions.

## **2. Voice Disorders**

The respiration, abnormal vocal fold vibration leading on to faulty phonation, and abnormal resonance may all contribute to the poor voice characteristics such as pitch, loudness and quality. Inability to extend the exhalation would seriously limit the phonation duration and capacity necessary for speech production. The laryngeal spasms (due to neural irregularities mostly) may cause, at the vocal cords, adductor or abductor spasms precluding phonation. The attempt at phonation without adequate airflow and air pressure will result in feeble or no phonation, or phonation if present may be characterized by an inappropriate pitch. The malpositioning of articulators like the tongue, palate and mandible may all lead to improper resonance and hence poor voice quality.

## **3. Disorders of Prosody**

Because of the inadequate functioning of articulators, and incoordinated breathing and improper phonation the rhythm and rate of speech may be affected. The speed of the movement of articulators may cause imperfect inflection and poor melody. The severe impairment of prosodic characteristics of speech can make the speech unintelligible to the listener.

Rutherford (1944) studied voice characteristics (loudness, pitch and quality), rate and rhythm of the speech of the

Cerebral Palsied and attempted to differentiate between athetotic and spastic groups of Cerebral Palsy. Subjective rating scales were used to judge the spontaneous speech characteristics among large groups of spastic (N=74), athetoid (N=48) and normal (67) children. It was found that there was no clear-cut separate entity as Cerebral Palsied speech that was particularly characteristic of the group. Hence it was recommended that terms such as "spastic speech" (referring to Cerebral Palsied group as a whole) should be avoided. However, some differences between the two Cerebral Palsied groups were found. The athetotic speech tended towards slower, more jerky speech than the speech of the spastic group and it had more loudness, more low pitch and more monotony and breakness. The groups were found to differ on the agility of the speech musculature and breathing.

Wolfe (1950) attempted a comprehensive evaluation of fifty cases of Cerebral Palsy. The study was designed to evaluate a representative sample of the disorder for purposes of determining the physical, intellectual, educational and speech status of the individuals and to define the nature of service procedures to achieve maximum effective rehabilitation. The examination of peripheral speech mechanism revealed that the greatest degree of involvement was found in the athetoid group. The athetoid group also had the greatest problem of understandability whereas the spastic type showed the least amount. Speech rate was also affected in 50% of cases the athetoid and ataxic groups whereas the 'other' group (rigidity,

tremor and combined type) had the greatest degree of involvement of speech rate.

Clement and Twitchell (1959) studied dysarthria in Cerebral Palsy in terms of deficits in phonation, respiration and articulation in this pathological group and suggested a physiological interpretation of the deficit. 20 subjects (age 3-12 years) belonging to two groups of spastic quadriplegia and bilateral athetosis were evaluated. The spastic dysarthria (of the spastic quadriplegic group) in terms of phonation, was characterized by high pitch, monotone, weak intensity, breathy quality with abnormal nasal resonance, and broken phonation. Athetotic dysarthria was, on the other hand, characterized by a low pitch, sudden uncontrolled rising inflections, weak forced and varying intensity, throaty quality with large amount of pharyngeal resonance. In terms of respiration, spastic dysarthria was characterized by shallow inspiration and forced expiration with spasmodic and broken rhythm while athetotic dysarthria was accompanied by a shallow but varying and uncontrolled inspiration and a forced uncontrolled expiration with a jerky and uncontrolled rhythm. In terms of articulation, both the groups showed impairment of lingua-dental sounds on production because of tongue placement abnormalities. In general, the spastic dysarthria was noticed to be due to spasticity and consequent stiffness of the peripheral speech musculature. In athetosis all motor function was found to be biased towards withdrawal and periodic alternation towards the

opposite reactions thus causing uncontrolled movements of speech musculature.

Kamalashile (1975) assessed speech problems of 110 Cerebral Palsied children. The analysed results indicated that quadriplegics were affected most in terms of speech and delayed speech formed the predominant speech defect. One to one relationship was observed between the vegetative functions (chewing, sucking, swallowing, etc.) and articulatory functions of speech organs.

While there have been many studies on the articulation of speech sounds no provision has been made to annotate or record non-target sounds produced.

An extraneous vocal behaviour comprising of non-standard meaningless sounds prior to actual vocalization has been noted and studied by a few. Haphazard, extraneous, meaningless or non-standard speech behaviour may be defined as those vocal "noises" emitted during speech production which are not accepted phonological components of the words of the language spoken (West, Ansberry and Carr 1957). Berry and Eisenson (1956) earlier had discussed these atypical patterns in terms of incoordinated "relax and linkage" concerned with breathing. Van Riper (1954) also had attributed these unnatural pauses and gaspings to faulty breathing patterns. Farmer and Lencione (1977) analyzed spectrographically and phonetically such extraneous vocal behaviour in 14 Cerebral Palsied speakers (9 subjects were athetotic and 5 predominantly spastic) aged



8-44 years. Spontaneous speech was recorded and words beginning with initial stops were noted. These were subjected to both durational and articulatory analysis, 71% of the subjects demonstrated prevocalization (the extraneous vocal behaviour). These prevocalizations (PVs) were found to occur more and with longer mean durations in athetotic speakers than in spastic speakers. The articulatory analysis indicated that PVs occurring with initial stops demonstrated an inability in these subjects to achieve consistent and immediate oral and nasal stopped production. The use of voiced sounds for voiceless sounds was also noted as an articulatory problem. This early glottal adduction and delayed oral and nasal constriction (PV) implicated temporal incoordination in the manner of speech production. It was inferred that because of the nature of brain damage which caused a variety of neuromotor disturbances the Cerebral Palsied speakers were demonstrating phonetic , errors (performance errors) rather than errors of phonological competence, i.e., these speakers appear to know the phonological rules but their brain damage and the subsequent lack of motor control did not enable them to correctly express these rules phonetically, The use of prevocalizations, it was felt, could be regarded as an indication that Cerebral Palsied speakers appear to have the ability to generate additional performance behaviours in order to realize the phonology of their language. PVs appeared to result from inadequate control of vocal tract in time and other extraneous vocal behaviours may indicate other compensatory devices used to achieve

developmentally production of the adult phonology.

In another study of three adult, athetoid speakers who consistently used a prevocalization, Farmer (1977) confirmed the earlier findings that for all athetoid speakers, prevocalizations occurred more frequently and that they were generally of a longer duration before voiced than voiceless stops.

Kent and Netsell (1978) studied the articulatory abnormalities in 5 athetoid speakers. The speech samples consisting of isolated, sustained production of vowels, selected VCV utterances and some sentences were treated cinefluorographically. The articulatory abnormalities were identified from tracings of vocal tract shapes and from displacement by time plots of articulatory events. All the subjects in the study presented abnormalities in the control of lips, tongue, mandible and velum. The most frequent abnormalities were large ranges of jaw movement, inappropriate tongue positioning for various phonetic segments, intermittency of velopharyngeal closure caused by an instability of velar elevation, prolonged transition times for articulatory movements. Many of these abnormalities were evident during the simple task of phonating isolated vowels and increased as the subjects attempted to produce VCV utterances and short sentences. In these phonetic sequences abnormalities of timing and coordination became apparent. The speech disorder in athetosis was explained on the basis, of a feedback deficit theory of motor learning of

speech. It was felt that an athetoid would suffer from inadequacies of proprioceptive feedback and therefore he would not develop expected normal feedback either about evolving or completed movements. Hence, rehabilitative techniques for such a group should focus on ways of improving the sensory inflow associated with speech production.

More recent works have well defined the characteristics of ataxic dysarthria. Brown Darley and Aronson (1960) compiled based on the literature on cerebellar disease and their own observations, description of ataxic dysarthria. They found ten perceptual dimensions of characterizing this disorder, viz., imprecise consonants, irregular articulatory breakdown, distorted vowels, excess and equal stress, prolonged phonemes, prolonged intervals, slow rate, monopitch, monoloudness and harsh voice. From an analysis of the co-occurrence of deviant dimensions the investigators proposed three major clusters of deviant dimensions. In addition they inferred the neuromuscular defect for each cluster and arrived at descriptions that might suffice as hypotheses of abnormal speech physiology in ataxic dysarthria. The three clusters with their associated neuromuscular defects are:

1. Cluster of articulatory inaccuracy (imprecise consonants, irregular articulatory breakdown, distorted vowels): errors of individual movements and dysrhythmia of repetitive movements.
2. Cluster of prosodic excess (excess and equal stress, pro-

longed intervals and slow rate): slow individual movements and slow repetitive movements.

3. Cluster of phonatory-prosodic insufficiency (monopitch, monoloudness and harsh voice): hypotonia.

Kent and Netsell (1975) verified and confirmed these descriptions in an ataxic dysarthric on spectrographic and cine-radiographic observations of articulatory positions and movements and also observations of prosodic patterns.

Love et al (1980) evaluated the adequacy of biting, sucking, swallowing and chewing as well as the presence or absence of nine infantile oral reflexes against speech proficiency in sixty Cerebral Palsied speakers belong to the spastic, athetotic and mixed groups. The subjects with adequate feeding skills were found to have achieved better levels of speech proficiency than those with inadequate skills. They were also who had better articulatory efficiency. The presence and number of dysphagic symptoms did not predict precisely the lack of speech. It was also felt that abnormal oral reflexes were not particularly predictive of lack of speech or dysarthria in the sample tested. These findings raise critical doubts about certain aspects of widely advocated oromotor training techniques and their relation to the speech performance of the Cerebral Palsied.

The relationship between judgement of speech proficiency and some quantitative measures of speech parameters

of Cerebral Palsied speakers was investigated by Clark and Hoops (1980). The vocal parameters were the number of articulatory errors, the intelligibility of speech, mean vocal fundamental frequency, variation of vocal fundamental frequency, mean speech sound pressure level, variation of speech sound pressure level, and word-per-minute speech rate. The study also investigated the differences in the speech of the spastic and athetoid populations in terms of the parameters tested above. The results indicated that there was a relationship between the number of articulatory errors, intelligibility, word-per-minute reading rate and the rating of speech proficiency. The results also suggested that an individual tended to receive a lower speech proficiency rating if he had a large number of articulatory errors and a slower reading rate. The more neurologically impaired a subject, the lesser, it was felt, was the coordination and consequently speech tended to be more slow and laborious with a lot of articulatory errors. In comparison, the spastics tended to be better in articulatory ability, intelligibility and reading rate than athetoids. It was generally felt that it was impossible to control all the variables associated with neurological impairment, in the two groups and hence the validation of neurological diagnosis in each case would be difficult.

#### **4. Intelligibility in CP Speech**

Several investigators have been interested in the articulatory impairment and the intelligibility of the speech

of the Cerebral Palsied speakers. The effect of the dysarthria on intelligibility and, therefore, on the communicative ability has been a focus of many investigations. In the following few pages a few recent investigations of this order have been summarized.

Andrews, Platt and Young (1977) evaluated the factors affecting the intelligibility of Cerebral Palsied speech as it appears to the average listener. Orthographic transcriptions of naive listener responses to a phonetically balanced list of monosyllabic words uttered by 50 CP males (age 17-55 years) were translated into phonetic symbols and formulated into error patterns on word-initial and word-final consonants and compared to those identified by a trained listener. The same pattern of errors was identified by both the trained and naive listeners for the predominant errors. More errors were identified on word-final consonants than on word-initial consonants and within-manner errors exceeded between-manner errors.

Laing (1979) investigated, in a left hemisplegic child having the peripheral impairment of the speech musculature, as to whether the dysarthric errors resulted from an articulatory or phonological disorder. The speech sample was subjected to independent transcriptions by three transcribers. The data was analyzed in terms of a natural phonological analysis determining the processes operating in the subject's speech to affect all single consonants and initial consonant clusters.

Results indicated that the phonological system of the subject was systematic and rule governed and that the processes operating upon the phonological system are attributable, only in part, to the deviant speech musculature.

The relationship between information transfer and speech intelligibility of dysarthric CP population was measured (Beflkelman and Yorkston 1979) by single-word and paragraph transcription across a wide range of dysarthric speakers ( $N=9$ , ataxic spastic and hypokinetic types). Their performance was judged by 108 listeners. It was judged that both information and intelligibility were highly related. It was implied that the intelligibility score was useful as a functional index of communicative performance.

Platt (1980s) also analysed the dysarthria in Cerebral Palsied adult individuals (aged 17-55 years and belonging to both spastic and athetotic groups). Phonetic transcriptions were made of single-word utterances which contained 49 selected phonemes, 22 word-initial consonants, 18 word-final consonants and 9 vowels. Errors of substitution, omission and distortion were categorized in such a manner that patterns could be observed. It was found that within-manner errors (place or voicing errors or both) exceeded 'between-manner' errors by a substantial amount which were found to be more on final consonants. The within-manner errors predominantly were of devoicing and they were found to be frequent in final position. The predominant between-manner errors involved liquids. The

position errors involved liquid-to-glide-and-affricate-to-stop changes and for final position, affricate-to-fricative phoneme omission occurred three times more on final than on initial consonants. The error data of individual subjects were found to correspond with the identified overall group patterns and they were implied to be of help in training the Cerebral Palsied for improvement of intelligibility.

Platt in another study, (1980b) examined the speech intelligibility and articulatory impairment of 32 spastic and 18 athetoid subjects. Two estimates of speech intelligibility were obtained for native listeners: single words correctly recognized and prose intelligibility rating. Diadochokinetic syllable rates and percentage of correct articulation of selected phonemes were employed as indices of articulatory impairment. The fifty subjects were in average judged to be fifty per cent intelligible on both the intelligibility estimates Group mean diadochokinetic rate was found to be 2.9 syllables per second and 78% of the phonemes were transcribed as correctly articulated. The mean scores of the spastic subjects were found superior to the athetotics on all speech measures significantly so, for single word intelligibility and DDK rate. It was observed that specific phonemic features characteristic of dysarthria in CP were, (1) anterior lingual place inaccuracy, (2) decreased precision of fricatives and (3) inability to achieve the extreme in the vowel articulatory space. The author compared these results with those reported for children and it was observed that the consonantal place and manner problems were



fairly stable features of dysarthria in Cerebral Palsy.

### **2.12. Language Abilities of the Cerebral Palsied**

Because of the neuromotor involvement of many children with Cerebral Palsy, it is not surprising that over 70 per cent of them have speech and language deficits (Lehroff 1958). Adequate language and communication skills cannot be developed if the reception is in anyway distorted or precluded. Expressive and/or receptive language disorders in this population have been reported by many in the past (Cohen 1956, Hannigan 1956, Myklebust 1956, Denhoff and Holden 1951, Kastein, 1951, Byrne 1959).

Among the speech and language problems found in the group of cerebral dysfunction, Denhoff and Robinault (1960) reported delayed speech, aphasia of expressive type, receptive type, central aphasia, agraphia, anomia, alexia, stuttering and voice disorders. Morley (1972) identified three expressive deficits, namely, developmental dysarthria, developmental aphasia and apraxia in Cerebral Palsied children, while Eisenson (1972) thought that CP children were severely delayed in all aspects of language even when they were not mentally retarded.

Some studies in literature (cited previously) have indirectly indicated that speech and language develop slowly among Cerebral Palsied children and that, although retarded, the language abilities in this group develop in the same sequential

pattern as in normals. Denhoff and Holden (1951) reported that among 100 Cerebral Palsied children, single words appeared at an average age of 27 months and the mean age for using two and three word sentences was 37 months. In comparison with normal children a delay of approximately one year in the appearance of single words was noticed.

Lencoine (1966) found that fourteen year old Cerebral Palsied compared with normal eight year old in terms of consonantal competence.

Irwin (1956) found an increase in the types and frequencies of vowels with age both in normals and Cerebral Palsied children and that normal surpassed Cerebral Palsied children in pace.

Byrne (1959) evaluated 74 educable mild to severe Cerebral Palsied children (37 spastics, 37 athetoids aged 2-7 years) for their communication skills on both oral and gestural modes. Majority were found to use oral language while a few used gestures. The group with oral language presented the following characteristics:

- (i) In learning oral language there was a strong similarity between these Cerebral Palsied and normal children. Although there was a delay in achievement, this Cerebral Palsied group developed earliest those sounds and language items which appeared first in normals.
- (ii) Achievement in proficiency of production of groups of sounds followed the normal developmental schedule. Vowel

and diphthongs were uttered correctly by all the Cerebral Palsied children, half of all the consonants and less than 1/4 of the consonant blends were accurate.

- (iii) Consonantal proficiency followed an orderly pattern of development. Bilabials were produced correctly most frequently followed by tongue-tip, single, back of the tongue, lip complex and tongue-tip complex sounds. Initial sounds were more frequently correctly uttered than medials and medial sounds were frequently correctly uttered than final consonants. However, accuracy in consonantal production was found limited.
- (iv) The level of articulation skill of this group appeared to be below that of 3 year olds. The mean age of total oral language group was 65 months.
- (v) Acquisition of three language items was delayed: the median age for the appearance of first words was 15 months, for 2-word sentences 36 months and for 3-word sentences 78 months.
- (vi) Differences in scores for speech sound proficiency between the athetoids and spastics were not significant. In all the sub-tests, however, the spastics had higher mean score.

Myers (1965) studied the language abilities of a large group of spastic and athetoid types of Cerebral Palsied children through the use of ITPA described earlier. It was

found that the spastic children were superior to athetoids on tasks involving the automatic sequential level whereas the athetoids were superior on language tasks at the representational level. Thus it was found that there were basic differences in the language structure of the two types of CP.

Orvis C. Irwin has been a pioneer in the study of speech and language of the Cerebral Palsied. He has conducted several studies over a period of thirteen years on the articulation, sound discrimination, abstraction, vocabulary and sentences, immediate memory span, manifest anxiety which in total constitute the communication process as such of the Cerebral Palsied children. All his studies are compiled and detailed in his recent work (1972).

In 1955, Irwin collected information on the phonetic equipment of 266 spastic and athetoid children (age 1-12 years), Four analyses with respect to the phonetic types and frequencies were made: vowel types, consonant types, vowel frequencies and consonant frequencies. It was found that with respect to these there were no strong differences and there was no statistical evidence to say that differences existed among these two groups of Cerebral Palsy. Irwin (1966) also found that the length of articulation test for consonants was not a significant variable and that both short and long consonants tests were equally efficient.

The relationship of vocabularies of use and understanding of several variables by Cerebral Palsied children was

explored by Irwin (1966). The effect of the type, extent and degree of Cerebral Palsy was evaluated against the comprehension and use of vocabulary. The relationship of vocabulary achievement by Cerebral Palsied children to their speech ratings as evaluated by speech therapists was studied.

91 Cerebral Palsied children aged 5-17 years were given the Peabody Picture Vocabulary Test to measure the vocabulary comprehension. The subjects were also asked to describe three pictures of Cerebral Palsied children in familiar situations. The number of words uttered by the children constituted the score of the vocabulary of use (functional vocabulary). No significant differences were found between the mean vocabulary scores between the spastic and athetoid children, or among quadriplegics, hemiplegics, or paraplegics or in terms of severity. However, the difference between the two vocabularies (between spastics and athetoids) was significantly in favour of the vocabulary comprehension in each comparison. Children rated by speech therapists as being very good, good, medium, poor and very poor showed no significant differences between spastics and athetoids. But the differences between the two vocabularies (comprehension and use) was significant for these rated groups-

A test of language abilities for use with Cerebral Palsied children was developed by Irwin (1966). The aims of the study were (i) to evaluate the ability of these children to articulate consonants, to discriminate sounds, to perform the mental function of abstracting meanings and to understand

words, (ii) to determine the interrelation of the scores of the sub-tests, (iii) to study the effect of sex, of type and extent of CP and (iv) the relation to therapists, ratings of the children's speech and language. The mean scores of the sub-tests and of the total battery confirm previous findings. The correlations with cerebral age were low. The effect of sex, of the type of CP and of the degree of involvement was negligible. There was a significant trend in the mean ratings by therapists of the general language ability of the children. On the basis of the measure of extreme groups there was ample evidence for the validity of the battery as a whole. The test was found to be reliable and valid.

A later study investigating the correlations among the aforementioned five speech tests and WISC (Wechsler's intelligence scale for children) verbal scale produced low correlations (Irwin and Korst, 1967). The five speech tests (consonant articulation, sound discrimination, abstraction, vocabulary of use and vocabulary of understanding) and WISC verbal scale administered on 3 groups of Cerebral Palsied children revealed poor intercorrelations.

The length of sentences uttered by this pathological group was investigated along with the sex differences (Irwin 1966). A 3-picture vocabulary test was administered to sixtysix Cerebral Palsied children. The resulting data v/ere categorized into complete and incomplete declarative sentences and according to the sex of the children. The analysis was in two parts:

(i) The number of both kinds of sentences by the boys and girls

.together and (ii) The length of both kinds of sentences by each sex. It was found that the number of complete declarative sentences was greater than that of incomplete sentences and that the mean for boys on the two types of sentences significantly exceeded that of girls. This sex difference in favour of boys is strange indeed considering the well-documented notion of females buy better in terms of language abilities. Regarding the length of sentences in the same study, it was found that the mean number of words per sentence was significantly larger for the complete declarative sentences than for the incomplete utterances. Sex differences, however, were not apparent in the mean number of words per sentence.

In contrast to this study, a further study of the number and length of sentences in the language of Cerebral Palsied revealed no sex differences (Irwin et al 1967) Forty-four subjects (22 male and 22 female) were shown three pictures and were asked to give descriptions of them each. The subjects were matched according to chronological age and IQ. Responses were taped and the sentences were classified according to sex, according to structural completeness, and according to length, and were subjected to an analysis of variance. The analysis showed that sex differences were not significant and the difference between mean number of complete and incomplete sentences did not also comply. However, the difference between the means for number of words per complete and incomplete sentences were significant with the former being higher.





such as, addition, deletion, 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 these basic strategies even with advancing age. The limited grammatical competence, it was observed, remained upto age 8 and was found to be characterized by short phrases joined by 'and'. The problems according to the author, are not recognisable at an earlier age since the children can manage to communicate their needs with their speech, however, meagre. The study, however, did not examine the differences among the various subgroups such as quadriplegia versus dylegia or right versus left hemiplegia, etc., although it was thought that there would be significant differences, due to a very small number of subjects in 7 year old age group. However, the study is highly commendable for the single reason above that it signifies a lone incidence in the area that has long been in the dark, i.e., the syntactic development in this conspicuous clinical population especially in the recent times. Note also that a tendency towards description of the morphology and syntax of CP speech and language is noticed in the literatun in consonants with a trend for detailed description of syntactic structures of normal language and its acquisition. This can be clearly seen in a comparison of successive articles by Irwin in the years 1956, 1966, 1967.

### 2.13. Indian Studies

There are very few Indian studies, in fact, a meagre three or four on Cerebral Palsy. Two of these are theoretical reviews. Menon (1970) in her paper gave a review of Bobath's method of physiotherapy that is based on neurological lines of inhibiting abnormal reflex activity and facilitating normal automatic reactions. She remarked that speech therapy, hand-in-hand with physiotherapy, would be very beneficial in the habilitation of Cerebral Palsy. Chandrashekhar (1973) debated the appropriateness of usage of the term "Cerebral Palsy". He felt that the alleged difference between "Cerebral Palsy" and "brain damage" did not exist. This paper, however, did not take into account the specificity of the physical motor symptoms of cortical/subcortical lesions that separate Cerebral Palsy from other types of diffused brain damage on the basis of which the two can be differentiated.

In another clinical review paper on Cerebral Palsy, Anantha Murthy (1972) found that Delayed Speech was predominant among the speech and language problems of 114 cases of Cerebral Palsy. He did not go into the details of this speech and language disorder.

In a paper on clinical research with Cerebral Palsy, Hosakote (1981) evaluated the efficacy of operant conditioning procedures in motor training of a single 8 year old athetoid male with hearing loss and mental retardation. She found that it was possible to effectively improve dexterity.

Note that none of these studies focus on the language abilities of CP and not even a description of CP in an Indian context is available.

#### **2.14. Summary of Findings Reported in the Literature**

The following list gives a summary of findings noted by the survey of available literature in terms of speech and language behaviour of CP children:

1. Most of the Cerebral Palsied children have speech and language deficits.
2. Each CP child is unique with her own particular abilities for speech production and comprehension.
3. Quadriplegics are affected most in terms of speech and language characteristics.
4. Spastics tend to have higher or better speech and language abilities than athetoids or ataxies or other groups of CP although this difference may not be statistically significant.
5. The effects of sex, the type of CP, and degree of severity may or may not be significant. One finds studies supporting both the stands.
6. There may not be a clear-cut entity as "Cerebral Palsied speech" or "spastic speech".

7. Motor disability as a primary symptom can affect the speech communication ability.
8. Dysarthria and poor intelligibility are the main characteristics of the speech of the Cerebral Palsied.
9. The dysarthria is due to problems of respiration, phonation, resonance, articulation and prosody which give rise to an overall general impression of poor intelligibility and a bizarre characteristic.
10. Dysarthria, the central type of the articulation disorder, is primarily due to faulty functioning of speech mechanism.

There is also dysphonia due to poor and faulty respiration, abnormal vocal fold vibration and abnormal resonance and this is evidenced by poor voice characteristics such as those of pitch, loudness and quality.

11. Rate and rhythm (prosody) of speech may be affected because of all the above factors and poor intelligibility may
12. The dysarthric symptoms are theorized differently, to be due to different attributes of the problem. They are conceived as being basically the compensatory manifestations employed • to overcome a vital motoric deficit of maintaining setmental control over the subglottal breath pressure. On another view, the speech disorder in CP mainly is explained on the basis of a feedback deficit theory of motor learning of speech. It is felt that a CP child would suffer from

inadequacies of proprioceptive feedback and therefore he/she would not develop expected normal feedback for evolving, or completed movements for speech.

13. One-to-one relationship is observed between the vegetative functions such as chewing, sucking, swallowing and biting and articulatory functions of speech organs.

The CP subjects with adequate feeding or vegetative skills (biting, sucking, swallowing and chewing) are found to have achieved better levels of speech proficiency than those with inadequate skills.

14. The presence and number of dysphagic symptom and abnormal oral reflexes do not particularly predict the lack of speech or dysarthria in a given sample.
15. The more neurologically impaired a subject is, the lesser, it felt, is the coordination, and consequently speech tends to be slower and laborious with a lot of articulatory errors.
6. There is a relationship between the number of articulatory errors, intelligibility, word-per-minute reading rate and the rating of speech proficiency.
17. The speech errors of individual subjects are found to correspond with the identified overall group patterns, and they are implied to be of help in training the Cerebral Palsied for improvement procedures for intelligibility.

18. Word and sentence intelligibility and speaking rates have been evaluated as quantitative indices of communication proficiency. However, speaking rates and intelligibility scores may or may not be correlated. The studies support both the claims.
19. Intelligibility estimates include rating single words, sentences and prose or passages as being correctly recognizable. It is found that CP children are only partially intelligible.
20. Dysarthria estimates include diadochokinetic rates (the rate of the ability of the tongue to move in coordination with other articulators to accomplish rapid, repetitive articulatory movements) and percentage of correct articulation of selected phonemes. In CP subjects the diadochokinetic rates and the percentage of correct phonemic articulation are found reduced.
21. The information transfer and intelligibility are highly related in the dysarthric speech of CP subjects and intelligibility score is very useful as a functional index of communicative performance.
22. There are differences between the different types of Cerebral Palsy in terms of the speech characteristics. The groups differ on the agility of the speech musculature and breathing. The description of speech characteristics of the three types of CP are given in a previous section.

The athetoids have the greatest problem of understandability whereas the spastic type has the least and ataxic is placed in between. Spastic group is better in terms of speech rate whereas the athetoid and ataxic groups have reduced rate. The group with the symptoms of rigidity, tremor or combined type have the greatest degree of involvement of speech rate.

In comparison, spastics tend to be better in articulatory ability, intelligibility and speech rate than the other groups of Cerebral Palsy, viz., ataxies and athetoids.

From the literature, one could see that the spastics have received more attention and then the athetoids and in least, the ataxies in terms of the study of their speech characteristics.

- 23a. Majority of the CP population uses oral language while a few make use of gestures and non-verbal communication.
- 23b In terms of the language abilities it has been reported that 'Cerebral Palsy may hinder, delay or arrest the development of language, verbal or otherwise.
24. Adequate language and communication skills cannot be developed if the reception is in anyway precluded or distorted as it is in the case with the problem of Cerebral Palsy.
25. The progression through sensory motor, perceptual and conceptual levels of development may be delayed, distorted, retarded or arrested in varying degrees of severity.

26. Linguistic impairment is a significant problem in the symptom-complex of CP and speech and language delay is a predominant feature seen.
27. Expressive and/or receptive language disorders are complicated issues seen regularly in this disorder. Both comprehension and execution of language may be disturbed to the extent not attributable to the motor disability.
- 28o In the language abilities, vocabulary comprehension is better than vocabulary production.
29. The language impairment present in this group could be diagnosed as receptive and/or expressive aphasia, auditory impercention or a central communicative disorder.
30. Delayed speech, stuttering, expressive aphasia, receptive aphasia, central aphasia, anomia, alexia, agraphia are among the language problems reported in this group.
31. Speech and language develops slowly and although retarded, it is implicitly assumed that the language abilities in this group develop in the same sequential pattern as in normals. The general tendency in the literature is to relate and describe the speech and language abilities of the CP children as one of delays in comparison with the normals. Thus many studies propose, in comparison with normals, a delay of one year to more than six years.



32. There may or may not be any differences in terms of the language abilities between various subgroups of Cerebral Palsy such as right versus left hemiplegia, quadriplegia, paraplegia, etc. There are studies that support both the claims..
33. There may or may not be differences in language competence and expression between CP children of varying severity.
34. There may or may not be differences in terms of language abilities between the disordered groups such as spasticity, athetosis and ataxia. The earlier studies point to the former and more recent studies point out the high likelihood of such differences being present between the CP groups.
35. The language comprehension and use were found better in spastic and athetoid cases diagnosed as possessing better speech proficiency, than in cases with poor speech. In other words, the better the speech proficiency (in terms of structure and function of speech mechanism) the higher are the language abilities. There seems to be a positive correlation between the two interdependent issues.
36. Although the dysarthric errors result mainly from deviant speech musculature functioning, their effects on the phonological system may be significant, both in terms of competence as well as performance. That is, the CP speakers may demonstrate just phonetic errors or errors due to a deficient or inadequate phonological competence.

37. The phonological system of CP speakers may be systematic and rule governed even when deviant.

Achievement in proficiency of production of groups of sounds and their phonemic realizations is assumed by some scholars such as Irwin (1956) to follow the normal developmental schedule. Vowels, diphthongs and consonantal proficiency is also assumed to follow an orderly pattern of development. However, accuracy in consonantal production is found limited. Bilabials are produced correctly most frequently followed by tongue-tip simple, back of the tongue, lip-complex and tongue-tip complex sounds. Initial, medial and final sounds are uttered in the same order of increasing difficulty.

In terms of error patterns affecting intelligibility, more errors are identified on word-final consonants than on word-initial consonants.

Within-manner errors exceed between manner errors.

Phonological deficiencies are fairly stable features of childhood and adult CP speakers.

38. From the very few studies available, certain aspects in the grammatical development of CP speakers are noted. There is a single pilot study in the recent times, which analyzed the quantitative as well as qualitative aspects of grammatical development (Singer, 1976). It would be difficult to generalize on the strength of a single study but yet, some

observations are made from the findings of this study in order to formulate hypotheses relevant to the present study:

This brain-injured group uses fewer age-appropriate forms and more agrammatic ones than the normal group.

It is noted that CP children speak very less in a given unit of time compared to normals. They need more promptings and persuasion to obtain a comparable amount of speech as the normals.

Qualitatively also the CP children and normals differ. Certain grammatical forms are characteristic of this pathological group, especially the restricted or agrammatic forms.

CP children fail to acquire developmental language strategies (such as substitution, deletion, etc.) such as those adopted by normal children for language acquisition, even with advancing age.

The limited grammatical competence remains so upto 8 years of age and beyond.

The speech is characterized by short phrases and the frequent use of 'and'.

39. From a few studies of length of utterances and the number of declarative sentences (irwin 1966), following observations are made:

The mean number of words per sentence is significantly larger for complete sentences than for incomplete sentences.

The number of complete declarative sentences were more than the incomplete sentences.

The boys were found better in the use of declarative type of sentences than the girls. However, in a later study of the similar type by the same investigator no sex differences were found.

#### **2.15. Purpose and Significance of the Study**

The present study is first of its kind on CP having an Indian language as their home language. As such the study focuses first of all on the description of available speech and language of the patients/subjects selected for the study. Secondly, it aims at identifying the characteristic features of the speech and language and relate these characteristic features to normal language, in terms of presence/absence and characteristics of distribution, etc. Thirdly, the study focuses on the general speech and language characteristics of spastic population as opposed to those of athetoid population. Questions are raised as to whether age, severity and sex play any crucial role in the development of speech and language in CP while presenting an overall picture of the processes and contents of speech and language acquisition by CP children, as a group.

Based on the claims made in the literature, the following null hypotheses have been formulated for the purpose of the study in the present investigation.

1. Cerebral Palsied (CP) children present no deficits/deviances

in terms of their speech and language abilities.

2. There are no differences in the speech and language characteristics between the different types of CP such as spasticity and athetoids.
3. Speech characteristics like rate and rhythm of speech, clarity of speech and quantity of speech are not affected in the CP speakers of the two types, namely, spasticity and athetosis.
4. There is no language delay or language impairment in the CP children.
5. There is no difference between the spastics and athetoids in terms of phonological abilities.
6. There is no difference between the spastics and athetoids in terms of morphological abilities.
7. There is no difference between the two groups in terms of syntactic abilities.
8. The language abilities of individual CP children do not correspond with the overall patterns of the CP group as a whole.

## CHAPTER III

### METHODOLOGY

This chapter gives a description of the procedures adopted for the selection of subjects, collection of data, tests, methods of study and analysis, and problems encountered in the analysis.

#### 3.1. Subjects

The study aimed at collecting speech and language data on the most common types of CP, namely, Spasticity and Athetosis two most common types of CP in the same proportion of their availability. Hence there were altogether six subjects in the Spastic group and three subjects in the Athetoid category.

It was felt that the topographical subgroups, namely, quadriplegia, hemiplegia, Diplegia or paraplegia would be varied in results. Hence, only one category, namely, quadriplegia with the lower limbs more severely affected than the upper limbs was taken up for the study. Thus six of the subject were Spastic quadriplegics and three were Athetoid quadriplegics

Severity of the pathology was another variable that was considered in the selection of subjects. Very mild cases of CP were not chosen because of the surmised less significant or mild effects on speech and language. Very severe cases were also rejected because of the high likelihood of absence of speech in such cases. Thus only "moderate" cases as diagnosed

by the neuro-physicians/paediatric-neurologists were considered aiming at higher efficacy in the study. Hence, all the subjects studied belonged to the moderately severe group.

Age was another important variable that was considered. The children of the study ranged from 4-10+ years in age, and 7 years was the mean age. The choice was motivated by the facts of language acquisition by normal children, who, by general accounts, appear to complete most of the basic processes of language acquisition by the period covered by this study. Thus the speech and language profiles of the children of this group could be more easily compared with the stages completed by normal children for practical purposes. Secondly the collection of data is made easier with older CP children.

Sex was another important variable that was taken into account while selecting the subjects. There was only one female each in two pathological groups studied. Thus there were 5 males and 1 female in the Spastics group, 2 males and 1 female in the Athetoid group. This was in consonance with the reported less incidence of this pathology in females.

It was so chosen that the subjects were all 'speaking' children and their mode of communication was verbal. The role of gestures and panto mime along with verbal communication was, however, noted.

The subjects were all chosen from Bangalore and Mysore cities where Kannada is the regional language. It was seen that

all children included in the study had Kannada as mother tongue (language of the household). Their parents had the knowledge of other non-cognate languages such as English. Thus, all the subjects of the study had Kannada as their mother tongue.

All the subjects came from the urban set up. The parents were educated (fathers were all graduates and mothers had all studied upto matriculation or graduation). The subjects could be placed as 'middle class' or 'upper middle class' categories in terms of socioeconomic status.

Only the subjects with normal hearing were taken. Hearing within 20dB HL of audiometric limits was ascertained with audiometric testing by an audiologist.

Intelligence was another criterion of selection. An intelligence quotient of 85-110 or an expert clinical psychologist's opinion concerning presence of normal intelligence was ensured in each subject of the study.

All the subjects of the study had either minimal amount of therapy or no therapy (before beginning on therapy) at the time of the study.

### **3.2. Method of Data Collection**

For each child, the initial one or two sessions were spent on building a working rapport by the investigator. The actual data collection commenced when the child was comfortable with the investigator and he/she could verbalize freely with the investigator.



The speech evaluation including the evaluation of the structure and functioning of speech mechanism was done along with the subjective evaluations of intelligibility rate and rhythm of speech. The detailed format is given in Appendix-1.

Spontaneous speech, elicited and narrative speech along with the use of some pictures, and an imitation task were used to arrive at the data for language analysis of each child. See Appendix-2 for imitation list.

Tape recording and diary keeping of each session of speech interaction were made. Each recording session lasted 20-30 minutes, and sometimes longer depending on the child's comfort. Each child was put in his most comfortable position namely, prone/supine/sitting with strapper belts of the special chair/sitting without straps during the speech interaction. The comfortable position of each child was ascertained by the investigator to find out the position in which maximum comfort and fluency were present. The data collection in the form of verbal interactions took place when the child was in his most active self usually in the mornings and when he/she was not drowsy. The recording sessions lasted for six or seven days for each child at the rate of one session per day. Thus nearly 3 hours speech sample in total was sought for each child.

### **3.2.1. Recording of Verbal Interaction**

The data was collected both at home and the special centre which the child has been admitted to. Verbal interaction were pursued between the investigator-child, mother-child,

mother-child-investigator, grandfather-child-investigator, father-child-investigator.

Positive reinforcements were used for each session of verbal interaction. The incentive were either sweets/small pictures for each child at the beginning or at the conclusion of each session. This was adopted to ascertain the desired verbal interactions in the sessions.

Attempts at tape recording the conversations with or without the child's awareness was made. In cases where the child was aware of taping of speech, it was used to positively reinforce the verbal utterances as the child showed positive reactions to the same.

Diary keeping for each instance/session of verbal interaction with the child was made with the view to drawing adequate contextual information for the data collected. List of participants in each interaction, the context and period of conversation, the purpose of conversation, antecedent to the present conversation, the mood of the participants, the locale of the conversation, and other chief characteristics of conversation for the each session were noted. Interpretations offered by the adults around for the forms uttered by the child were also noted. The purpose of such detailed recording was to aid in the identification of possible adult forms, the child may have used, to check the correspondence between the forms used by the child and the adult linguistic forms, for assistance in the grammatical parsing and delineating the domains of language

### **3.2.2. The Data for Recording**

#### **Spontaneous Speech**

Spontaneous verbal interactions with the attendant and the investigator around. The child's interaction in natural free play with toys and picture books were also recorded.

#### **Elicitation**

Speech was elicited using pictures and picture books of kindergarten which were likely to elicit long utterances and discourses from the children. Elicited speech samples were either independent conversations by themselves or were part of the longer attempts at verbal interaction.

#### **Narrative Speech**

Story telling and describing picture stories

#### **Imitation**

In order to overcome the possible lacunae in the spontaneous utterances and the data collected in this manner, will be used as adjunct to the analysis of spontaneous speech. List consisting of minimal pairs of sounds and also a number of short phrases and sentences were used. See Appendix-

### **3.3. Method of Data Analysis**

The speech and language characteristics were recorded by a broad IPA transcription of the tape recorded speech interaction. This transcription was also aided by diary keeping.

observation and testing by the investigator. The transcription and analysis followed neo-Bloomfieldian procedures. The phonological analysis, morphological analysis and analysis of syntactic aspects were made in terms of distribution of linguistic forms and the structural patterns they form in the speech of the child. The following items were covered in the linguistic analysis. The choice and scope were also determined by the nature of the speech studied:

1. Phonology

- a. Vowels
- b. Consonants
- c. Phonemic analysis
- d. Phonemic distribution
- e. Paralinguistic features
  - (i) Clarity of speech
  - (ii) Speech rate
  - (iii) Pauses
  - (iv) Quantity of speech
  - (v) Juncture
  - (vi) Intonation

2. Morphology

- a. Nouns
- b. Pronouns
- c. Gender
- d. Number
- e. Case

- f. Conjunction
- g. Verbs
- h. Tense
- i. Adjectives
- j. Numerals
- k. Adverbs
- l. Interrogation
- m. Negation
- n. Kinship
- o. Reduplication
- p. Onomatopoeia

### **3. Syntax**

- a. General characteristics
- b. Single word utterances and their characteristics
- c. Two/multiple word utterances with their characteristics and functions
- d. Relationship between syntax and discourse

The aim of the investigation was not to obtain a detailed linguistic analysis but to obtain a comprehensive profile of speech and language structures in each of the children studied.

After the evaluation of each child's speech corpus, an intra-group comparison of the speech and language characteristics of spastics and athetoid groups was made. Finally an intergroup analysis between the two groups was made by comparison. Thus, the analysis was three fold:

- (i) Individual description of each patient.

- (ii) Intra-group pattern establishment for each of the two groups, namely, spasticity and athetosis.
- (iii) Inter-group comparison of the speech and language; profiles obtained, for each group and the general observations for the disordered group as a whole.

#### **3.4. Problems Encountered in the Analysis**

The retrieval of a word/sentence from an utterance was difficult in the speech of CP children because of the following reasons:

1. Poor articulation of speech sounds including distortion, substitution, omission or deletion, freevariation and abbreviation of speech sounds, partial variations and neologisms in place of target words.
2. Poor clarity because of the above problems leading on to poor intelligibility and understandability of speech.
3. Reduced/limited quantity of speech output.
4. Reduced rate and abnormal stress patterns in their speech.
5. Abnormal/absence of appropriate intonation patterns.
6. Problem of identification of an utterance as a word because of inappropriate pauses and intonations.

### 3.5. Points aiding in Analysis

However, in spite of the difficulties in retrieval of words from utterances, identification of the linguistic units sounds and words was made by the following guiding hints.

1. Intuitive judgement of the investigator.
2. Contextual information gathered from diary keeping.
3. Familiarity with target words.
4. Frequency of the words uttered by these children.
5. Intuitive assessment of the internal coherence of the
6. Parental/attendants' guidance.
7. Knowledge and reference of adult Kannada.
8. Status of units as found in research articles.
9. The presence of initial syllables of a word in utterances.
10. Distribution of phonemes

The analysis focused on the internal patterns of the speech and language data of the CP children with normal language and speech as the background in the format described earlier (see section 3.3).

## CHAPTER IV

### RESULTS AND DISCUSSION

#### Part I Individual Speech and Language Profiles

##### A. Speech and Language Profiles of Spastics

###### 4.1. Speech and Language Profile of C<sub>1</sub>

###### Personal Information

C<sub>1</sub> is a 4 year old male child who is the first and only child to his parents. An his four limbs are affected with spasticity, with the lower limbs more affected than the upper ones. He is mobile and moves around on his legs although very clumsily so. He is observant and cognizant of the surroundings. He is a naughty and 'intelligent' boy with a streak of stubborn nature in him.

C<sub>1</sub>'s parents are well educated (both are graduates) and belong to middle class in terms of socio-economic status. Mother was also working, but she quit the job to take care of the child. She takes very active interest in the child and keep; herself informed as regards the general diagnosis and therapy procedures of Cerebral Palsy. The parents live in a joint family set up and work well with the child.

The child's problem was present from birth but was identified around 1 year of his age. The affliction was diagnosed as spastic quadriplegia of the moderate degree by the paediatric neurologist.



C<sub>1</sub> uses speech and gestures for communication. He speaks a lot but the speech sounds more like jargon. He tries a lot to communicate but it is not well understood by the people around. This perhaps makes him fall back frequently upon gestures. He is comfortable in sitting down position on a chair suitable for his height. The speech corpus for the study was collected in this most comfortable position.

### Phonological Profile of C<sub>1</sub>

C<sub>1</sub> has a limited phonological system. This apart, he also exhibits severe inconsistencies in the use of appropriate sounds, especially consonants in comparison with normal spoken Kannada language. (For a description of normal spoken Kannada, see Schiffman 1979; Nayak 1967; and Upadhyaya 1972).

### Vowels

The following table gives the list of vowels found

	Front	Central	Back
High	i	ɨ	u
	i:	ɨ:	u:
Mid	e		
	e:		
	aɛ		o
	aɛ:		o:
Low		a	
		a:	

The table reveals that C<sub>1</sub> produces all the vowels in normal spoken Kannada language. The use of these vowels, however, is extremely inconsistent. This aspect is dealt with later in this section. C<sub>1</sub> also has four additional vowels, namely,  $\text{ɨ}$ ,  $\text{ɨ:}$ ,  $\text{ɛ}$ , and  $\text{ɛ:}$  which are marginally used, very often in place of u and its counterpart u:, and e and e: respectively. The last two vowels  $\text{æ}$  and  $\text{æ:}$  are used either in words considered to have been borrowed into normal spoken Kannada, or in conditions in which C<sub>1</sub> is unable to fully pronounce e and e:.

C<sub>1</sub> also uses two diphthongs au and ai. While the former is retained as a diphthong, the latter may be pronounced either as a diphthong or as a combination of a and the semivowel y.

### Consonants

The normal spoken Kannada has the following consonants (Schiffman 1979).

	<u>Stops and Nasals</u>				Nasals
	Voiceless		Voiced		
	un-aspirated	aspirated	un-aspirated	aspirated	
Velar	k	kh	g	gh	n
Palatal	c	ch	j	jh	ɲ
Retroflex	ʈ	ʈh		ɟ	ɳ
Dental	t	th	d	dh	n
Labial	p	ph	b	bh	m

	Glides	Sibilants	Fricatives	Laterals	Continuant:	
	Glides (voiced)	Sibilants voice- less	voic- ced	Fricatives (voice- less)	Laterals (voiced)	Continuant: (voiced)
Pharyngeal				h		
Retroflex		s			l	
Apico- palatal	y	• s			• l	
Alveolar		s	z		l	r
Labial	v			f		

In the present case, C<sub>1</sub> has the following consonants in his speech.

#### Stops and Nasals

	Voiceless	Voiced	Nasals
Velar	k	g	
Palatal			
Retroflex			
Dental	t	d	n
Labial	p	b	m

	Glides	Sibilants	Fricatives	Laterals	Continuants
Pharyngeal					
Retroflex					
Apico- palatal	y.				
Alveolar				l	
Labial	v				

The tables above reveal that  $C_1$  has only the following sounds in his consonant system: The voiceless and voiced stops k, g, t, d, p and b. The nasals include the dental and the labials n and m. Note that the corresponding velar nasal is absent.

The following are the sounds absent in  $C_1$  's repertoire,

1. All aspirated sounds
2. Palatal stops c and j
3. Retroflex stops ṭ and ḍ
4. Velar, palatal and retroflex nasals ŋ, ɲ, ɳ respectively.
5. Sibilants ʃ, s and z
6. Fricatives h, and f
7. Retroflex lateral ɭ
8. Trill r

From the description above it is clear that in none of the points of articulation does  $C_1$  produce all the sounds produced in that point of articulation in normal spoken Kannada speech. In terms of their occurrence, a descending hierarchy of points of articulation is as follows:

Bilabials

Dentals

Velar

Alveolar/Palatal (semivowel)

The following points of articulation are not used at all:

Retroflex (stops, nasals, sibilants and laterals) and Pharyngeal.

The hierarchy of manner of articulation in  $C_1$  is as follows:

Stops

Voiceless and voiced

Nasals

Semivowels

Lateral

Note that sibilants and other fricatives and trills are not at all found used.

By the aforementioned findings one can see that  $C_1$  has no problem for vowels. The consonants that are produced by  $C_1$  may be considered as those which involve a single and total constriction in their production. In comparison, the palatal, retroflex sounds, sibilants and fricatives that require finer manipulation of the tongue in the sense that these require maintaining narrow aperture, arduous movement on the part of the articulator (the tongue) in relation to other articulators are affected severely.

### Phonemic Analysis and Distribution

A chief characteristic of the speech of  $C_1$  is that

minimal pairs are not readily found in the spontaneous speech corpus of C<sub>1</sub>. The minimal pairs found as responses to the imitation task, and analogous pairs found in the same responses alone allow one to suggest that the sounds listed in the above tables may, more or less, function as independent phonemes.

Minimal pairs are not found mainly because of the sparse speech produced by C<sub>1</sub> which when coupled with the spastic dysarthric difficulties may have led to reduction in the sounds at his disposal. This, however, has not reduced the need for additional sounds and words as C<sub>1</sub> is cognizant of and sensitive to the environment. This mismatch between his phonological ability and cognitive needs has resulted in freevariations and inconsistencies.

It is seen in the data that since there are only a lesser number of sounds used by C<sub>1</sub>, when compared with normal Kannada speech, there is a lot of overlapping of speech sounds and/or correspondences maintained between the speech sounds.

The following correspondences (substitutions) are noticed. Note that these substitutions are sporadic and do not follow any regular pattern. There are, however, some exceptions like a voiceless sound is generally substituted by another voiceless sound and a nasal is generally substituted by another nasal. Where C<sub>1</sub>'S phonology does not have a particular sound found in normal spoken Kannada, the same is substituted by one of the sounds available in the phonology

of  $C_1$ . In this last case, there does not seem to be any pattern maintained. Two or three repetitions of the same substitution are, however, noticed as in substitution of y for r. 1 which is found in the speech corpus is also substituted by y. These are illustrated below:

m for n	ma:yi for	na:lige	'tongue'
y for r	la:yi for	la:ri	'lorry'
t for c	tatta for	cakra	'wheel'
t for t	te:yi for	te:bal	'table'
b for g			
and }	bugakki for	gubbacci	'sparrow'
k for c			
d for b	dayu: for	balu:n	'balloon'
	and} bayu:n for	balu:n	'balloon'
y for l			
k for ṭ	mokke for	moṭṭe	'egg'

There are no allophonic variations identified as regards the consonants. We have ignored the inconsistent correspondences as well as the poor clarity of speech as constituting allophones since they do not fall into a pattern either in terms of distribution or in terms of points and manner of articulation.

$C_1$ 's speech exhibits no homophonous forms in spite of sporadic and inconsistent correspondences.

### Phonemic Distribution

There are no differences between the distributional characteristics of the phonemes found in normal Kannada and the phonemes in C's speech.

Most words in C<sub>1</sub>'s end with a vowel as found in normal speech.

All the consonant phonemes occur initially and medially. Most of these sounds, including semivowels, also occur in gemination in the medial position. Thus, considering only the positional occurrence of the sounds of C<sub>1</sub>, C<sub>1</sub>'s speech presents more or less a distribution of the consonants it has resembling normal Kannada. However, the pattern of distribution found in C<sub>1</sub>'s speech is a simplified version of normal Kannada speech patterns in several other respects. The following simplification patterns are noticed.

1. Multisyllabic words are reduced to monosyllabic and very rarely disyllabic formation.

gu or gugu for gubbacci 'sparrow'

e:ga for e:ro:ple:n 'aeroplane'

2. In the reduction process, the consonant sounds that do not form part of the phonology of C<sub>1</sub> will be totally deleted.

gu for gini 'parrot'

u: for huḷi 'sour'

Note that h, ŋ and ɭ do not form part of C<sub>1</sub> phonology and thus are deleted.



3. the non-identical clusters in the normals' speech will be made into identical clusters.

buggi for bugri 'top'  
kikki for kitki 'window'

4. Replacement of a gemination of an unfamiliar consonant sound by a gemination of a known or available sound found in his phonology.

otte for hotte 'stomach'

5. Substitution of a known/familiar and available consonant sound for an unfamiliar consonant sound found in the normal Kannada speech.

timma for simha 'lion'.

6. There are two processes noticed as regards the distribution of nasal clusters

- (i) In some cases, the homorganic nasal plus stop cluster is retained.

bombu for bombe 'doll'

- (ii) In some, the homorganic nasal plus stop cluster such as -ṅṭ- which is not found in C<sub>1</sub>'s speech is uttered as a homorganic nasal plus stop cluster, with both the consonants found in C<sub>1</sub>'s speech.'

eṅṭu becomes entu 'eight'

7. Use of an entirely different utterance for the adult word

atta for hagga 'rope'

amma for kenne 'cheek'

kuki for sruti 'name'

8. Use of a neologism for the adult word,

kaika for pavithra 'name'

amuta for elifeṇṇ 'elephant'

Thus it is seen that C<sub>1</sub> employs processes of deletion, distortion, substitution, abbreviations and additions in his phonology to simplify normal Kannada utterances.

### **Paralinguistic Features**

C<sub>1</sub> has a voice that is mildly low pitched, adequately loud and slightly harsh in quality.

### **Clarity of Speech**

C<sub>1</sub> has a very severely unclear speech. An unaccustomed listener would need several repetitions along with the assistance of C<sub>1</sub>'s mother before he/she could understand him. Even C<sub>1</sub>'s mother, who is familiar with his speech most of the time, had problems in understanding him at times. The extremely affected articulation due to dysarthria, and probably inadequate cognitive skills, along with the abnormal pauses, stress and juncture affected the intelligibility of his speech.

### Speech Rate

C<sub>1</sub> has a rate of speech that is extremely slower than normal. This is also contributed by the difficulty of production of sounds, the longer and abnormal pauses, and the longer response time.

### Pauses

C<sub>1</sub>'s speech is abundant with abnormal pauses. Pauses are seen both between syllables of a single word as well as between the occasionally seen two-word utterances. The pauses are more prolonged than normal.

### Quantity of Speech

C<sub>1</sub> has a speech output that is very less compared to his peers. This is because of his single word utterances, longer response time/reaction time for each utterance, abnormal and long pauses and the lack of self-initiated speech in his speech sample.

### Intonation

The speech of C<sub>1</sub> is not indicative of presence or absence of intonation patterns. His verbal output mainly consists of single word utterance. In a very few two-word utterances seen, there seem to be inadequate intonation patterns even in single word utterances that have inherent intonations such as some imperative forms nillu 'stop'/'stand'; kudi 'drink' etc., C<sub>1</sub> has difficulty in using correct intonations.

He utters them in a non-inflected fashion. As a result of this, combined with the poor intelligibility of his utterances, it is extremely difficult to decipher his utterances & intonations.

### Morphological Profile of C<sub>1</sub>

C<sub>1</sub> does not exhibit any affixation process. Where there are suffixes in the utterances they are treated as integral part of the word given by C<sub>1</sub>. There is no overt marking for case relations, tense, gender and number, time, manner and location and other qualitative characteristics. Thus the above said semantic notions are not explicit in the speech of C<sub>1</sub>. The inference of such notions, is left to the imagination of the listener based on the context of situation and familiarity of target word.

C<sub>1</sub>'s speech does not also clearly distinguish between nouns, verbs, adverbs, adjectives and postpositions since he mostly uses single word utterances only.

C<sub>1</sub>'s speech, however, has more nouns than verbs. The verbs, when used as single word utterances are used in the root forms only. Verb endings are absent. During repetition task he attempts to retain the verb endings.

The initial syllable of the target word is not retained in most cases and as such there is very little direct correspondences between his speech and normal Kannada words. In this regard, the entire data can be divided into three major groups.

- (i) Group of utterances which retains partial similarity mostly on initial syllables and correspondences in gemination.

atta	for	akka	'elder sister'
a:yi	for	na:yi	'dog'
iyyi	for	illi	'here'
kitti	for	kurci	'chair'

- (ii) Group of utterances which does not have any direct similarity with the target normal utterances but may have some similarity through certain correspondences, in terms of number of syllables, syllabic reversals, and syllabic correspondences through substitution.

bu:ga	for	gu:be	'owl'
bugakki	for	gubbacci	'sparrow'
gaga	for	gadya:ra	'clock'
gu:	for	gini	'parrot'
ambii	for	angi	'shirt/dress'

The difference between (i) and (ii) categories is that while the utterances of the first category may have some partial similarity in shape as well as certain correspondences the utterances of the 2nd category do not have any direct similarity in correspondences with the distributional patterns and the choice of particular sound.

- (iii) The use of neologisms or entirely different items

gugu	for	buguri	'top'
ba:y	for	buguri	'top'

da:ci for ba:tu 'duck'  
 a:ya:ya for pa:riva:la 'pigeon'

(iv) Use of borrowed words with or without distortions

mammi for mammi 'mother'  
 ba :bu for ba:g 'bag'  
 mo for no: 'no'

### Grammatical Categories in C<sub>1</sub>

The single word utterances are

- (i). Nouns in most instances and
- (ii) Verbs or nominalized verbs

These are, however, not retained in full in both single and two-word utterances. Nouns are retained usually with no inflections.

ku:ka for sumukhandu (his own name) 'sumukha's'

This was in response to the question 'whose is the toy horse?'  
 Verbs have only root forms with no inflections.

kuyi for ju:sna kuditiddaine '(He) is drinking juice'

### **Pronouns**

Kannada has the following pronouns (Schiffman 1979).

I Person	na:nu	'I'	na:vu	'we'/'us'
II Person	ni:nu	'yourself'	ni:vu	'yourselves' (plural) 'yourself'

**III Person**

	masc.	avanu	'himself'	avaru	'themselves' (plural/honorific)
Remote	fem.	avaḷu	'herself'	-do-	-do-
	neut.	adu	'that'	avugaḷu or avu	'those'
	masc.	ivanu	'himself'	ivaru	'themselves' (plural/honorific)
Proximate	fem.	ivaḷu	'herself'	-do-	-do-
	neut.	idu	'this'	ivu/ ivugaḷu	'these'

C<sub>1</sub> does not use pronouns except on an imitation task. He was found to use only one pronoun and that too was not distinguished correctly. He used ni:nu 'you' for na:nu 'I' in the utterance ni:nu ni:yu for na:nu ni:ru kuditini 'I am drinking you water I am water drinking water

ni:nu ku:ti for na:nu ku:tkoṇḍi:ni  
you sitt(ing) I am sitting down

C<sub>1</sub> does not use any other pronouns. According to the information given by the mother C<sub>1</sub> confuses between the use of na:nu 'I' and ni:nu 'you'. Mother complained a reversal between the two in the sense that he uses regularly ni:nu for na:nu. She has not complained that C<sub>1</sub> used na:nu 'I' for ni:nu 'you'. Our data does not indicate consistent use of ni:nu for na:nu.

**Gender**

Kannada has the following gender system (Schiffman 1979). There is no gender marking for first person and second

person gender, na:nu and ni:nu respectively. Third person singular is specifically marked for gender.

	(masc. avanu 'he'
Remote	(fern. avaiu 'she'
	(neut. adu 'that'
	(masc. ivanu 'he'
Proximate	(fern. ivat'u 'she'
	(neut. idu 'this'

Besides, the finite verb endings also have gender marking in the III person.

-ne, -nu, -aa	masc.
- e, - u,	fem.
-de, -tu	neut.

C<sub>1</sub> does not distinguish between genders as seen in the lack of appropriate affixation either in nominal forms or verbal expressions. He did not also distinguish pictures of male and females correctly.

Gender seems to be distinguished only while using kinship terms like appa 'father'

amma 'mother' etc.

This could be because of habitual exposure to these terms mnemonically. .

C<sub>1</sub> exhibits difficulties in mastering words that would distinguish sex of the members of the same species. This difficulty appears to be shared by other subjects as well, and



is discussed in some detail under  $C_2$ .

### Number

Kannada has the following number system. No distinguishing suffix for singular, and use of -aru and -gaḷu for plural marking with some exceptions.

Singular	huduga	'boy'
	hudugi	'girl'
	mara	'tree'
Plural	hudugaru	'boys'
	hudugi:ru	'girls'
	maragaḷu	'trees'

$C_1$  does not discriminate between singular and plural in the utterances. Even on a comprehension task he does not discriminate between single or multiple objects. In the verbal constructions also his utterances do not have any provision to indicate the number since there is no PNG (Person-Number-Gender) marking in the verb phrases of  $C_1$ .

### Case

Without going into theoretical and descriptive details, one may suggest that Kannada has the following 'case system' (Schiffman 1979).

- (i) The Nominative Case; The basic form of the noun with no apparent marker in the surface form.

(ii) The Genitive Case indicating possession.

Suffix

-da marada 'of the tree'

-a avaḷa 'her'<sup>1</sup>

"-(iii) The Accusative Case indicating that a noun is an object of the action of a verb.

Suffix

-anna maravanna 'tree' (object)  
(accusative case)

avaru maravanna kadidaru

they tree (accus.) cut

'They cut the tree'.

(iv) The Dative Case to express motion toward a noun, benefaction by the noun, etc.

Suffixes

-kke marakke 'to(ward) the tree'

-ige manege 'to the house'

(v) The Locative Case to express location mainly

Suffix

-alli maradalli 'in/on the tree'

(vi) The Instrumental/Ablative Case indicating instrumental (by means of) and ablative (motion away, from something) notions.

Suffix

-inda maradinda 'from the tree'

kattiyinda 'by the sword'



past forms marked with person-number-gender (PNG), modals and verbal nouns. The nonfinite forms include infinitives, verbal and adjectival participles, and verb stems.

**Verb stems** The verb stem is a non-finite form to which present tense markers, infinitives markers and several other grammatical forms are added: ho:gu 'go'

**Past verb stems** Majority of past verb stems are formed by adding past tense marker -id- to the verb stem.

ho:gu      ho:danu      'He went'.

Note that past verb stems have several ways of getting inflected in Kannada. Comparatively speaking past tense formation is more complex than the formation of non-past tense constructions in Kannada.

**Infinitive** The infinitive suffixes +-al, and +-okke are used to express purpose.

ho:galu      'to go'

ho:gokke      ' -do-

**Imperative** Commands, exhortations are usually imperative forms in non-polite, singular state.

kodu      'give'

ho:gu      'go'

In case of C<sub>1</sub> first of all, there are very few verbs used, in comparison with the nouns. However, when present, they occurred mostly as single word utterances or as the second item

of the rarer two-word utterances.

kuyi for kudta:idda:le 'She is drinking'

a:yu be:ku '(I) want milk' (obj.)

In the two word utterances as in the second example, above, the preceding item may be a subject or an object noun and the verb would be a modal or any other imperative.

Single verb utterances also rare and occur in the imperative or verb root form only. It may also be noted that simplification occurred even in these forms and abbreviation, deletion or substitution of the sounds were usually seen:

kogu for kodu 'give'

Because of the lack of inflections, except for the semantic interpretations, the verbal forms behaved as nouns in most instances.

Even among the verbs used, transitivity was explicit in most, and intransitive forms were found least used.

(intransitive) o:kku for ho:gu 'go'

(Transitive) tiyyu for tinnu 'eat'

### Tense

Kannada makes the past and non-past distinction as indicated by different suffixes.

The present tense marker is -tt- that usually occur between the verb stem and PNG markers with some exceptions.

Past tense marker is usually -id- that occurs with PNG markings.

By the available data it is seen that C<sub>1</sub> has not mastered past-non-past distinction. Verb forms are usually devoid of any inflections for tense. Note also that PNG markings were very rarely seen in verbal constructions. On imitation tasks also there was very unsuccessful attempt at the tense suffixation as in the following.

matta for ma:dtai;ne 'he is doing'

### Numerals

Kannada has the following numeral system.

- (i) Cardinal numerals indicating the sum of what is being counted:

ondu 'one'  
 erdu 'two'  
 mu:ru 'three'

- (ii) Ordinal numerals indicating order of the item in a set,

ondne : 'first'  
 erdane: 'second'  
 mu:rane: 'third'

C<sub>1</sub> used cardinal numerals mnemonically from 1-3. That is, he used onnu 'one', addu 'two', mu:yu 'three'. However, he could not match the said number with the actual number of objects. He did not also repeat numbers beyond three successfully. He does not have a distinction between ordinal and cardinal numerals at all. Thus he has not mastered the numeral system. Note that the singular-plural distinction is also not maintained.

### Adverbs

Kannada has adverbs of place, manner and time according to their meanings (Andronov, 1969). Some of the examples are as follows:

munde	'infront (of)'
i:ga	'now'
be:ga	'quickly'

C<sub>1</sub> does not use adverbs of location, manner or time except on imitation task.

### **Interrogation**

Kannada has the following basic interrogative markers (Schiffman 1979).

(i) -a: usually added to a constituent of a sentence being questioned.

barala:?	'Shall I come?'
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## (ii) wh- interrogatives

e:nu?	'what'
e:ke/ya:ke?	'why'
elli?	'where'
ya:va:ga?	'when'
ya:ru?	'who'
he:ge	'how'
eṣṭu?	'how much'

In comparison, C<sub>1</sub> uses no interrogative markers nor does he use interrogative intonation. Hence the questions such as the following that are directly relevant for cognitive development and vocabulary acquisition are never raised.

adu e:nu	'What is that?'
adu elli	'Where is that?'
ya:va:ga	'When?'
he:ge	'how?'
ya:ke	'why?'

C<sub>1</sub> has not acquired interrogation yet. This child has non-verbal gestural ability. But this gestural ability also is not used or is rarely used in place of the different types of verbal questions listed above.

**Negation**

Kannada has the following simple negative morphemes.

illa	'not present'	barlilla	'did not come'
alla	'not'	avanalla	'He is not the one.'



These occur independently as well as in conjugation with verbs or other constituents of a sentence.

Besides the above there are also the modal negative *be:da* 'do not want', and the prohibitive negative *ba:radu* 'should not', *ku:dadu* 'should not'

$C_1$  indicated negation in the following manner, listed in the descending order of proportional usage.

- (i) Horizontal shaking of head
- (ii) Use of *be:ya* for *be:da* 'do not want'
- (iii) Use of *iyya* for *illa* 'no'/'not'.

The use of the latter two morphemes was very minimal. Other negative morphemes are not used at all.

### **Adjectives**

Adjectives in Kannada can be 'true' or 'derived' (Schiffman 1979). The second type of adjectives can be derived from nouns or verbs. The 'true' adjectives are usually qualifier or quantifiers.

<i>cikka</i>	'small'
<i>dodda</i>	'big'
<i>hosā</i>	'new'
<i>haleya</i>	'old'

No adjectives of quality or quantity are found used by  $C_1$  except the colour terms which will be dealt with later.

### Colour Adjectives

C<sub>1</sub> uses some basic colour terms with less efficiency and certainty.

keppu or tempu for kempu 'red'  
 akku for hasiru 'green'

These terms were not matched with the corresponding actual colours.

### Kinship Terms

C<sub>1</sub> uses the following kinship terms usually as address terms, and very infrequently for reference purposes.

amma 'mother'  
 appa 'father'  
 pa:pa 'child'  
 magu 'child'  
 aggi for ajji 'grand mother'  
 ta:ta 'grand father'  
 a:ṅṅi 'aunty'

These are used quite frequently and correctly, probably because of continuous exposure to these terms as the individuals addressed to and referred to have constant contacts with the child in the household.

### **Reduplication**

Reduplication (repeating a word or part of a word more than once) is used in Kannada to provide various semantic

functions such as intensification, emphasis, addition, distribution, enumeration, etc. The examples are given below.

(i) Intensification or emphasis

be:g be:ga 'very fast'  
 ho:ge: ho:gtini '(I will) definitely go.'

(ii) Distribution

e:n e:nu be:ku? 'What all do you need?'  
 ya:r ya:ru bandru? 'Who all came?'

(iii) Enumeration with numerals

erd erd ca:kle:ʈ 'two chocolates each'

(iv) Echo word reduplication

huli gili 'tigers and other animals'

C<sub>1</sub> indulges himself very frequently in reduplicative items in which the same syllable is repeated several times. However, these do not fit into any of the above categories. In contrast, these reduplicative forms, for example, ga ga ga for gadya:ra 'clock' bear a resemblance to the process of stuttering—a disorder of fluency characterized by hesitations, repetitions prolongations and pauses in speech. It is more likely that these episodes in C<sub>1</sub>'s speech can be related to the stage of non-fluency noticed frequently (Berry and Eisenson, 1962) in normal children around 2 year of age, which is said to be a function of inadequate language acquisition vis-a-vis mastery over fluency. In several cases it is seen related to the subsequent

stuttering ( Van Riper, 1978) In the present case it is more likely that C<sub>1</sub>'s reduplication is reflective of that stage of non-fluency abutted by the CP condition.

These reduplicative items are not self-emitted utterances to be categorized either as babbling or self-talking. They were all responses to elicited speech and they occur more on initial syllables only. They were seen as problems in responsive/elicited speech.

### Onomatopoeia

C<sub>1</sub> uses onomatopoeic reduplicative forms such as the following:

poy poy	'horn of the car'	
bam bam	'dongs of the clock'	
kikiki:k	'scooter screech'	
bau bau	'dog's bark'	
miyya:	'cat's	mew' ::

The terms indicated the process of action and usually referred to the objects which performed these actions.

### Syntactic Profile of C<sub>1</sub>

In C<sub>1</sub> there are mostly single word utterances. Two or three word utterances are very rarely found. The longest sentence or phrase noticed was 2-word utterances which were very few. But the inappropriate utterances and prolonged pauses, and

dysarthric errors make it difficult to distinguish them as independent sentences.

There is no open and pivotal class in the utterances ( Mc Neill,1966 ) Each utterance functioned as a separate sentence.

The single word utterances were

- (i) replies to questions asked,
- (ii) repetitions after another speaker and
- (iii) perseveratory responses occasionally.
- (iv) There were no linking morphs between the utterances.

magu a:yu

baby milk

- (v) The utterances were phonologically simpler than the target

gakke for gaṅṅe 'time'

tanna for candra 'moon'

- (vi) The single word in the utterances were usually the crucial linguistic items in the corresponding normal Kannada sentence.

tentil for pensil for the target utterance of  
i: huduga ya:tralli bari:ta: ida:ne? 'what is this boy  
writing with?'

- (vii) The utterances were usually object/event identification

utterances.

Exemplified as above.

- (viii) The utterances serve the need-filling function when spontaneously, spoken, which is very rare.

ni:yu for ni:ru '(I want) water'

- (ix) The utterances functioned as subject.

pa:pa 'baby' for pa:pa ha'lu kudita: ide  
'The baby drinking milk.'

- (x) They functioned also as object. Exemplified as in (viii) above.

- (xi) They functioned as predicate.

be:ya for be:da  
target nange u:ʔa be:da 'I do not want food.'

- (xii) They were simplified all the time with deletion/substitution, distortion/abbreviation as illustrated in phonology section.

No coherence between the single word utterances is seen unless instigated by the listener, over a stretch of utterance thus forming discourse. Discourse markers are otherwise absent.

#### 4.2. Speech and Language Profile of CU

##### **Personal Information**

C<sub>2</sub> is a five year old male child who is the first and only issue to his parents. He is immobile since his lower limbs are more affected (arms are comparatively very less affected) with spasticity. He is observant and cognizant of his surroundings. He looks around curiously (with corrected vision with spectacles for short sightedness) and demands 'verbally' to get things done for him. He is probably a little overprotected because of his handicap.

C<sub>2</sub>'s parents are well educated (father is a graduate and mother has studied upto matriculation) and belong to middle class in terms of socioeconomic status. Parents take good care of the child. They live in a joint family setup and C<sub>2</sub> has at least 2-3 people who constantly attend to him.

The problem was present from birth but was identified around 2 1/2 years of age. The problem of C<sub>2</sub> was identified by the neurophysician as spastic quadriplegic of the moderate degree with the lower limbs more affected than the upper limbs.

C<sub>2</sub> uses speech for communication. Although his speech is not very clear, his needs are well understood by his family members who are very familiar with him. He is comfortable in his sitting down position with his legs folded across, on the chair, and speech sample for this study was collected from him in this position.

## Phonological Profile of C<sub>2</sub>

C<sub>2</sub> does not produce all the sounds of normal spoken Kannada. This is not true, however, with the vowels in his repertoire.

### Vowels

The following table gives the vowels found in C<sub>2</sub>'s speech,

	Front	Central	Back
High	i		u
	i:		u:
Mid	e	æ	o
	e:	æ	o:
Low		a	
		a:	

The table reveals that C<sub>2</sub> used all the vowels found in normal spoken Kannada language. In addition, he is found to use the æ, sound also along with its long counterpart. Note that these latter two sounds occur in loan words in Kannada, as they did in C<sub>2</sub>'s speech.

### Consonants

has the following consonants in his speech.



Stops and Nasals

	Voiceless		Voiced		Nasals
	un- aspirated	aspirated	un- aspirated	aspirated	
Velar	k	g			
Palatal	c	j			
Retroflex					n (occasionally noticed)
Dental	t	d			n
Labial	p	b			m

Glides Sibilants Fricatives Laterals Continuant:

Pharyngeal				
Retroflex			ɭ (occasionally noticed)	
Apico- palatal	y			
Alveolar			l	
Labial	v			

From the above tables it is obvious that the following sounds are present:

The voiceless stops k, c, t, p and their voiced counterparts g, j, d and b.

Nasals n, m and occasionally ŋ

Semivowels y and v

The laterals *l*, and *ɭ* occasionally.

The following sounds are not present.

All Aspirated sounds *H*

Retroflex stops *ɖ* and *ɗ*

nasals *ŋ* and *ɳ*.

All sibilants *ʃ*, *ʃ'* and *s* and *z*

Fricatives *h* and *f*

Trills *r*.

The retroflex nasal and lateral are noticed very occasionally and are heavily distorted. Thus, sounds which require finer manipulation of the tongue, maintenance of narrow aperture and arduous movement like retroflex sounds, trills, sibilants and fricatives are characteristically absent. Comparatively speaking, the generous occurrence of the stop consonants vis-a-vis the negligible occurrence of non-stop consonants, coupled with the particular absence of sounds for the production of which one requires a finer manipulation or handling of the tongue characterize the consonant profile of C. In the imitative task also, the child was unable to produce these sounds. The sounds that C produces are generally produced fairly clearly. At times, there is mild distortion. However, for those who are not exposed to his speech, even sounds that are produced clearly appear to have some mild distortion.

### **Phonemic Analysis and Distribution**

The sounds listed in the table cannot be established

as phonemes for the same reasons stated in the phonological profile of C<sub>1</sub>. See the appendix for minimal pairs on the imitation task.

It is seen in the C<sub>2</sub> data that there are only a lesser number of sounds used by C<sub>2</sub> when compared with normal spoken Kannada. There is a lot of overlapping and/or correspondence between speech sounds used by C<sub>2</sub>. This overlapping and (or correspondence) is of the following types.

(i) Consistent correspondence

use of t for c as in the following:

tikkamma for cikkamma 'aunty'

(ii) Inconsistent or occasional correspondence

l for r le:llo for re:dyo 'radio'

a for r a:yo for re:dyo 'radio'

(iii) Sporadic correspondence where any sound is substituted

use of p for b patte for baṭṭe 'dress'

b for b batte for baṭṭe 'dress'

Though one may tend to treat the sounds produced with poor clarity as allophones, there appears to be a need to ignore the poor clarity of pronunciation and not treat them as allophones since with greater effort, C<sub>2</sub> is able to approximate the given sound. Furthermore in isolation as well as in

individual words one always notices a range of poor clarity to better clarity within the same points and manner of articulation

There are no allophonic variations identified as regards consonants since all the consonants occurring in C<sub>2</sub>'s speech are identified as occurring in contrasting positions in imitation task and as analogous pairs in the speech corpus. But this contrast is not the one generally found in normal language in the sense that these contrasts do not go into the making of lexicon and/or distinguishing one lexical item from another. These contrasts, within the limits of the three categories listed above, namely, consistent correspondences, inconsistent correspondences and sporadic freevariation are not built into a creative scheme for the coinage and use of new vocabulary. As a result, C<sub>2</sub>'s speech exhibits a considerable increase in the occurrence of homophonous forms.

### Phonemic Distribution in C<sub>2</sub> Speech

In the speech of C<sub>2</sub>, k and g occur initially and medially in a word. They also occur medially in gemination in a word. Thus there is no difference between the distributional characteristics of this sound in normal speech and C<sub>2</sub>'s speech.

ka:tu	for	ka:ru	'car'
akka	for	akka	'elder sister' (a general form of address as well)

This is largely true for other consonant stops as well

The bilabial and dental/alveolar nasals occur in the word initial and medial positions. The semivowels v and y occur both in initial and medial positions. All the consonant and semivowels also occur in gemination in medial positions. Thus, there is an overall pattern of distribution for all the consonant sounds in the speech of C<sub>2</sub>. In other words C<sub>2</sub>'s speech presents a more or less homogenous or identical pattern of distribution for all the consonant sounds. This picture is, of course, different from the picture in normal spoken form, where distribution patterns generally vary from group to group, stop to nasals to semivowels, etc. The pattern of distribution found in C<sub>2</sub> is, thus, a simplified pattern of distribution in normal speech. With this simplification, identification of a lexical item in C<sub>2</sub>'s speech in relation to normal Kannada speech becomes a problem when the words used by C<sub>2</sub> are to be listened to and to be understood. Dependence on the immediate contextual situation in which the utterances were made becomes a necessity.

The simplification itself involves the following processes.

- (i) More frequently multisyllabic words are reduced to monosyllabic and very rarely disyllabic formations.

acci	for	ausadi	'medicine'	
kat	for	kæ:reṭ	'carrot'	• •

- (ii) In this reduction, the consonant sounds that do not form part of the phonology of C<sub>2</sub> will be totally deleted.

e:yo for re:dyo 'radio'

- (iii) The non-identical clusters in normal spoken Kannada will be made into identical clusters. This conversion of non-identical to identical clusters is two-fold.

- (a) The deletion of the consonant sound that does not form part of C<sub>2</sub> phonology, retention of the consonant that forms part of C<sub>2</sub> phonology and the conversion of the latter into a geminated form.

takka for tarka:ri 'vegetables'

- (b) Deletion of the second consonant of the non-identical cluster even if this consonant forms part of the phonology of C<sub>2</sub> and conversion of the former into a geminated sound.

a:ttu for ba:tlu 'bottle'

- (iv) Replacement of a gemination of a consonant phoneme in normal speech which does not find a place in C<sub>2</sub> phonology by a gemination of a sound found in his phonology

baccu for bassige '(to the) bus'

- (v) Substitution for a consonant phoneme of normal speech that is not found in C<sub>2</sub>'s speech by the consonant that is found in C<sub>2</sub>'s speech.

ka:tu for ka:ru 'car'

- (vi) Retention of the initial syllable and addition of another syllable/syllables to stand for the deleted sounds from the normal spoken form.

pollu for paudar 'powder'

- (vii) Retention of initial syllable and deletion of all other syllables through the substitution of a geminated consonant, followed by a vowel for the deleted portion of the spoken form.

addi for angadi 'shop'

auci for auadi 'medicine'

- (viii) The use of an entirely different utterance for the normal spoken word.

ba:la for be:da 'do not want'

- (ix) Non-identical homorganic clusters would be simplified into a gemination with one of the consonants found in C<sub>2</sub>'s speech.

gunni for gundi 'button'

- (x) Yet another method of simplification is the resort to neologism.

iggu for siva 'a proper noun'

Thus C<sub>2</sub>, like C<sub>1</sub>, employs the processes of distortion, substitution, deletion, addition and abbreviation and their combinations in his efforts to simplify utterances of normal spoken Kannada.

### **Paralinguistic Features in C<sub>2</sub>**

C<sub>2</sub> has a voice that is very slightly low pitched, soft and hoarse in quality.

### **Clarity of Speech**

Clarity of speech is only moderately affected in C<sub>2</sub>. Misarticulation due to dysarthria, abnormal stress and juncture and pauses affect the understandability of speech. An unaccustomed listener would need one or two repetitions of the utterances before he/she can understand the speech of C<sub>2</sub>. C<sub>2</sub>'s speech is characterized by poor placement of articulators and inadequate or deviant manner of production. Clarity of speech is affected also by the fact that not all the sounds of spoken form are produced by C<sub>2</sub>. He exhibits an ability to produce only a limited number of sounds. Clarity of speech is affected also by his inability to make finer essential variations in the intonation patterns. This may be compared with his inability to make finer manipulations necessary for the production of certain consonant sounds listed previously. Clarity is also affected by incomplete utterances, delay in utterance, prolonged gaps between uttered forms, inappropriate use of pauses which make it



difficult to parse the forms involved appropriately under relevant structures. Clarity is also affected because of his inability to adhere to the adult sandhi rule and inability to produce homorganic sounds. Clarity of speech is affected in C<sub>2</sub> by a failure of syntagmatic relations not directly connected with dysarthria. This is evidenced in the use of incorrect or inadequate use of case relations, number, PNG markings, etc. See discussion for further details.

### **Speech Rate**

C<sub>2</sub> has a speech rate that is slower than normal. Expressive difficulty is also seen in the form of longer response time taken even when simple questions are asked. The slower speech rate is more obvious on a repetition task of 2-3 word sentences. (Note that only in repetition task C<sub>2</sub> produces longer sentences.) Otherwise the responses are all single word utterance in majority.

Speech rate is governed directly by the degree of dysarthria as well as certain not so obvious cognitive malfunctioning. That there is cognitive malfunctioning can be surmised from the fact that even though C<sub>2</sub> has demonstrated control over and knowledge of specific items of lexicon, he replied in a delayed fashion of different nature, even when it concerned the specific items of lexicon families to him which could not be taken as caused by dysarthria. The word finding difficulty is illustrated in the form of hesitations and longer response

time in coming out with the terms such as the following:

a:yi for na:yi 'dog'

puttu for bukku 'book' (borrowed from English)

Thus there are two types of delays seen - one that is caused by dysarthria alone and another that is caused by either dysarthria combined with cognitive factors or cognitive factor only.

### **Pauses**

These are present in C<sub>2</sub>'s speech. Pauses are frequent after every word. The pauses are longer than the normal pauses although we do not have measures to quantify. This child has an excess and abnormal and equal stress on each syllable of each word besides the pauses.

The pauses are of various types. In one type of pause C<sub>2</sub> makes prolonged pauses between forms/words. In such cases each word sounds as if it were a separate sentence by itself. While this is largely true, as already indicated, in some cases two or three words together are intended as a single sentence, in spite of the long pauses between them. In such cases, it becomes difficult to isolate groups of words as forming separate sentences.

In another type, pauses may occur between the syllable: of a word uttered. In general, pauses occur within syllable boundaries. The inter syllabic pause rate/prolongation is much

larger than that found in the normal speech.

### **Quantity of Speech**

C<sub>2</sub> speaks less than what is normal. This is easily obvious because of his single word utterances and the longer time taken to give the utterances. C<sub>2</sub> very rarely initiates speech on his own. His speech is mainly a response to others' speech. Even when the answers are given, these are single or two-word utterances, involving considerable time for the utterances that constitute the data of this study. Most of his utterances could be considered as responses to investigators' others' speech.

C<sub>2</sub>'s self-initiated utterances include words calling for the attention of those around him, like the address terms which are very rare as his needs are attended to by others without him asking for it; asking for fulfilling certain basic personal needs such as food, water, etc.; perseverative verbal forms which include repetition of words in absence of original stimulus that caused it in the first place. Thus, infrequent speech coupled with pauses, lack of self-initiated utterances, slow rate of speech, single word utterances, longer response time all characterize the quantity of speech as reduced or limited speech output.

### **Intonation**

C<sub>2</sub> does not use correct intonations. With excess and

equal stress in speech syllables and most frequently seen single word utterances, it is difficult to establish intonation patterns, if any, used by C<sub>2</sub>. Even in single word utterances that invariably have intonations attached to them in normal speech such as nillu 'stop'; kudi 'drink'; barta:ne '(he) is coming', etc., C<sub>2</sub> has difficulty in uttering them with even approximate intonations. He utters such words/sentences in a non-inflected fashion. As a result it is mainly the familiarity with the context that enables one to assign an appropriate intonation meaning to his utterances. In other words, the distinction between interrogation, statement, exclamation, etc., is to be imposed on the utterances by the listeners, based on the context of the situation. However, the occasions for the use of such varied meanings are few and far between. Most of the time, the utterances are considered as expressions of his need, thus imposing only an intonation of request on the utterances he makes, in most of his self-initiated speech.

### **Morphological Profile of C<sub>2</sub>**

The data on hand reveals the following:

C<sub>2</sub> does not exhibit any affixation process. But there are a few items which have suffixes. Such cases, where there are suffixes, are treated as integral part of the word given by C<sub>2</sub> since C<sub>2</sub> does not use these suffixes regularly in words which normally take such suffixes in the spoken language.

The statement that there is no affixation process in C<sub>2</sub>'s speech does not fully reveal the significance of the absence of the process. The absence of affixation in Kannada means that in C<sub>2</sub>'s speech there are no overtly marked case suffixes/relations, no indication of the tense involved in the constructions, no indication of the gender and number, no indication of time, manner and location and no indication of various other qualitative characteristics. In essence, conveying semantic notions of time, quality, gender, number, etc., is not explicit in the speech of C<sub>2</sub>. Inferences of such notions is left to the context of situation, knowledge of the target utterance and the familiarity of the listener with the speech of C<sub>2</sub>.

C<sub>2</sub>'s speech also does not specifically distinguish in any explicit manner, nouns, verbs, adverbs, adjectives, etc. Since the speech consists mainly of single word utterances, indication that he has the notions of these and other grammatical categories is to be inferred from two word or multiple word utterances which are very rare. In the case of two word and multiple word utterances, the verb usually occurs at the end of the utterance, while this is a formal criterion to distinguish verb from other grammatical categories, this criterion is not absolute in the sense that nouns also occur in the same position. That is, the order of occurrence in C 's speech cannot be always taken as the proof of grammatical function that the item performs

Another feature of the morphological profile of C<sub>2</sub>'s speech is that there are more nouns than verbs used. The difference in quantum is very wide indeed. One may report that C<sub>2</sub>'s speech consists mainly of nouns or nominal forms.

Another morphological feature is that, whenever a verb form is used, it is generally used in the form of verb root which in most cases are identical to the imperative forms in Kannada. This is perhaps because of the absence of affixation process in the speech of C<sub>2</sub> as indicated above.

Another morphological feature is the retention of the initial syllables in words. This has been already dealt with under phonology. This has certain lexical consequence as well, namely, in a multisyllabic word, the initial syllable alone retains its similarity with the word in the normal spoken language.

Another feature is the reduplication. The function of reduplication is not very clear.

These are exemplified in the following sections.

### **Grammatical Categories in C<sub>2</sub>**

Most utterances are single words. These single word utterances can be classified into the following two categories in the descending order of frequency.

(i) Nouns are used in most cases.

a:ttu for va:cu '(wrist) watch (n)'

(ii) Verbs or nominalized verbs as in

pa:cu for pa:condide 'is sleeping'

pi:pi for pipi u:dtida:ne 'is whistling'

In C<sub>2</sub> the grammatical forms are not retained in full as seen in the utterances either single (as seen mostly) or multiple. Distortions in grammatical categories are made in the following manner

(i) Nouns are retained with no inflections

appa for appandu 'father's' (genitive case)

(ii) Verb roots with partial or no inflections

a:tta for a:dta:ɽe '(she) is playing.'

kudi for kudita:ɽe '(she) is drinking.'

### Pronouns

C<sub>2</sub> makes use of pronouns so rarely that we may be justified in stating that C<sub>2</sub> does not use pronouns. It is done very rarely so. In the data only two pronouns have been identified.

Occasionally ni:nu 'you' and na:nu 'I' are used, but interchangeably so.

amma ni:nu banne . 'Amma and I came'

for amma na:nu bandevu 'Amma and you came'

There are, indeed, very few occurrences of the first and second person pronouns. They seem to be used like any other lexical items. It is likely that C<sub>2</sub> has not mastered the pronouns at all or he has an inability to master the pronominal system. It may be further pointed out that the use of pronominal system in Kannada is also related to the use of PNG markers in the finite verb and C<sub>2</sub> has exhibited lack of this ability as well.

The following observations may be offered as regards the pronominal system.

- (i) Occasional occurrence of I and II person pronouns, .
- (ii) Confusion in the use of I and II person pronouns.
- (iii) Non-occurrence or non-use of III person pronouns.
- (iv) Non-occurrence of reflexive pronouns
- (v) A stray occurrence of hortative inclusive plural as in the following:

baccu o:na for na:vu bassige ho:go:na 'Let us  
go to the bus. '

### Gender Concept

No gender concept development is evident in either nominal or verbal expressions as seen in the lack of gender suffixes.



Even in distinguishing pictures of males and females, errors are committed indicating that C<sub>2</sub> has not yet acquired the concept.

C<sub>2</sub> does not also distinguish between masculine and feminine names. However, there are certain words in normal spoken Kannada in which sex distinction is inherently maintained such as kinship terms or some animal names such as hasu 'cow'. It is noticed that C<sub>2</sub> is able to maintain consistently the sex discrimination while using kinship terms whereas in the use of words as in the category 'cow', he is unable to make such discrimination of gender. For instance he would use acu for hasu to refer both to the cow and the bull.

### Number

No distinction between singular and plural is seen in C<sub>2</sub> 's speech both in the nominal and verbal expressions. The suffixes for number marking are not seen in both the cases of nouns and verbal constructions. There is no indication whatsoever that C<sub>2</sub> uses number as a variable either verbally or non-verbally. When pictures consisting of several objects such as pencils were shown he would only use the word pentil for pensilgalu 'pencils' and no construction to indicate collectivity was used. Thus neither in the subject-noun slot nor in the predicate slot did C<sub>2</sub> ever use plural markers. He did not also have other devices available in his speech to indicate plurality.

Case

C<sub>2</sub> does not use case markers at all. Although no explicit case markers are used, there are certain case relations expressed or implied in the constructions. These are the following.

## (i) Nominative

akka ku:tu for akka ku:tkondida:le  
'Elder sister (is) sitting'

## (ii) Accusative Case relations

a:yu bu: for ka:rannu (accus.) bidutta ida:ne  
'(He is) driving the car.'

## (iii) Locative Case relations

kayya batte for kayyalli (loc.) batte  
'cloth in the hand'

## (iv) Occasionally dative

tale for talege to:pi  
'cap for the head'

Even under the constructions, we do not get the semantic relations of genitive, instrumental and the ablative case relations. The non-occurrence of explicit case markers may be explained by the general constraint imposed on the use of affixation processes in the speech and language of C<sub>2</sub>. However,

the non-occurrence of semantic casual relations of the genitive, instrumental, and ablative of motion in comparison with the covert use of accusative, locative, dative and the nominative could not be assigned to only explicit factor. This may perhaps be a characteristic of the current developmental stage of C<sub>2</sub>

### Conjunctions

C<sub>2</sub> uses two types of conjunctions

- (i) An explicitly marked one which, however, is very rare. This explicit marking is done by using a conjunctive allomorph -u which is done in the normal spoken language also. '

aruma ni:nu:  
mother (and) you (I or I )

- (ii) Another type of conjunction used by C<sub>2</sub> is the iterative type in which no overt marker is used by him.

idli catni 'eatable and chutney'

Note that in the latter case an explicit conjunctive marker is optionally used in normal spoken Kannada.

### Verbs :

There are very few verbs used in comparison with the nouns. However, the verbs occur both as a second item in a two word construction and as a single word utterance. In a two word

utterance, their occurrence as a second item fully reflects the placement of verb in sentences in normal spoken Kannada. The preceding first item is a noun which may either be a subject or an object noun.

tale ba:cu for na:nu taleyanu ba:cti:ni  
'(I am) combing hair (head).'

The order given in C<sub>2</sub> sentence cited above is object and predicate which is same in the normal speech.

Single word verb utterances are very few and they resemble more or less the imperative form.

ma:ti for ma:dtidda:ne '(He) is doing'

It may also be noted that a process of simplification takes place in all the occurrence of verbal forms. In such cases initial syllable of the verb form is invariably retained.

a:t for a:dta: idda:re '(They) are playing'

Some other syllable/syllables, by way of simplification processes listed in the phonology section are also added.

In one or two cases, there is also the process of reduplication in which either the entire form or the initial syllable is repeated.

kaccu kaccu 'bite bite'  
for the target sentence avalu kaccibitlu  
'She has bitten off the (finger)'

The verb is not inflected for tense, PNG, conditional markers, etc. There are no explicit markers and by way of semantic interpretation the verbal forms behave and look almost like nouns.

The very few verbs C<sub>2</sub> uses relate only to immediate personal acts either by himself or as seen by him in pictures.

Even among the very few verbs used, the transitive forms find a greater place than the intransitive ones.

(Trans.) kuyi for kudi 'drink'

(Trans.) a:tta for a:ta:dta ida:ne '(He is) playing.'

(Intrans.) ku:cu for ku:tidda:re '(They are) sitting.'

He does not use any other types of verbs (such as causative, reflexive, etc.) at all.

### Tense

No tense distinction is seen in C<sub>2</sub>. He has not yet learnt to inflect for tense. Only the verb root is retained except in some sentences where attempts at correct verb ending marking is seen, although not successfully so.

ma:tta for ma:dta idda:re

'(They) are doing.'

No past tense forms are seen. No tense suffixes are also seen in verbal expressions as seen in earlier illustrations. The tense suffixes are deleted along with the PNG markings. Thus there is no reference even to 'ego' or 'self' in these utterances.

### **Numerals**

C<sub>2</sub> used only the following cardinal numerals.

onnu ondu 'one'

ellu erdu 'two'

When asked to count, he was not able to go beyond two. when pictures of single object and two objects were shown to him and he was asked to identify he was not able to distinguish between them or use correct numerals 'one' and 'two'. These numerals were also not used with other nouns. The use of such cardinal numerals were mnemonic only. Secondly, he did not correlate numbers with their denotants even on a comprehension

Using cardinal numbers is limited to single word digit only. He has difficulty even in repeating beyond one digit number also.

He does not have a distinction between cardinal and ordinal numerals.

At this stage of speech and language development we may surmise that C<sub>2</sub> has not acquired the notion of numerals. This is also reflected in his non-acquisition of singular-plural distinction at the grammatical level as discussed in an earlier section.

### **Adverbs**

Adverbs are not generally used on one occasion, however, C<sub>2</sub> was found to use adverb of location.

a:ce bassu for a:ce bassu nintide  
'bus is standing outside'

In the above case, C<sub>2</sub> used an adverbial construction only in the locative sense. Thus among the adverbs of time, manner and location, location seems to be used. The data does not indicate the other types of adverbs.

### **Interrogation**

C<sub>2</sub> uses interrogation in his speech. The interrogative marker used is only e:nu 'what' without, however, appropriate intonation.

The other wh- questions, as listed in C<sub>1</sub>, are not found used at all. Use of e:nu 'what' as a self-initiated explorative question is used in normal spoken language to object and event identification as in the following sentence.

adu e:nu? 'What is that?'

avanu e:nu ma:dtidda:ne? 'What is he doing.'

Of the two functions, C<sub>2</sub> uses only the object identification which is more concrete in some sense. It is also noted that the interrogative marker -a: generally attached to a constituent of a sentence being questioned is not found. This can be illustrated as follows from normal Kannada.

ada:? 'Is that the one?'

ho:gala:? 'Shall I go?'

Note that the affixation of -a is a very frequent and easily accomplished act in normal spoken kannada. Even this was not done by C<sub>2</sub>, perhaps because of the underlying restriction on or inability for affixation process.

### Negation

C<sub>2</sub> uses negation indicators. He uses the following in the descending order of proportion.

- (i) Nodding of the head horizontally for negation as against vertically for indicating agreement. This is frequently found.
- (ii) Use of the negative morpheme (modal).

be:la or ba:la for be:da 'do not want'

- (iii) Use of ~~illa~~-'not (there)' to indicate that the said item is not present.



The use of both these forms is minimal. He does not use any other negative morphemes. He uses the above said negative morphemes as independent single word utterances. In other words the negative forms do not follow the items they negate as in normal language. This is in consonance with the general nature of C<sub>2</sub>'s speech which has very few two or multiple word utterances.

### **Adjectives**

C<sub>2</sub> infrequently uses adjectives of quality. This use is two-fold.

(i) Use of the colour terms.

o:su to:pi for ro:su topi 'pink cap'  
ni:la tapli for ni:la capli 'blue chappal'

(ii) Another usage is adjectives of quality other than colour.

This category is more infrequently used than the former.

ni:la oca batte for ni:la hosa batte  
'blue new dress'

Note' that in this example also the colour term is used, From the data on hand it appears that the occurrence of the adjectives other than colour terms is almost practically nil and is found only in the utterance (uttered in two consecutive parts ni:la and oca batte) listed above. As is seen in the next section, the acquisition and use of colour terms by C<sub>2</sub>

has been ascribed to deliberate therapy by parents. In the absence of any other adjective than the colour term, one is tempted to conclude that the category of adjectives has not emerged in the speech of C« as a function of natural development

### Colour Terms

C<sub>2</sub> used all basic colour terms correctly at the time of study, although phonologically distorted. The availability of colour terms and its discrimination by C<sub>2</sub> was rather a surprise since even the normal children of his age group would have problems with these. When the parents were questioned about it, it was found out that C<sub>2</sub> had been taught the same as the lack of it was strikingly obvious in comparison with a cousin of his. Otherwise, the parents said, he would not definitely have been well versed with the colour terms.

### Kinship Terms

Use of kinship terms was seen in the speech of C<sub>2</sub>. The following were noted.

appa	'father'
amma	'mother'
cikkappa	'uncle'
cikkamma	'aunt'
doddamma	-do- (elder sister of the mother)
•• doddappa	'uncle'

These are the individuals found all the time around the child in the household. In view of the presence of these individuals all the time, the use of such address terms are rather concrete for the child and hence use a them both as address and reference terms.

### Reduplication

C<sub>2</sub> used reduplication very occasionally probably for emphasis

kaccukaccu for kaccibittida:le

'(she) has bitten off (the finger)'

It is also possible that he used reduplication to indicate the aspect of completion. However, the data on hand is meagre and no conclusion can be drawn.

### Onomatopoeia

C<sub>2</sub> does not generally use onomatopoeic forms. However, the cries of animals like the cat's mew, miyya: and the dog's barking baubau are correctly used by the child. C<sub>2</sub> does not use these words to label the objects. That is, when he wanted to refer to an object such as dog he would rather use the word for dog as found in his lexicon than the corresponding onomatopoeic label

## **Syntactic Profile of C<sub>2</sub>**

In C<sub>2</sub> there are very few multiple word sentences seen. The longest was a 4-word sentence. But the prolonged pauses in between these make it difficult to differentiate it as a sentence.

### **The Single Word Utterances in C<sub>2</sub>**

Most responses of C<sub>2</sub> are single word utterances. These single words serve as complete sentences in most instances. These have the following characteristics.

- (i) They are direct replies to the question asked

tinni for tindi 'snack' for the question avnu e:nu ma:dtida:ne? 'What is he doing?' The target would be avnu tindi tintida:ne 'He is eating snacks.'

- (ii) Either one word or part of it is chosen from among the target or normally spoken sentence.

Exemplified as above.

- (iii) The utterances are interspersed with prolonged pauses.

- (iv) They are usually most crucial linguistic item in the sentence.

Exemplified as above.

- (v) The linking morphs are absent between the single word utterances. Thus there is the possibility of assigning

single utterance to preceding utterance as well as to the succeeding utterances.

tikkamma for cikamma 'aunt'

This utterance had continuity with the previous utterance of pa:ttu for ba:tal 'bottle' and the succeeding utterance of pa:pa for pa:pa 'baby' on questions for the same each time, although there were no continuous linking morphemes. Note that this would form snatches of utterances from the sentence.

tikkamma pa:pange ha:lanna ba:tlalli kudista:re  
'Aunty feeds the child with milk bottle.'

- (vi) Occasionally they are the first or the final word of a sentence.

Exemplified in the above.

- (vii) The single words are usually made simpler and shorter phonologically.

kuli for na:nu ju:s kuditini 'I drink juice'<sup>1</sup>

See also the phonology section.

- (viii) They are object/event identification utterances.

Illustrated in the examples above.

(ix) They may have been self initiated, when they meet the need filling function.

o:na for na:vu ho:go:na 'let us go'  
'(I want to go)'

(x) They might be repetitions of his own previous utterances such as perseveratory responses. ,:

ta:ke:t for ca:klett 'chocolate'  
was repeated for 5 times till the chocolate was given, in spite of the repeated questions about different pictures.

(xi) They may be functioning as subject only.

See example in (v) above.

(xii) They may be functioning as object only.

See (x) above for example.

(xiii) They may be functioning as predicate only.

See (ix) above for example.

In none of the above, affixation is found and, as a consequence, the usual grammatical sense indicative of PNG marker, tense, case and other semantic relations are not revealed. There is an element of abbreviation, deletion, substitution and distortion of the forms in all.

Proper grammatical contiguity is sometimes gleamed by accepting the utterances of a stretch as constituting a discourse. In other words the adjacency relations between single word sentences alone appear to contribute other grammatical meanings. The following have been noted with regards to discourse.

1. The coherence or cognecy between the single word utterances in a discourse is not maintained when such utterances are self initiated.
2. In replies to questions,  $C_2$  however, maintains coherence/cogency between successive single word utterances. See for example (v) above.

### Two/Multiple Word Utterances in $C_2$

The rarer two or multiple word utterances are similar in some respects to the two/multiple word utterances given by normal children in their early language development. They are different from the latter in some respects such as the absence of affixation and linking morphemes, the lack of open and pivotal class (Mcneill, 1966) constructions. We find in a normal child's speech when he/she begins his/her two/multiple word utterance. In other words, each utterance functions as a sentence either single or multiple worded. These two word utterances have the following relations.

- (i) Subject predicate relationship

akka ku:tu for akka ku:tkondida:le

'Sister (is) sit(ting).'

(ii) Object predicate relationship

tale ba:cu for amma tale ba:ctidda:re

'Mother is combing hair (of the boy's).'

(iii) Subject object relationship

pa:pa a:lu for pa:pa ha:lanna kudita: ide

'baby milk (is drinking)'

(iv) Object-subject relationship

ka:lu ga:ya for ga:ya ka:lalli ide

'(There is a) wound (in the) leg.'

(v) Adjective-Noun relationship

ni:la tapli for idu ni:la capli

'(This is a) blue chappal(s).'

(vi) Adjective-Adjective-Noun relationship

ni:la oca batte 'blue new dress'

(vii) Conjunction relationship

amma ni:nu for amma na:nu: bandevu

'Mother (and) yourself (came)' for

'mother and I came'

(viii) Reduplication or Repetition relationship

ijja vijja for vijaya 'proper name'



### 4.3. Speech and Language Profile of C<sub>4</sub>.

#### Personal Information

C<sub>4</sub> is a 7 year old male who is the first child to his parents. He has an younger sister who is normal. C<sub>4</sub> is mobile in that he can walk around although in a clumsy fashion. He is abservant of the surroundings.

C<sub>4</sub>'s parents are both well educated and are rather rational and practical about his condition. They live in a nuclear single family setup and belong to middle socioeconomic status. They speak Kannada at home and they are also well-versed in English.

C<sub>4</sub> is a case of spastic quadriplegia with the lower limbs more affected than the upper limbs. The degree of severity of the problem was identified as mild-moderate only by the neuro-physical.

C<sub>4</sub> uses speech for communication. He speaks fairly well which the others around understand quite well, although at times they need one or two repetition of his utterance for correct interpretation.

#### **Phonological Profile of C<sub>4</sub>**

##### Vowels

The table below presents the vowel found in the speech of C<sub>4</sub>.

	Front	Central	Back
High	i		U
	i:		U:
Mid	e		O
	e:æ		O:
Low		a	
		a:	

As the table reveals, C<sub>4</sub> produces all vowels found in normal spoken Kannada. There is an addition to the repertoire as well, that is, the long vowel æ:. This vowel is usually seen in C<sub>2</sub>'s production of borrowed words from English like

bæ :g 'bag'

kæ:t 'cat'

Note that this æ : occurs in borrowed words even in normal spoken Kannada.

The long and short vowel distinction is maintained as seen in both spontaneous as well as imitation tasks.

The diphthongs ai and au are also found in C<sub>4</sub>'s speech as in the following.

kai's 'hand'

paullu for paudar 'powder'

These vowels are all clearly produced in all the three initial, medial and final positions. However, the longer vowels

in final position are very rare and even when present are comparatively shorter than the long vowels in the normal speech.

ku for ku: 'Railway engine's sound'

## Consonants

Unlike vowels, C<sub>4</sub> does not produce all consonants of Kannada. The sounds found in his speech corpus are given in the tables.

### 1. Stops and Nasals

	Voiceless		Voiced		Nasals
	un- aspirated	aspirated	un- aspirated	aspirated	
Velar	k		g		
Palatal	c		j		
Retroflex	ʈ		ɖ		ɳ
Dental	t		d		n
Labial	p		b		m

The encircled sounds are heavily distorted.

2. Other Consonants

	Glides voiced	Sibilants voice- less	voiced	Fricatives voice- less	Laterals voiced	Continuant voiced
Pharyngeal						
Retroflex			s		l	
Apico-						
palatal	y					
Alveolar		s				l r
Labial	v			f		

The encircled sounds are heavily distorted.

There is a general perception of distortion on production of all sounds. One can observe from the tables that the stops and nasals including velars, voiced and voiceless k and g, the dentals t, d, n and labials p, b, m are produced quite accurately. The sounds encircled in the tables, namely, palatals c and j, retroflex t and d and n are all heavily distorted than the other sounds. Note that these were the sounds not found at all in C<sub>1</sub> and C<sub>2</sub> whose ages were respectively 4 years and 5 years, junior to the present subject.

Among the sounds given in the table 2, the glides y and v, the dental sibilant s, dental lateral l are quite well preserved. C<sub>4</sub> has difficulty in producing some retroflex sounds, including sibilants, and fricatives and nasals. Specifically the absent sounds are the following:

All aspirated stops kh, ch, th, ph, gh, jh, dh, bh, nasals n, ñ, apicopalatal s and pharyngeal fricative h.

The retroflex sibilant and lateral s and l respectively and trill r are very much distorted and barely recognizable. The sounds which are most distorted are also those that were most inconsistently produced. There were also the sounds that were produced with difficulty on imitation tasks. These were the sounds that were prone to misarticulations. The misarticulations included, besides distortion, deletion and substitution. These misarticulations however are not consistent. Thus dysarthria and therefore misarticulations and hence poor intelligibility of speech characterize the speech production of C<sub>4</sub>.

#### **Phonemic Analysis of C<sub>4</sub>**

All the sounds listed in tables 1 and 2 may be treated occurring as phonemes in the speech of C<sub>4</sub>, subject to the conditions stated for the speech corpus of C. and C<sup>^</sup>. The minimal pairs could not be readily found in the spontaneous speech of C<sub>4</sub>. The speech is marked by sporadic freevariation that does not fall under any condition. Since C<sub>4</sub> has better speech than previous subjects studied, there is more similarity seen between the normally spoken Kannada and C<sub>4</sub>'s speech than in the previous cases. This may be taken as an indication of the possible phonemic status of the sounds C<sub>4</sub> used. In any case, no discernible allophonic pattern can be identified within his spontaneous speech. Instead, one can look for correspondences between the

normal and a CP child's speech in terms of phonological forms. Substitutions are not easily identified in C<sub>4</sub>'s speech. The seemingly substituted items are generally the distortions of the sounds found in the words of normal speech. There is no clear substitution as in other subjects. In other words, although C<sub>4</sub> has an ability to produce most of the normal speech with considerable clarity in isolation, he has difficulty in producing these sounds in contiguity as required for the production of a word. This difficulty gets reflected in the form of distortion and not substitution in his speech.

### Phonemic Distribution

C<sub>4</sub>'s speech follows overall phonemic distribution pattern found in normal Kannada.

Most words end with a vowel as in normal spoken Kannada

All the consonant sounds occur initially and medially. Gemination also follows the same pattern. Thus, when analysed into individual units and described as regards the pattern of distribution, the sound of C<sub>4</sub>'s speech follow more or less the normal phonemic pattern of distribution. However, the difference between the two lies in the manner of clarity, quality of pauses between syllables, transitional difficulties from one sound to another and heavy distortions, substitutions of a freevarying nature, and certain correspondences which are of regular pattern. When the data is transcribed on paper and only this transcribed data is looked into, there is no difference seen in the phonemic

distribution seen in the utterances of C<sub>4</sub> and normal speech. The data of C<sub>4</sub> would look like an utterance from a dialect of Kannada, a dialect much different in shape similarity of forms, but quite similar in underlying patterns of phonemic distribution.

As in the other cases, the following simplification of normal phonology is noticed.

- (i) Multisyllabic words are reduced to simpler monosyllabic and disyllabic formations.

a:te for va:rte 'news'  
 ma:ti for ma:dtidda:ne '(he) is doing'

- (ii) The non-identical clusters are reduced to identical clusters

pentil for pensil 'pencil'

It could be noted that distortions in C<sub>4</sub>'s speech occur as the main form of simplification. Deletion and substitutions exemplified above are an additional feature. -

### Paralinguistic Features

C<sub>4</sub> has a low pitched voice with sufficient loudness and hoarse quality.

### Clarity of Speech

Clarity of speech is mildly affected. His speech is

quite easily understood by the listeners who are familiar with his speech. However, for those who are not, the speech is abundant with misarticulations, specifically distortion on all sounds. This is also compounded by the fact that he has abnormal stress and juncture as well.

### **Speech Rate**

Speech rate is generally slow in C<sub>4</sub> because of his difficulty with articulation of speech sounds due to dysarthria. The rhythm appears to be slow for the same reason as well as for the mild delay seen in response time to questions.

### **Quantity of Speech**

Quantity of speech is less than normal for his age in case of C<sub>4</sub>. However, this appears only moderately less compared to many other subjects in the study. Reduction in speech output is obvious because of C<sub>4</sub>'s short, single or two word utterances.

### **Pauses '**

Pauses appear to be more frequent than normal in C<sub>4</sub>. C<sub>4</sub> has a drawing speech which is interspersed with pauses. Hence the slower appearance in the rate of speech.

### **Intonations**

C<sub>4</sub> has fairly well preserved melody of speech in terms of the inflections. However, because of the poor rate, slower



response time, frequent pauses, distortions of speech sounds, inadequacy of speech as a whole reflected in deletions, a general abnormality of intonations is perceived. C<sub>4</sub> has an intact overall intonation pattern found in the speech for interrogation, exclamation and statements. However, because of distortion and other factors listed above, some reduction in the quality of melody is found. Secondly, the frequency of intonation patterns occurring in his speech is rather less. This shows his difficulty in general, with the use of intonation patterns. One may conclude that, although C<sub>4</sub> has several all the intonation patterns, the quality of such intonations as well as the frequency of use of such intonations for interactions is limited.

#### **Morphological Profile of C<sub>4</sub>**

Most utterances of C<sub>4</sub> are single words. There are occasionally longer sentences constituting 3-4 words also. Usually single or two words serve the purposes of sentences.

The data obtained from C<sub>4</sub> reveals that he exhibits partial affixation processes. This impression is obtained from the inflected utterances seen only in about 40% of utterances. In such cases, although these affixes cannot be necessarily considered as integral parts of the utterances themselves, they can be considered as approximations to the normal utterances.. The pattern of affixation is not established as a process covering invariably and consistently all the words used by C<sub>4</sub>

However, the presence of affixation in such quantity and strength in C<sub>4</sub>'s speech must be considered as evidence of the developed status of C<sub>4</sub>'s speech and language.

Generally it can be said that conveying semantic notions of quality, case, gender, number, etc., is not always explicit in the speech of C<sub>4</sub>. Thus many a times inferences are based on the contextual information available to the listener.

C<sub>4</sub>'s speech does not specifically distinguish between grammatical categories. However, there are more nouns used than any other categories. Verbs stand next in the descending order of proportion.

Another feature is that the verbs are not used in full. The verb endings are either very vaguely uttered or not uttered at all. Thus verbs are uttered in the form of verb roots. (These will be dealt with in the later sections.)

Some observations with regard to the morphological processes include the following. Illustrations are given in later sections.

- (i) Some of the utterances have full grammatical forms and these are mainly nouns.
- (ii) There are many utterances which serve as verbs but the verb endings or PNG markers are absent usually.

- (iii) Case markers are rarely seen.
- (iv) The generally longer expressions in normal spoken Kannada are shortened in actual realization by way of simplifications.
- (v) C<sub>4</sub> retains the underlying semantic notions but reduces the phrases/utterances in conformity with his phonological constraints.

### Personal Pronouns

C<sub>4</sub> uses the following pronouns with his usual phonological simplicity.

na:nu	'I'
ivanu	'he' (proxi)
ayanu	'he' (remote)
avalu	'she' (remote)
• ivalu	'she' (proxi)
• idu	'this'
adu	'that'

Note that the singular I person and III person pronouns are present and not the II person. Thus deficiency in pronoun usage appears to mark this subject also. There seems to be also some confusion in the use of some or the pronouns. For instance, in case of avanu/avaḷu 'he'/'she', C, uses plural or honorific conjugation in the verb in both instances on a number of occasions.

avanu batta:re 'He (sing.) is coming (hon./well)

Although C<sub>4</sub> does not use avaru 'they' (plural/singular honorific) overtly as a separate pronoun, its corresponding suffix is used in the finite verb when it is inflected for number.

tindi tinta:re '(They) are eating snacks.'

In all such cases, the reference is to a single honorific sense rather than III person plural.

C<sub>4</sub> does not use the following:

avu	'those'	III person neuter plural
avugalu	'those'	-do-
ni:vu	'you'	(singular honorific/plural) II person
ni:nu	'you'	(singular) II person
ta:nu	'you'	(reflexive) II person
ta:vu (hon./pl.)	'you'	-do- II person

The hierarchy of use of pronouns is as follows,

- (i) Use of III person neuter remote and proximate pronouns

adu 'that'

idu 'this'

- (ii) Other III person pronouns

i:lu for ivaḷu 'this girl'

a:lu for avaḷu 'that girl'  
inu for ivanu 'this man/boy'  
a:nu for avanu 'that man/boy'

(iii) Very occasional use of I person pronoun

na:nu 'I'

(iv) Use of verb inflections for plural/singular honorific

batta:re 'he (honorific) comes'

(v) Non-use of III person neuter plural.

avu

avugalu } 'those'

Most of these pronouns are used more covertly than overtly. That is, the pronouns are implied more in verb endings

na:nu 'I' is only implied and not uttered in the use of battini '(I am) coming'

It appears C's pronominal usage is more well developed than any other grammatical category in his speech and language.

### Gender

C<sub>4</sub> uses gender suffixes correctly, whenever he uses them. Such uses are however, very few and far between. The concept is used in the verb constructions occasionally.

The suffixes -ne and le used for masculine and feminine gender marking at the end of a finite verb construction are found to be used correctly (in the fewer occasions) whenever they are used.

u:ta ma:tta:ne      '(He) is eating lunch.'  
o:tta:le .            '(She) is reading.'

C<sub>4</sub> also distinguishes between male and female names.

### Number

C<sub>4</sub> differentiates correctly between single and plural items as seen by his recognition on a comprehension task. However, he does not use plural suffixes in his nominal expressions.

ugga for hudugaru      'boys'  
hannu for hannugalu    '**fruits**'

Very occasionally C<sub>4</sub> appears to use singular or plural suffixes in verbal constructions although usually, the verb endings are omitted.

batta:ne      '(He) is coming.'  
ma:tta.'re    '(They) are doing.'

Thus comprehension of number concept is better developed than its expression as C<sub>4</sub> does not use number suffixes regularly. He reveals consistent knowledge of collectivity and singular forms on recognition tasks.

### Case

All case markers are omitted. However, certain case relations are implied in the language constructions as in the following.

(i) Nominative

pa:pa tinta for pa:pa tinta: ide 'Baby (is) eating.'

(ii) Accusative relations

pa:pu tako for pa:puna takko 'Carry the child'

(iii) Dative case relations

u:ta o:tta for u:takke ho:gta:re  
'(They) go for lunch.'

(iv) Locative case relations

u:vu ni:raili for hu:vu ni:ralli ide  
'flower is in water'

### **Conjunctions**

C<sub>4</sub> does not use any overt conjunctions in running speech. He comprehends, however, conjunctions like matte, a:me:le and as he gives appropriate answers to questions. '

a:cu de:dyo 'watch, radio'

These utterances were elicited one after the other with an intervening a:me:le 'then' by the investigator. Similarly C<sub>4</sub>

identified three different actions when prompted with a:mele  
'then' after each utterance of an action.

sa:na for sna:na ma:distida:re  
'(They) are bathing the (child).'

kudi for kudi:tide  
'(The baby) is drink(ing).'

o:tta for o:dutta ida:ne  
'(He) is running.'

There are conjunctions implied as in the utterances  
like the following.

kai ka:lu 'hand and leg'  
capli su:su 'chappals and shoes'

### Verbs

Although nouns are found more in number than verbs,  
verbs of many types are found in C<sub>4</sub>'s speech. Verbs occur both  
as single utterances and also as a second item in a two word  
construction. The preceding first item is a noun which is  
usually a subject or an object.

na:yi no:te for na:yi ho:dta: ide  
'Dog is looking.'

a:ta:ta:re for a:ta:dta:re  
'(They) are playing.'





Past tense forms, optatives, hortatives and causatives are not found

Simplification in verbal construction are seen in the following manner.

- (i) PNG markers are omitted or are not heard clearly at all. Most of the time the inflections are not heard and they are difficult to identify. Thus, the longer expressions are shortened in actual realization.

o:tta for huduga ho:gta: ida:ne  
'(The boy) is going.'  
no:te for no:dta: ide  
'(That) is looking'

- (ii) When there are participial constructions, these are reduced to single word utterances through processes of reduction/deletion of intervening syllables.

bicci akoladu for biccihotgutte anta ha:koladu  
'to wear so that it should not fall open'

Note that this child has participial constructions but these constructions involve only statements of present/non-past nature.

### **Tense**

All the utterances of C<sub>2</sub> are on the present or non-past variety.

C<sub>4</sub> does not use past tense specifically. He uses the non-past also for past. In one instance in the data, he referred to completed action, however.

nu:buttu for nu:kibidtu 'pushed'

C<sub>4</sub> uses the following non-past tense markers.

-a:ne, ta: ide appropriately.

o:tta:ne (He) is reading

kudita:re (They) are drinking

However, the present and future tenses are not clearly distinguished.

C<sub>4</sub> also does not distinguish between

nenne 'yesterday' and

na:le 'tomorrow'

although he uses these words.

See also under verb section for participial constructions.

### **Adjectives**

C<sub>4</sub> uses very rarely adjectives of quality as found in some examples:

os batte for hosa batte 'new dress'

He also uses the basic colour terms such as red, white blue, green, etc., but does not correlate their meaning with the terms, when the colours are shown and words are elicited. Thus he would make the following errors.

ve:t 'white' for blu: 'blue'  
 aldi 'yellow' for gri:n 'green'

Note also that he uses the colour terms more in English than in Kannada.

### Numerals

C<sub>4</sub> has not yet developed the number concept. He uses, however, the cardinal numbers in a mnemonic manner only. He counts upto 20 but only mnemonically so.

ondu 'one'  
 erdu 'two'  
 mu:ru 'three'

C<sub>4</sub> does not associate the number with the quantity of objects. Although he recites mnemonically the numerals one to twenty, C<sub>4</sub> does not identify the number of objects correctly in the order in which the numerals were sequentially recited on a recognition task.

C<sub>4</sub> does not also distinguish between ordinal and cardinal number

erdu huduai for ibru: hudugi:ru 'two girls'

The above utterance apart from being against the nuance of normal Kannada was also wrong factually in the sense the correct answer in the context of situation was not two but three.

As seen in the above example, use of ordinal number is not at all found in C<sub>4</sub>'s repertoire thus revealing that C<sub>4</sub> has not yet acquired fully the concept of numbers. He does not also distinguish between singular/plural items in his expression,

### Adverbs

Adverbs are found used occasionally by C<sub>4</sub>.

Place adverb, by way of using post-position like words, is very occasionally used.

alli	'there'
illi	'here'
me:le	'up'

No time adverb is used. C<sub>4</sub> uses a:me:le 'then' but it is always used in the conjunctive sense.

No manner adverbs are used.

Thus, among the adverbs, the locative is better acquired.

### Interrogation

C<sub>4</sub> uses the following wh- questions.

e:nu 'What'  
 elli 'where'

he:ce 'how', ya:va:ga 'when', etc., are not found used at all. This may be compared with our previous observation, that adjectives of quality (for he:ge 'how'), and adverbs of manner and time (ya:va:ga 'when') are not acquired. Thus object identification is better developed than the exploration/identification of other matters.

The use of interrogative marker -a: attached to a constituent of a sentence being questioned (see the profile of C<sub>1</sub> for details) was also not found used in C<sub>4</sub>'s speech. This is not in consonance with the general pattern of C<sub>4</sub>'s speech and language in which there is some partial affixation. As already pointed out in the profile of C<sub>2</sub>, in normal spoken Kannada, the interrogative marker -a: is attached to a constituent of a sentence being question and such a suffixation is an easily accomplished act. However one is required to identify the item to which the interrogative marker is to be attached and this identification needs a firmer semantic manipulation of the context.

### Negation

C<sub>4</sub> uses negative morphemes

illa 'not there'  
 alla 'no'/'not that'  
 be:da 'do not want'

He uses shaking of head also has an accomplishment very frequently to saying alla and be:da. The morphemes alla and be:da are most conspicuously used and then illa is used in a descending order of proportion in C<sub>4</sub> 's speech.

-a Prohibitive negative: ku:dadu; ba:radu are not found used at all.

### Kinship

C<sub>4</sub> uses the following kinship terms.

appa	'father'
amma	'mother'
apkal	'uncle'
akka	'sister'
anna	'brother'
ta:ta	'grand father'
a:nti	'aunty'

C<sub>4</sub> utters these clearly and confidently, although he would not explain the meanings of the terms. He also exhibits an ability to use in general terms some kinship terms such as apkal 'uncle' and a:nti 'aunt' used to address or refer any individual much older to ego in normal spoken Kannada when initiated into such usage.

### **Reduolication**

C<sub>4</sub> does not use reduplication. He, however uses

synonyms by way of translation from Kannada to English as in the following:

na:yi da:gi for 'dog', as if such constructions are reduplications.

### Onomatopoeia

C<sub>4</sub> uses very few onomatopoeic forms such as the following:

miya: miya: for cat's mew.

### **Syntactic Profile of C<sub>4</sub>**

Most utterances of C<sub>4</sub> were single word utterances. The two and multiple word utterances are few and far between. The longest sentences seen in C<sub>4</sub> also are 3 word sentences only. C<sub>4</sub> shows isolated features of good language acquisition such as the use of verbal participials as well as poor language acquisition as in the non-use of case markers.

The inadequate language development is mostly evident in the lack of open and pivotal class distinction. Each utterance, nominal or verbal, serves as a single sentence in each case.

Even in nominal and verbal phrase utterances, there are several reductions affected in actualization.

no:te for no:dxa: ide '(that) is looking'



Single word utterances .

The single word utterances have the following function-characteristics:

(i) They are usually direct replies to questions asked.

(ii) The content of these utterances are linguistically more crucial than the deleted ones, when these utterances are compared with their full form in normal spoken Kannada.

takkari for taraka:ri 'vegetables'

This was for the question "Why do you go to market?" The target answer would be tarka:ri tagond baro:dikke ho:gti:vi 'to buy vegetables we go (to the market)'. .

(iii) They are object/event identification utterances.

(a) gombe for i: hudugi gombena barita:le

'This girl is drawing a doll.'

(b) nidde for nidde ma:dta ide

'(This baby) is sleeping'

(c) They have, when self initiated, the need filling function

tetar for svetar 'sweater'

The target utterances would be svetar kodu da :di 'give me the sweater, daddy!'

(d) They function as subject only.

iḷu for ivaḷu 'this'girl'

Target; ivalu a:ta a:dta: idda:le

'This girl is playing'

(e) They function as objects only.

Exemplified as in (c) above.

(f) They function as predicates only

ta:ta for pa:pa ta:ta ma:dta ide

'The baby is waiving good bye.'

In most of the above, affixation processes are affected although not affecting the grammatical sense significantly. This is seen despite the elements of deletion and other simplification processes operating in most of the utterances.

The discourse contiguity is maintained across a few stretches of utterances, such as in describing a picture, prompted by the questions of the listener, intervening between his utterances.

mane a:ta (They) are playing house

tu:gu (They are) swing(ing)

ni:ru (They are playing in), water

These were uttered describing a park scene.

Thus, a basic discourse ability is present in C<sub>4</sub>.

### Two/Multiple word utterances

In the few two multiple word utterances, the distinction between subject and predicate was difficult to make because of the intervention of uneven pauses, reduction and abbreviation and other simplifications in the utterances.

The following sentential relations were noticed in the two-three word utterances.

(i) Object-Predicate relationship

ta:yu ma:ttare for kə:rettalli sa:ru ma:dta:re  
'curry (they) make'

'They make curry out of carrots'

(ii) Subject-Predicate relationship

ugga o:tta: for huduga o:dta: ida:ne

'Boy is reading.'

(iii) Subject-Object relationship

anna immeannu for annakke nimbehannu harktaire  
'(They) put lemon to the rice.'

(iv) Direct Object-Indirect Object relationship

puska b æ:g for b æ:gñalli pustaka ha:kñi:ni

'I will put books in the bag.'

(v) Adjective-Noun relationship

oc batte for hosa batte 'new dress'

4.4. Speech and Language Profile of C<sub>5</sub>**Personal Information**

C<sub>5</sub> is an 8 year old male who is the first of the two children to his parents. He is immobile since his lower limbs are more affected than his upper limbs with spasticity. He is highly active in spite of his physical disability.

C<sub>5</sub>'s parents are educated and they belong to middle socio-economic class. They speak Kannada at home and they are both well-versed also in English. The mother is very much interested in the child and very actively participates in the discussion about the child's condition. The parents live in a single, nuclear family set up.

C<sub>5</sub>'s disability is of moderate type of spastic quadriplegia as diagnosed by the neurophysician. His problem was first identified around the age of 2-3 years.

C<sub>5</sub> uses speech for communication. His speech is clear compared to most other subjects of the study. His speech is quite well understood despite the few misarticulations seen.

**Phonological Profile of C<sub>5</sub>**

C<sub>5</sub> does not produce all the sounds of Kannada, although he is much better than most of the other subjects in terms of the phonological repertoire.

**Vowels**

C<sub>5</sub> produces all the vowels of Kannada as seen in the table below.

	Front	Central	Back
High	i		u
	i:		u:
Mid	e æ		o
	e: æ:		o:
Low		a	
		æ	

The table reveals that C<sub>5</sub> uses all vowels found in the normal spoken Kannada and their long counterparts. In addition he uses æ and its long counterpart æ: in the borrowed items from English. He also has two diphthongs ai and au.

**Consonants**

C<sub>5</sub> produces the following consonants in his speech.

### 1. Stops and Nasals

	Voiceless		Voiced		Nasals
	un- aspirated	aspirated	un- aspirated	aspirated	
Velar	k		g		
Palatal	c		j		
Retroflex	ṭ		ḍ		ɳ
Dental	t		d		n
Labial	p		b		m

The encircled sounds are heavily distorted.

### 2. Other Consonants

	Glides	Sibilants	Fricatives	Laterals	Continuants
Pharyngeal					
Retroflex				ḷ	
Apico- palatal	y				
Alveolar		s		l	r
Labial	v				

The encircled sound is heavily distorted.

From the table it is obvious that the following sounds are present: The voiceless and voiced stops k, c, t, p and g, j, d, b. The retroflex stops and nasals although present are very much distorted as is the trill. No aspirated sounds are seen.

The retroflex sounds that need finer manipulation of the tongue (as explained in the profiles of C<sub>1</sub> and C<sub>2</sub>) are affected by way of distortion or absent altogether. Likewise fricatives and retroflex sibilant s are also absent.

These sounds were found affected even on an imitation

A comparison with the previous subjects indicates that this subject has more sounds in terms of points of articulation and manner of articulation. Even the distorted sounds are few. Sounds that are absent or affected in most CP cases such as retroflex, fricatives and sibilants are found in the speech of C<sub>5</sub>, in some quantity. This is a picture of better acquisition from the previous cases. This development may be assigned to the increase in age and/or exposure. There is also a better clarity of production for those sounds which are not distorted.

Phonological picture, however, is not complete, nor is it comparable favourably with the normal speech of his peers since there continues to be some distortion, absence of several sounds such as aspirated ones sibilants, fricatives and also some nasals. The other reasons for this picture are similar to those listed in C<sub>1</sub> and C<sub>2</sub>.

#### **Phonemic Analysis and distribution**

The observations we have made for C<sub>4</sub> hold good for the utterances of C<sub>5</sub> also. Minimal pairs are not easily identifiable.

However, there is greater similarity or correspondences between the forms of C<sub>5</sub> and normal spoken Kannada. Based on this information and based on some stability and recurrence of forms used, one may conclude that the sounds given in table 1 and 2 function as phonemes.

Most words end with vowels as seen in normal spoken Kannada.

There is simplification of the heterogenous cluster into the identical cluster.

na.'ganna for na:garatna 'proper name'

All stop consonants occur in initial and medial positions. They also occur medially in gemination.

The sounds which are produced with distortion are substituted by other consonants.

annu for hannu '-fruit'

Our observations about the distortions for subject C<sub>4</sub> hold good for this subject also. The simplification processes listed in C. are also applicable to this case.

Thus the ohonemic distribution in the speech of C<sub>5</sub> follows the pattern found in normal spoken Kannada.

In spite of better speech abilities and closer similarity with the distributional patterns of sounds, the speech of C<sub>5</sub>



sounds different from the normal speech not only because of misarticulations but also because of its 'strangeness'. His speech sounds more like a closely related dialect of the language in spite of the better articulation of individual sounds, rhythm and accent that approximate normal spoken language. Thus abnormality in speech would remain an essential feature of C<sub>5</sub>'s speech.

### **Paralinguistic Features**

C<sub>5</sub> has low pitched voice with soft and husky quality.

### **Clarity of Speech**

C<sub>5</sub>'s speech is fairly well clear. He, however, has misarticulation due to mild dysarthria. He also gives abnormal stress on syllables and unnaturally long and inappropriate pauses affecting absolute clarity in speech.

### **Speech Rate**

C<sub>5</sub> has a speech rate that is slower than normal. This is because of the longer reaction time. Secondly, he has a fumbling behaviour with syllables and words that can be simulated to stuttering. These two characteristics, along with the pauses in between syllabic or word utterances, give the impression of a slower speech rate.

### **P a u s e s**

C<sub>5</sub> has pauses in speech that are abnormal. Pauses are more frequent after every word but are also seen between

syllables of a word. Speech fluency is affected because of these pauses.

### **Quantity of Speech**

C<sub>5</sub> has a speech quantity that is better when compared to other subjects in the study although the quantity is certainly less than that of his normal peers. Again majority of his utterances are single word, but there are also 3-4 word sentences found. However, very rarely does C<sub>5</sub> initiate speech on his own and most of his utterances are responses to others speech only. The longer response time also contributed to the lesser output of speech in a given amount of time. See also discussion.

### **Intonation**

The intonation patterns adopted by C<sub>5</sub> are not normal, although they are much better than those of other subjects in the study. The intonations are mildly affected due to abnormal and long pauses, longer response/reaction time, and abnormal stress on some syllables that is very inconsistent. Most single words are uttered with correct intonations. The intonation patterns are not employed to express various meanings such as interrogation, exclamation and statement in longer stretches of utterances.,

### **Morphological Profile of C<sub>5</sub>**

The data on hand reveals the following.

C<sub>5</sub> exhibits a fairly well preserved affixation process when compared to many other subjects in the study.

The overt suffixes are not always used, but there is, by and large, an indication of case suffixes/relations, time, manner and location and other qualitative characteristics. In spite of this, conveyance of semantic notions of time, quality, gender, number, etc., is not clearly distinguishable in the speech of C<sub>5</sub>

There are more nouns used than verbs or any other categories in the single word utterances. Majority of utterances consist only of single words.

### **Grammatical Forms**

The majority of the single word utterances can be classified into the following two categories in the descending order of frequency.

Nouns

Verbs or nominalized verbs.

The grammatical forms, however, are not retained in full. Distortions in the grammatical categories are made in the following manner.

(i) Nouns are retained in full in majority of utterances. But there are also instances where no inflections are used.

u:ta for u:tavannu ma:dta:ne  
'(He) is eating food.'

(ii) Verb form is used mostly in the verb root form; when used in full, the verb endings are not intelligible. The verb inflections are so distorted that it is difficult to distinguish them. Occasionally partial inflections as well as fully inflected verbs are seen.

**Partially inflected:** a:dti for a:dtida:le  
'(She) is playing.'

**Fully inflected:** vasta:ne '(He is) cleaning.'

### **Pronouns**

C<sub>5</sub> uses only III person singular proximate and remote neuter pronouns.

adu 'that'  
idu 'this'

The following are not found used although they are comprehended correctly.

na:nu 'I'            na:vu 'we/us'  
ni:nu 'you'(sing)    ni:vu 'you' (pl.)

avanu	'he'
avalu	'she'
avaru	'they'(pl.)/he/she (honorific)
ta:nu	'yourself (reflexive)
ta:vu	'yourself (plural or honorific)

Most finite verbs are also devoid of the person markers thus revealing probably an inadequate learning of the pronominal system.

### **Gender**

C<sub>5</sub> does not clearly distinguish between the genders. Gender suffixes are generally absent both in pronominal and verbal expressions.

ugga	for	hudugi	'(huduga) boy'	for	'girl'
ku:ti	for	ku:tkondida:ne	'He is sitting.'		

In distinguishing pictures of male and females, no errors are committed. Feminine and masculine names, however, are not distinguished correctly all the time.

On a comprehension task he showed the picture of a boy for the term ru:pa 'a proper name for a girl'. He showed the picture of a girl for the term 'navi:n' 'a proper name for a

C<sub>5</sub>, however, maintains sex discrimination in the use of kinshio terms. See the section on kinshio terms below.

### Number

C<sub>5</sub> does not distinguish between singular and plural in the nominal or verbal expressions. No plural suffixes are seen. He correctly distinguishes however, the pictures of one and multiple objects when asked to identify.

### Case

C<sub>5</sub> does not use case markers. However, the following is found expressed occasionally.

#### (i) Dative Case

talege for to:pi talege ha:kota:re  
'Cap is worn on the head'

The following case relations are found implied although no overt markers are used.

#### (i) Nominative Case

anna for avanu anna 'He is the elder brother.'

#### (ii) Accusative Case

a:lu kudi for pa:pa ha:lu kudiyutte  
'Baby is drinking milk.'

#### (iii) Locative Case

ba:tal for batlalli 'in the bottle'

The genitive, instrumental and the ablative case relations are not expressed at all.

### Conjunctions

C<sub>5</sub> uses the conjunctive allomorph -u. Thus is identifiable as such but not long enough as the normal form.

nu:su    na:du    'news and songs'

Otherwise C<sub>5</sub> does not use conjunctions overtly. The following are implied, however, on many occasions.

C<sub>5</sub> comprehends the conjunction a:me:le, mattu 'and' in his attempt at continuous naming of things/objects in the picture.

### Verbs

Verbs are few in number compared to the use of nouns. Verbs occur both as single items as well as the second item in a two word phrase or sentence. In the latter it fully reflects the placement of verb in a normal utterance. The preceding first item is a noun which may be a subject or an object noun.

Single word verb utterances resemble more or less imperative forms as the verb endings are either too distorted to be intelligible or not uttered at all. Thus there is a process of simplification taking place in the occurrence of verbal forms.

The verbs are used relating to immediate personal act; or describing pictures.

kuditi for ju:s ku:ditini

'(I) drink juice.'

Of the few verbs used the transitives are found more than the intransitives.

(Trans.) ma:tta: for ma:dta '(He is) doing'

(Intrans.) malaki for malakoṇḍide '(The baby) is sleeping.'

Other subcategories of verbs are not found used.

### **Tense**

C<sub>5</sub> does not inflect for tense correctly. However, he understands the past and non-past distinction on a comprehension task.

No past tense suffixes were seen in the data.

Present tense suffixes were seen in a few instances.

kuditti for kudittini '(I) drink'

no:tta for no:dta:le '(She) looks'

### **Numerals**

C<sub>5</sub> uses the following cardinal numerals but mnemonically so.



ondu 'one'  
ellu 'two'  
mu:ru 'three'

However he does not match the terms with the exact numbers. This is seen even on a recognition task.

He repeats the numbers upto 20 but not on his own.

Thus the lack of number concept reveals that C<sub>5</sub> may not have acquired the notion of numerals. This is also reflected in the poor singular and plural distinction he makes in the nominal and verbal constructions.

### Adverbs

C<sub>5</sub> uses very occasionally adverbs of location.

du:ra 'far off  
kayyalli 'in the hand (is)'

Thus among the adverbs of time, manner and location, adverbs of location alone are retained/acquired.

### Interrogation

C<sub>5</sub> uses one interrogative marker e:nu 'what?' with correct intonations.

ide:nu 'what is this?'

The other wh- questions involving the following are not found .

-a:	is it?
elli	where
ya :va:ga	when
he:ge	how

The use of e:nu is restricted to object or event identification with the former being more frequent than the latter.

### Negation

C<sub>5</sub> uses negative morphemes in the following order of descending frequency.

1. Shaking of head and movement of the hand to indicate negation.
2. Use of negative morpheme illa 'no' when asked nin je:balli ka:sidya:? 'Is there money in your pocket?' he came out, with the morpheme 'illa'.
3. Use of be:da 'do not want' for refusing something like excess food put into his mouth.
4. Use of alla 'no' for a question like nin hesru sandipa:? 'Is your name Sandip?'

C<sub>5</sub> uses the above as independent utterances.

**Adjectives**

C<sub>5</sub> does not use adjective of quality except on imitation task.

**Colour terms**

C<sub>5</sub> uses the following names of colours.

kappu        'black'

kempu        'red'

assu         'green'

However, C<sub>5</sub> does not have the concept of these colours as he does not match the terms with actual colours. He also does not recognize the colours correctly on a comprehension task. Moreover C<sub>5</sub> does not use the terms as adjectives of quality.

**Kinship terms**

C<sub>5</sub> uses the following kinship terms correctly. The individuals bearing the kinship listed below to the ego attend to the child frequently.

amma        'mother'

appa         'father'

pa :pa       'child'

akka         'sister'

ta:ta        'grand father'

a:nti        'aunt'

ankal        'uncle'

These are used only as address terms and not as reference terms. Immediacy has helped the acquisition of these terms. They are also learnt only for use when the person addresses are present.

### Reduolication

Occasional reduolicative forms are seen in C<sub>5</sub>'s speech.

la la lasmi for laksmi 'a name'

ca: ca: canandi for ja:rbaṇḍe 'slide or sliding'

Note also the simplification of the nouns, especially in the 2nd illustration.

The reduplicative forms occur usually on initial syllables as in the above and resemble more like stuttering behaviour. See also C<sub>1</sub> and the section presenting discussion on all the subjects.

### **Onomatopoeia**

C<sub>5</sub> uses onomatopoeic forms such as the following:

pom pom 'bus horn'

bau bau 'dog's bark'

miya:v 'cat's mew'

amba 'cow's cry'

These are used both for reference as well as identification of the animals/objects.

### **Neologisms:**

C<sub>5</sub> used one instance of use of a neologism as in the following:

mekke in place of hallu 'teeth'

### **Perseveration**

C<sub>5</sub> showed several instances of perseveratory responses  
ugudu 'nail'  
repeated consecutively for 3 different questions.

### **Misnaming**

Occasionally C<sub>5</sub> came out with wrong names for objects or animals.

na:yi 'dog' for kudure 'horse'

### **Syntactic Profile of C<sub>5</sub>**

C<sub>5</sub> performs syntactically better than most of the other subjects in the study. Although most utterances were single words, 2-3 word sentences were also seen quite frequently, comparatively speaking. The sentences could be identified as being so despite the prolonged pauses in between the words. Thus the speech corpus could be identified as single word utterances

and two/multiple word utterances each serving as a sentence.

The single word utterances were found to have the following communicative functions.

(i) They were replies to questions asked.

(ii) There were usually the most crucial linguistic item in the supposed sentence.

angale for angadili

The target sentence is ca:kle:t angadili sigutte  
'Chocolates are available at the shop'

(iii) They are imitative or repeated utterances of the others.

akka for tangi 'younger sister'

The question asked prior to this was lakshmi ninna akka:na:? 'Is Lakshmi your elder sister? when actually Lakshmi was his younger sister. C<sub>5</sub> replied akka 'elder sister'. Note that he has repeated the key word from the question.

(iv) They are object/event identification utterances.

ne:yo for re:dyo looking at the 'radio'

ku:tida: for avru ku:tidda:re '(They) are sitting.'

(v) They perform the need-filling function.

kudde for kudure be:ku nange 'I want the toy horse.'

(vi) They serve as subjects only.

appa for appa a:fi:sge ho:gta:re  
'father has gone to the office'

(vii) Object only.

tinni for tindi 'snack' for na:nu tindi tinti:ni  
'I will eat the snacks.'

(viii) Predicate only.

vasta: for avaḷu ka-ru varesta:ḷe  
'She is cleaning the car.'

(ix) Action verbs as in the above example.

In all the above, abbreviation or simplification is noticed. The absent or unintelligible verb endings simplification/distortion of sounds, absence of case markers, tense, number and other semantic notions characterized these utterances.

A coherence among several, stretches of single word utterances give a sense of grammatical contiguity and hence discourse. Coherence between single word utterances is maintained both in responsive as well as instigated speech.

For the question ni: maneli e:n ma-dtiya:? 'What do you do in the house? C<sub>5</sub> gave the following responses prompted by a:me:le 'then' in between each utterance consecutively.

u:ta ma:t for u:ta '(I) have lunch'

a:tti: for a:ta a:dti:ni 'I play'

ni:de for ni:de ma:dtini '(I) sleep'

The coherence is also maintained in self initiated speech such as naming of objects in a picture.

bomme 'doll'

kudde for kudure 'horse'

ba:tu 'duck'

ni:ru 'water'

All these were present in the picture shown.

### **Two/multiple word utterances of C<sub>5</sub>**

The two-three word utterances in C<sub>5</sub>'s speech serve the following relationships.

1. Direct object - predicate relationship.

a:lu kudite for pa:pa ha:lu kudita: ide '  
'(Baby) is drinking milk.'

2. Subject-predicate relationship.

pa:pa ku:ti for pa:pa ku:tkondide  
'Baby is drinking'

3. Conjunctive relationship.

ce: te:bal for che:ru te:bal 'chair and table'



Note that such illustrations demonstrate the conjunctive relationship without any overt conjunctive markers.

4. Indirect object-subject relationship

lota du:s for lotadalli ju:s ide  
'juice is in the tumbler'

5. Subject-Indirect object relationship.

ta:ta u:ru for ta:ta u:rige ho:gidda:re  
'Grandfather has gone to other place.'

4.5. Speech and Language Profile of C<sub>6</sub>

**Personal Information**

C<sub>6</sub> is an 8 year old boy who is an active and very bright child in spite of the spastic quadriplegia he has. He is immobile since his lower limbs are more affected than upper limbs. He is curious about the surroundings and explores the environment even when he is on his all four limbs. He is the first child of his parents and he has one younger sister only.

C<sub>6</sub> 's parents are well educated and belong to middle socio-economic status. *The* father goes out for work and the mother is with the child all the time. She takes very active interest in the child's welfare. The parents speak Kannada at home. They are also well versed in English. They belong to a single nuclear family set up.

C<sub>5</sub> has spastic quadriplegia of the moderate degree as diagnosed by the neurophysician. His problem was identified around 2 years of age.

C<sub>6</sub> uses speech for communication and his speech is well understood by the listeners despite the poor clarity of speech.

### Phonological Profile of C<sub>6</sub>

produces many of the sounds of Kannada.

#### Vowels

The following table gives the vowels found in speech.

	Front	Central	Back
High	i		u
	i:		u:
	e <sup>a</sup>		o
	eæ		o:
Low		a	
		a:	

The table reveals that C<sub>6</sub> uses all vowels found in normal spoken Kannada. In addition, he also uses æ and its long counterpart which appears in borrowed words only. He uses the diphthongs ai and au in his speech. The long and short distinction of vowels is well maintained..

Consonants

C<sub>6</sub> has the following consonants in his speech.

1. Stops and Nasals

	Voiceless		Voiced		Nasals
	un- aspirated	asoirated	un- aspirated	aspirated	
Velar	k		g		ŋ
Palatal	c		j		
Retroflex	ʈ		ɖ		
Dental	t		d		
Labial	p		b		ɱ m

The encircled sounds are heavily distorted.

## 2. Other sounds

Glides Sibilants Fricatives Laterals Continuants

The encircled sound is heavily distorted.

Pharyngeal

Retroflex

ʄ

Apico-  
palatal

y

Alveolar

s

l

Labial

v

From the table it is obvious that the following sounds are present: Voiceless stops k, c, t, p and their Voiced counterparts g, j, d, b, Retroflex t, d,

Nasals  $\eta$ ,  $\eta$ ,  $n$  and  $m$

Sibilants  $s$

Semivowels  $y$  and  $v$

Laterals  $\text{ɭ}$  and  $l$

$C_6$  does not have the following sounds:

Aspirated sounds

Palatal nasal  $\check{n}$

Fricatives  $h$  and  $f$

Sibilants  $s$ ,  $s$

Trill  $r$

Of the sounds present, the retroflex sounds  $t$ ,  $\check{d}$ ,  $n$   
• • •  
and  $l$  are heavily distorted as noted by the encircling of the sounds. These and the absent sibilants, fricatives and trill are more frequently substituted and/or distorted than the other sounds. Thus the sounds which require finer manipulation of the articulators, as explained in the profiles of  $C_1$  and  $C_2$ , are all affected...

#### Phonemic Analysis of $C_6$

The stop consonants occur initially and medially. This holds good for retroflex sounds which are however, very much distorted, leaving only a trace of retroflexion or rather a trace of some presence of sound. Distortion is a strategy employed by  $C_6$  in common with other subjects in the study. The stop consonants also occur in gemination in the medial position.

amma 'mother'

katte 'donkey'

The homorganic retroflex nasal and retroflex stop also occur in the medial position.

gaṅṅe 'time'

guṅḍi 'button'

In a very few cases this cluster also occurs in the word final position.

makkōṅḍ 'sleeping'

No non-identical cluster is used by C<sub>6</sub>.

As regards vowels, they all occur initially, medially and finally and almost all words end in a vowel as found in normal spoken Kannada. There are also certain distortions noticed in the use of vowels. These distortions may be seen as reduction in the time taken for production of vowels. There is distortion between the long and short counterpart of a vowel. In essence shortening of the length and reduction in the size of closure of lips are noticed. One notable feature is the almost equal distribution of high, mid, low, front, back and central vowels in the word final position. This is somewhat different from the normal Kannada speech in which the high back rounded vowel is more commonly found in the word final position (Ranganatha, 1963). Rounding probably requires an additional effort and is directly related to lip movements and this has

resulted in their lesser use in C<sub>6</sub>'s speech, Note also that this type of distortion is difficult to be recorded on paper.

Bilabial and alveolar nasal occur initially, medially and in gemination medially.

anna 'mother'

anna 'rice'

They also occur in some cases with homorganic stops.

gombe 'doll'

The retroflex nasal is found very infrequently in the word medial position.

kaṇṇu for kaṇṇu 'eye'

This retroflex sound is also heavily distorted. There is also a retroflex lateral which occurs singly as well as in gemination in the medial position.

maḷe 'rain'

kaḷḷa 'thief'

This sound is also heavily distorted. On the other hand the alveolar lateral is not distorted and it occurs in the word initial and medial positions as well as in gemination in the medial position.

la:yi for la:ri 'lorry'

a:lu for ha:lu 'milk'

The semivowels y and v occur in the initial and medial positions. They do not occur in gemination in the medial positions.

The palatal semivowel occurs as the second member of a cluster with alveolar lateral.

palya 'vegetable preparation'

There are, however, no other example of such clusterin for both the semivowels.

### **Paralinguistic Features in C<sub>6</sub>**

C<sub>6</sub> has a voice that is greatly low pitched quite loud in intensity and a little harsh in quality.

### **Clarity of Speech**

Clarity of speech is only mildly affected in C<sub>6</sub>'s speech. The clarity is affected because of the dysarthric errors in speech, the unnatural pauses in between and the unnatural and inconsistent stress given to syllables. The speech, however, is quite intelligible to the unaccustomed listener as well, in spite of the distortions on many sounds.

### **Speech Rate**

C<sub>6</sub> has a rate of speech that is slower than normal. Along with the pauses in between longer response time taken is also one of the factors for slower rate of speech.





fairly explicit in the speech of C<sub>6</sub>. Aided by the contextual information his utterances are well understood by the listener.

There are more nouns than verbs or other items used. In general C<sub>6</sub>'s speech consists mainly of nouns or nominal forms.

### Grammatical Categories

The single word utterances can be classified into the following categories.

Nouns:           so:p     'soap'  
                  taṭṭe   'plate'

Verbs or  
nominalized verbs:   kudita:re     '(they) drink'  
                          tinnodu       'something that is eaten'

In C<sub>6</sub>'s speech, these grammatical forms are not retained in full always. The occasional distortions made in this respect include the following.

(i) Nouns without inflections.

ga:di for ga:dina 'of the cart'

(ii) Verb roots with partial inflections

kodta:     kodta:re     '(they) give'

Note that these distortions are not many and occur occasionally.

(iii) Nouns with inflections

nandu 'mine'

(iv) Verbs with complete PNG markers

barita:re 'they write'

Compare the former two distortions with the distortion of sounds dealt with under phonemic distribution. In the latter distortion functions as a trace for a sound or sounds that were not clearly produced in the speech of the CP child but are found in the normal Kannada speech. In the present case, the distortions are caused by the tendency to shorten or simplify an utterance which is instigated by dysarthric or cognitive inadequacies.

### **Pronouns**

The available data does not reveal the use of many personal pronouns. I person and II person pronouns are not used at all. III person neuter pronouns are found used.

adu 'that'

idu 'this'

However, the pronominal sense is covertly expressed through occasional and rare use of verb endings with person markers.

III person           batta:le     '(She is) coming'

I person            tintini       '(I will) eat'

## Gender

The notion of gender is fairly well developed in C<sub>6</sub>'s speech. He expresses gender suffixes in the following.

### (i) Nominal

huggi for hudugi 'girl'

hugga for huduga 'boy'

### (ii) Verbal expressions

aḷta:ḷe '(She) cries'

a:kta:ne for ha:kta:ne '(he) will put'

He also distinguishes between male and female names by correctly pointing at male/female picture when the names are given.

## Number

Number concept is not well developed since C<sub>6</sub> uses no number suffix for plural marking in nouns. However, on a comprehension task he would identify the single and multiple objects in pictures correctly. Thus, plural suffixation is problematic at language expression and not at comprehension. Thus, he does not use the plural suffixes -galu, -ru, and -andiru with nouns. In verbal endings, however, plural markers are correctly used.

o:tta:re '(They) are studying.'

The distinction between III person singular honorific and III person plural is not maintained, however.

### Case

C<sub>6</sub> uses correct case suffixes although the nouns are many times not inflected. The case relations expressed by C<sub>6</sub> include the following:

(i) Dative

pa:page kodta:re '(They) give to baby'

Note, however, that C<sub>6</sub> has used -ge instead of -nge in the above instance.

(ii) Locative case

kya:ttalli for kə:reṭṭalli 'in the carrot'

Some case relations are implied even without overt markers,

(i) Nominative case

huggi kuta:ie 'girl is sitting'

(ii) Accusative case

kə:mra kotta:ne for kə:mra kodta:ne  
'he gives the camera'

The genitive, instrumental and ablative case relations are not found used.

## Conjunctions

C<sub>6</sub> uses the conjunctive markers, -u: and the iterative type.

(i) Explicitly marked allomorph -u:

bi:su: tome:to 'beans and tomatoes'

(ii) Iterative type.

to:pi svetar 'cap and the sweater'

C<sub>6</sub> does not use allomorphs like matte/mattu, a:me:Ie for conjunctive marking. He comprehends these, however, in responsive speech.

## Verbs

C<sub>6</sub> uses comparatively less number of verbs than nouns although they are quite a few in number compared to many other subjects in the study.

The verbs occur both as the single utterance as well as the second item in a two word utterance. The first or the preceding item in the latter case is usually a subject noun or an object noun.

ku:ta:ne for (avanu) ku:tidda:ne 'He is sitting.'  
pa:pa a:dtade 'Baby is playing.'

The single verb utterances are frequently seen and most show incomplete endings.

makko for (huggi) malkondide 'Girl is sleeping.'  
 Note that the reflexive verb is used in above illustration.

Causative verb is occasionally found used.

kudista:re '(They) are causing the child to drink/'

Although transitive verbs are more compared to intransitive ones, the latter ones are also found more frequently than in the speech corpus of other subjects.

### Tense

Tense is not distinguished clearly in C<sub>6</sub>'s utterances. The non-past distinction is overtly expressed with the respective sense markers usually. The past tense is not expressed overtly with the past tense marker.

batta:re for 'bandru'  
 '(are)coming' for '(They) came'

Thus the use of present tense markers in place of past tense marker is seen. He does not also use the following terms nor does he distinguish them correctly.

nenne yesterday  
 na:le tomorrow

### Numerals

C<sub>6</sub> uses numbers one to ten correctly, thus revealing no difficulty in the use of cardinal numbers. However, he does not match the actual number of objects with the number. This is in opposition to the finding that he matches the number with its denotant number of objects better on a comprehension task. Thus comprehension of numbers is better than its expression.

C<sub>6</sub> does not use ordinal numbers. He repeats, however, two digits numbers well.

### Adverbs

C<sub>6</sub> reveals occasional use of place and manner adverbs,

kuccili 'in the chair'

hi:ge . 'like this'

'showing the action of brushing teeth'

Time adverbs are not found used at all. Even the place and manner adverbs are very occasionally used and not regularly so.

### Interrogation

C<sub>6</sub> does not use interrogation markers other than use of e:nu 'what?'. This was also seen only once.

idu e:nu 'What is this?'

This is only used for object and event identification in pictures.

The other wh- questions like the following are not found used.

-a	'is it?'
elli	'where'
he:ge	'how'
ya:va:ga	'when'

### Negation

C<sub>6</sub> uses negative markers in the following order of descending frequency.

- (i) Shaking of the head for refusing something.
- (ii) Use of illa.

For example, for the question 'nin hatra pensil idya'? 'Do you have a pencil with you?' C<sub>6</sub> answered illa 'no' (I don't have).

- (iii) Use of modal negative be:da 'do not want' accompanied with the shake of head for refusing a second chocolate offered to him.

Prohibitive negatives like ku:dadu, ba:radu are not found used.

### Adjectives

C<sub>6</sub> used two adjectives of quality. They are of colour and number.



kappu na:yi 'black dog'  
ondu pa:pa 'one baby'

These were also not used correctly all the time. The colours and numbers are wrongly named. Other quality adjectives of size, shape, etc., are not used.

**Colour terms** .

C<sub>6</sub> uses the names of colours but not consistently with the actual colours thus revealing inadequate acquisition of colour terms.

haldi 'yellow' for hasiru 'green'

**Kinship terms**

C<sub>6</sub> uses the following kinship terms correctly.

appa 'father'  
amma 'mother'  
ta:ta 'grandfather'  
ajji 'grandmother'  
akka 'elder sister'  
tangi 'youger sister'  
a:nti 'aunt'  
ankal 'uncle'

These are used both for address and reference purposes.

**Onomatopoeia**

C<sub>6</sub> uses certain basic onomatopoeic terms like the following.

bau bau 'dog's bark'

miya:v 'cat's mew'

These are, however, elicited on questioning about the respective cries and not produced on his own spontaneously. See the section on discussion also.

**Reduplication**

C<sub>6</sub> does not use reduplication forms at all. See the section on discussion also.

**Syntactic Profile of C<sub>6</sub>**

C<sub>6</sub> uses single word utterances and two-three word utterances which appear like elliptical sentences most of the time. Single word utterances, however, are more in number than the others.

**Single word utterances**

The following are the characteristics/functions of single word utterances.

1. They are usually replies to questions asked.
2. They are usually the crucial linguistic items of the target ' sentence.

u:ta '(He) is having) lunch'

3. They are object/event identification utterances. See also (2) for illustration.

a:dtale '(She) is playing.'

4. They have need-filling function.

a:lu for ha:lu 'milk' (I want milk)

5. They function as subject only.

papa for pa:pa ku:tide 'baby is sitting'

6. Object only.

Illustrated as in (3) above.

7. Action only.

kudista:re '(they)are causing the (child to) drink'

There is simplification seen in the use of all the above functions.

### Two/multiple word utterances

The multiple word utterances have the following functions.

- (i) Subject-predicate relationship.

pa:pa a:dtade 'Baby is playing.'

- (ii) Object-predicate relationship.

mane o:ta:re for manege ho:gta:re

'(They) go (to) the house.'

- (iii) Subject-object

huggi sa:s for hudugi sa:ksu ha:kota:le

'Girl is pulling on socks.'

- (iv) Adjective-Noun relationship.

ni:li su: 'blue shoes'

In spite of the elliptical appearance of the utterance the grammatical contiguity appears to be maintained by the stretch of utterance so as to constitute discourse. The coherence between the single word utterances is maintained whether such utterances are instigated by others or involving picture description.

While looking at the picture of a lemon when asked what is done with lemon after he named it, he came out with the following utterances prompted with a:me:le 'then' by the investigator in between.

ju:s ma:tta for ju:s ma:dta:re

'(they) prepare juice'

annakke for rasa annakke ha:kta:re

'(they) mix the juice with rice'

tinnud for tinta:re '(they) eat'

#### **4.6. Speech and Language Profile of C<sub>7</sub>**

##### **Personal Information**

C<sub>7</sub> is a 10 year old girl who is the second of three siblings. She is immobile since her lower limbs are affected severely than the upper limbs. She is cognizant of the surroundings. Her parents are well educated and belong to middle socioeconomic status. They stay in a single, nuclear

family set up. They speak Kannada at home and are very fluent with English also.

C<sub>7</sub> has spastic quadriplegia of the moderately severe degree as noted by the neurophysician. The problem was there since birth but was identified around 3 years of age.

C<sub>7</sub> uses speech as well as lots of gestures for communication. Her needs are well understood by her family members. For others her speech is very disfluent

### **Phonological Profile of C<sub>7</sub>**

C<sub>7</sub> does not produce all sounds of Kannada.

### **Vowels**

The following table gives the vowels found in C<sub>7</sub>'s speech.

		Front	Central	Back
High		i	i	u
		i:	i:	u:
Mid		e	e	o
		e: æ	-e:	o:
Low			a	
			a:	

The table reveals that C<sub>7</sub> uses all the vowels found in normal spoken Kannada. In addition she is also found to use central, high and mid half vowels ± and e along with their long counterparts. She is also -found to use long æ: in borrowed words. Thus it appears she is well able to manipulate the vocal tract for the production of vowels.

### Consonants

C<sub>7</sub> has the following consonants in her speech.

#### 1 . Stops and Nasals

	Voiceless		Voiced		Nasals
	un- aspirated	aspirated	un- aspirated	aspirated	
Velar	k		g		
Palatal	c		j		
Retroflex					
Dental	t		d	n	
Labial	p		b	m	

#### 2. Other Sounds

#### Glides    Sibilants    Fricatives    Laterals    Continuants :

Pharyngeal

Retroflex

Apico-  
palatal    y

Alveolar

l

Labial    v

It is necessary to note that all the sounds are extremely distorted. Voiced and voiceless distinction is also clearly not heard.

From the table above it is clear that C<sub>7</sub> has a very limited consonantal repertoire. She has the following sounds only.

Voiceless Stops	k, c, t, p	and their voiced counterparts	g, j, d, b
Nasals,	n, m		
Semivowels	y, v		
Lateral	l		

C<sub>7</sub> does not produce the following:

Aspirated sounds  
 Retroflex stops ʈ and ɖ  
 Retroflex lateral ɭ  
 Sibilants ʃ, ʒ and s  
 Alveolar trill r

It was found that this picture remained the same even on an imitation task. The sounds are all distorted and inconsistently produced. The sound that need finer and deliberate manipulation of the articulators, as explained in the profiles of C<sub>1</sub> and C<sub>2</sub>, are all affected. Thus, an inability to make finer variations in the placement of articulations is seen in the speech of C<sub>7</sub>.

### Phonemic Analysis of C<sub>7</sub>

The production of speech sounds is limited and is so much distorted that it is difficult to isolate speech sounds and to arrive at a distributional pattern. whatever the speech sounds we have identified and transcribed should be considered as approximations only. These approximations are generally notional. The following picture is seen in these approximations.

All the stop consonants occur initially and medially. They also occur in gemination medially.

-p- appa 'father'

There are also geminations in the initial position of a word. These occasional geminations in the word initial position may be considered as indicating prolonged effort the child makes to produce the particular sound.

ppa:t for bæ:g 'bag'

Nasal sounds occur in the initial and medial positions. They also occur in the word medial position in gemination.

amma 'mother'

mane 'house'

ni:yu for ni:ru 'water'

anne for nidde 'sleep'



Semivowels y and v occur in the word initial and medial positions. They do not occur in gemination in any of the positions.

ye:yo for re:dyo 'radio'  
a:yu for ha:lu 'milk'

The alveolar lateral occurs in the word initial and word medial positions.

la:yi for na:yi 'dog'  
do:li for go:li 'marble'  
allu for hallu 'tooth'

There are no non-identical clusters. The child does not even have a homorganic nasal plus stop cluster.

The above description indicates that the available sounds generally share some of the positions of occurrence found in the normal spoken Kannada, in so far as single sounds are concerned. A marked feature of the cluster is that there are only clusters of gemination as seen in some of the illustrations above.

### Paralinguistic Features

#### Clarity of Speech

Clarity of speech is severely affected in C<sub>7</sub>. This is mainly apparent because of the incorrect production of speech sounds and poor intelligibility of her speech. The

speech is also affected in clarity by the unnatural stress and juncture. A listener would need several repetitions of the utterances before he can understand the speech of C<sub>7</sub>. Her speech is characterized also by the fact that all the sounds of normal language are not produced and there are poor intonation patterns due to the inability to make finer variations. Clarity is not only affected by incorrect production but also by incomplete production of sounds, delay in utterance, prolonged pauses between forms and inappropriate pauses thus debilitating the listener in parsing the forms correctly. There is also a failure to use syntagmatic relations correctly. This will be discussed in a later section.

### Speech Rate

C<sub>7</sub> has a speech rate that is extremely slower than normal. Expressive difficulty is also seen in the form of laboured speech production. This problem is also aided by the requirement of a longer response time.

### Pauses

Pauses are very frequently found in C<sub>7</sub>'s speech. They are found to be of three varieties.

- (i) Pauses before the start of the utterances. Note that this along with the dysarthric difficulty, would account for the longer response or reaction time.
- (ii) Prolonged pauses between the syllables in an utterance.

- (iii) Prolonged pauses between the words, in cases where more than one word were present.

### **Quantity of Speech**

This is extremely less than expected in a normal child of the same age. The reduced quantum of speech output has also a relevance with the single word utterances and the longer time taken for expression. C<sub>7</sub> very rarely initiates speech on her own. Her speech is generally a response to others' speech. Most of the data for the study was only a set of responses to the investigator's promptings.

### **Intonation**

The intonation patterns of C<sub>7</sub> are highly inadequate. She uses mostly single word utterances only. The intonation on single word utterance seems to approximate that used in normal speech in a distorted fashion. The long pauses between the two words in the occasionally seen two word utterances give an unusual intonation pattern.

### **Morphological Profile of C<sub>7</sub>**

Most of C<sub>7</sub>'s utterances are single word utterances and almost all of these exhibit no affixation processes. If the suffixes are present, they are not regularly seen.

Most of these single word utterances are nouns. Next in the descending order are verbs or nominalized verbs and both

these categories are very heavily simplified.

In the single word utterances there is no overt marking for case suffixes/relations, tense, gender and number, time manner and location and other qualitative characteristics. Hence such semantic notions are not explicit in the speech of  $C_7$ . The inferences of such notions are left to the imagination of the listener based on the context of situation and familiarity of the target utterance.

In the single word utterances, initial syllable/syllables only or final syllable/syllables only are uttered with distortions and/or simplifications as in the following examples.

to: for so:p 'soap'  
 ta:ye for jo:dista:re '(they) will arrange'

The uttered forms are not retained in full. Distortions in the utterances/grammatical categories are made in the following manner.

(i) Nouns are uttered with no inflections.

a:yi for na:yige 'to the dog'

(ii) There are rare instances in the imitation in which the child sounds as if she has inflected the word, as in the following examples.

mayeya for manena 'house' (accus.)

atta:ye for altida:le '(she) is crying'  
tatteyi for tatteli 'in the plate'

In the non-imitation tasks very few or no attempts at inflections are seen.

- (iii) Only verb root forms with partial or no inflections are uttered.

koku for kodu 'give'  
no:de for no:dta ide 'is looking'

- (iv) Nominalized verbs in place of verbs with simplification are seen.

pa:cu for pa'condide '(Baby) is sleeping'

Note that this is an item (pa:cu) from the baby-talk, retained at this age also.

### Pronouns

Pronominal forms are not found used at all by C<sub>7</sub>. However, the pronominal sense/notion is glimpsed very occasionally in the verb endings.

III person plural a:tta:ye for a:dta:re  
'(They) are playing. '  
attiya for alti:ni  
'(I am) going to cry'

Note that there is a confusion in the use of PNG marking in the second illustration where II person marking -(y)a is used instead of the I person marker -ini. That is,

a:ɭtiya is used instead of aɭti:ni '(I am) going to cr

### Gender Concept

Gender suffixes are not used; in a repetition task on insistence, the child sometimes uses the gender suffixes. However, she differentiates between male and female names on a comprehension task. The kinship terms in which sexual distinction is inherent are found used correctly.

a:t̩ti for a:n̩ti 'aunty'  
 appa 'father'

### Number

No distinction between singular and plural noun forms is used as seen in the lack of number suffixes. The suffixes are also not seen in the verbal constructions unless in a distorted attempt on imitation task as seen in previous examples. The sense of collectivity is also not retained as seen on recognition tasks of pictures showing single and multiple

### Case

Case markers are not used by C<sub>7</sub>. However, there are certain case relations implied.

(i) Nominative

pa:pa atti for pa:pa ałtıda:le  
'Baby is crying'

(ii) Dative

ba:ye a:ye for batalge ha:kta:re  
'(They) put it into the bottle.'

(iii) Locative

anni for angdili 'in the shop<sup>1</sup>

No overt case markers are found used. This lack of explicit case markers is in perfect consonance with the general lack of affixation processes.

### **Conjunctions**

C<sub>7</sub> does not use any conjunctive marker covert or explicit.

### **Verbs**

Verbs are second in the descending order when compared to nominal utterances. Verbs mainly occur as single word utterances and very rarely still as the second item in a two word utterance. This is usually preceded by a subject or an object noun.

(i) As a single utterance

itta for tinta:le '(She) is eating'

(ii) As the second item in an utterance

idde ma:yaya for nidde ma:dtide  
'(Baby) is sleeping'

Note that there is very little correspondence with normal spoken forms in C<sub>7</sub>'s utterances. The process of simplification is abundantly seen in C<sub>7</sub>'s use of verbs as single word utterances. In many cases the initial syllable usually is retained as in the above illustrations. However, there are also many occasions in which the second or the latter syllable is retained instead of the the first.

ta:ye for ma:dta:ne '(he) is doing'

The verb is usually not inflected for tense, PNG or any other semantic notions. In such cases the verbal forms appear almost as nominal forms.

ku:ti for ku:tkondida:le '(She) is sitting.  
Note that this resembles kurci 'chair'.

Many a time, even in contexts where a verb is a necessary response, a noun or a nominal form of the verb is uttered as the response.

a:yu 'milk' for ha:lu kudita ide 'is drinking milk'

This response is in answer to the question pa:pa e:nu ma:dta ide? 'What is the baby doing? The target sentence is pa:pa ha:lu kudita: ide 'The baby is drinking milk'. However the



subject gives only a:yu 'milk' as the response.

Most verbs used by C<sub>7</sub> are action verbs, action performed by herself or by the agents shown in pictures. She rarely used verbs on her own.

### Tense

No overt or covert tense markers are used by C<sub>7</sub>. Even the past and non-past distinction is not maintained by C<sub>7</sub>. The tense affixation is not found in verb endings. C<sub>7</sub> does not also use terms like the following.

nenne 'yesterday'

na:ɭe 'tomorrow'

### Numerals

C- uses cardinal numerals from one to ten but she does not match the numbers with their corresponding number of objects. She does not have the distinction between cardinal and ordinal numbers also.

### Adverbs

No adverbs are found used in C<sub>7,s</sub> speech. Thus adverbs of location, manner and time are conspicuous by their absence as is the case with many other morphological suffixes.

### Interrogation

C<sub>7</sub> uses interrogation very rarely. She is found to use the interrogative morpheme e:nu 'what' only once showing

the picture of a zebra. Use of e:nu 'what' is also restricted to for object identification only (asking information to identify an object) as in the above. She does not use the same for any event identification purpose. The other interrogative markers are not used at all. Note that C<sub>7</sub> thus does not use the interrogative marker for same purpose as normals do. Note also that the use of -a: the simplest interrogative marker attached to a constituent of the sentence is not found.

### Negation

C<sub>7</sub> uses the following negative morphemes very occasionally.

inna for illa 'no'

attilla for gottilla (modal negative) 'I don't know'

She also uses gestures in the form of slow shaking of the head to indicate negation.

The hierarchy of use of negation is as follows:

- (i) Gesture indicating that she does not want something or negating a statement made by the question such as 'Is your name A?'
- (ii) inna for 'illa' 'no' for the question nimma amma bandida:ra? 'Has your mother come?'
- (iii) gottilla '(I) don't know.'  
when asked to identify a colour, namely, blue.

The use of this morpheme is very much limited, however.

### Adjectives

C<sub>7</sub> uses numbers and colours as adjectives of quality. But these numbers and colour terms are not used correctly or appropriately. po: is used for fo:r in the phrase 'four teeth' when the question 'est hallugalu ide pa:pange?' was asked showing a picture of the child showing two teeth. C<sub>7</sub> came out with Po:r 'four' wrongly.

Colours are also misnamed in a similar manner.

### Colour terms

C<sub>7</sub> uses the names of colours in English (taught by the parents) but inappropriately so.

For example, she said gi: 'green' for blu: 'blue' on insistence for recognition of the colour by the investigator. Thus, although she knows the names of a few basic colours, C<sub>7</sub> does not match the colours with the term nor does she recognize them correctly.

### Kinship terms

C<sub>7</sub> uses correctly the following kinship terms for purposes of address only.

appa	'father'
amma	'mother'

ta:ta 'grandfather'  
anta for 'uncle'  
a:nti for 'aunty'

### Reduplication

C<sub>7</sub> does not use any reduplicative forms.

### Onomatopoeia

C<sub>7</sub> does not use onomatopoeic forms apart from the following.

'cat's mew' 'miya'  
dog's bark 'pa: pa:'

### Syntactic Profile of C<sub>7</sub>

C<sub>7</sub> uses single word utterances in majority. The longest, however, is the 2-word utterance that is seen very occasionally.

### Single word utterances

The single word utterances have the following characteristics/functions.

- (i) Monotonous inflection (a fixed pattern of intonation)
- (ii) Interspersed with prolonged pauses.
- (iii) Direct answers to the questions asked.

(iv) Usually the most crucial linguistic element in the sentence. These are illustrated in many examples previously given.

(v) They are usually simplified phonologically.

a:ya:ye for ma:dta: ide '(The baby) is doing.'

yi:yi for kitaki 'window'

Thus there are elements of abbreviation, deletion, substitution and distortion of utterances seen. These deviances are also highly inconsistent in the sense that they are not repeated in the same manner all the time.

anne for nidde 'sleep'

idde for nidde 'sleep' .

These two were elicited consecutively.

(vi) The utterances frequently function as objects only.

mane 'house' for maneyalli amma idda:re

'mother is in the house'

(vii) They function as subjects only frequently.

ni:ru for nallili ni:ru bartide

'water is dropping from the tap'

(viii) They function as predicates only.

manane for ma:dta: ide '(It) is doing'

(ix) No discourse indicators are seen.

### Two-word utterances

The two word utterances are very less in quantity compared to single word utterance. These are also less when compared to those produced by other spastic children in the study. These few two word utterances have the following relations.

(i) Object predicate relationship .

naye ba:cu for talena ba:co:du  
(accus.)

'comb the hair'

(ii) Subject predicate relationship

botti itte for ba:tlalli enne ide  
'Bottle has oil in it'

(iii) Adjective-noun only.

Po: allu for fo:r hallugalu  
'four teeth'

No discourse indicators are seen as indicated by the lack of cogency between the utterances. It is not present in instigated speech or prompted speech.

## **B Speech and Language Profile of Athetoids**

### 4.7. Speech and Language Profile of C<sub>3</sub>

#### **Personal Information**

C<sub>3</sub> is a 6 year old male child who is the first issue of two sons. He is immobile since his lower limbs are affected because of athetosis. He also has flailing movements of the upper limbs on movement. In sitting position with strapped, chair, these athetoid movements are minimal. He is an 'intelligent' child with bright eyes and communicates a lot with eye movements. He has drooping also. He uses speech as well as gestures for communication. Although his speech is very unclear his mother reports that the family members understand him very well since they are familiar with him. His parents are educated and belong to middle socio-economic class.

C<sub>3</sub> is diagnosed as a case of Athetosis of moderate type by the neurophysician. He was identified as being so in the 3rd year, although the problem was present since birth.

The child has been exposed to Kannada since birth as it is the mother tongue of the parents. The parents also know English very well. They live in a single nuclear family set up and take active interest in the child's progress.

The data for the study was tape recorded in the most comfortable position of C<sub>3</sub> that is, in the sitting position on, a chair with straps for the trunk' and limbs.

## Phonological Profile of C<sub>3</sub>

C<sub>3</sub> does not produce all the sounds of Kannada.

### Vowels

The following table gives the vowels found in C<sub>3</sub>'s speech.

	Front	Central	Back
High	i i:	: :	u: u u:
Mid	e e:		o o:
Low		a a: ã:	

The table reveals that C<sub>3</sub> uses all the vowels found in the adult Kannada language. In addition, he also uses the half central, high and mid vowels ± and e with their long counter parts i: and -e: . There are also nasalized vowels ±:, u:, a: which are used independently. These are, however, used in free-variation with their nonnasalized counterparts (i:, u:, a:). C<sub>3</sub> also uses diphthongs ai as in ait to for saikal 'cycle' and au as in bau 'dog's bark' and auddu for paudar 'powder'.

### Consonants

C<sub>3</sub> has the following consonants in his speech.



### 1. Stops and Nasals

	Voiceless		Voiced		Nasal
	un- aspirated	aspirated	un- aspirated	aspirated	
Velar	k				
Palatal	c		j		n
Retrolflex	t̠				ɖ ɳ
Dental	t̪		d̪		n
Labial	p		b		m

### 2. Glides Sibilants Fricatives Laterals Continuants

Pharyngeal

Retrolflex

Apico-  
palatal y

Alveolar

l

Labial v

Note that all sounds are extremely distorted with the encircled ones being more affected.

From the above table it is seen that C<sub>3</sub> has the following sounds.

Voiceless stops k, c, t̠, t̪, p

Voiced stops g, j, d̠, d̪, b

Glides y and v

Lateral l

Surprisingly C<sub>3</sub> has the retroflex voiceless and voiced stops t̡, d̡ and retroflex nasal ŋ̡.

C<sub>3</sub> does not have the following sounds.

Aspirated sounds

Sibilants s, s and ś

Fricatives h, f

Lateral retroflex l̡

Trill r

Thus, C<sub>3</sub> has difficulty in producing those sounds that require deliberate and finer manipulation of the articulators to a large extent, as explained in the profiles of speech and language for C<sub>1</sub> and C<sub>2</sub>.

### Analysis and Distribution of Speech Sounds of C<sub>3</sub>

All the sounds listed in the tables are extremely distorted, more heavily than all the other subjects in the study, both spastics and athetoids. Comparatively speaking there are more sounds available in the repertoire of C<sub>3</sub>. However, the sounds are not used in the same manner as normals. Also there is no consistent picture seen in terms of use of the sounds. Even on imitation tasks, the sounds are not approximated, within the same points and manner of articulation. C<sub>3</sub> has extreme distortion and inconsistency in the production of same sounds at different points of time and occasion. The phonemic status of the sounds is difficult and not possible to establish, for reasons stated in the profiles

of  $C_1$  and  $C_2$ .  $C_3$ 's speech is characterized by freevariation so much so that for the same sense the child gives different utterances on different occasions.

There is a lot of overlapping and inconsistency in use of speech sounds either individually or in combination with other sounds. This overlapping and inconsistency can be classified into the following types.

1. Partial and in-consistent correspondence

Deletion of initial consonant:

a	for	n	a:yi	for	na:yi	'dog'
p	for	b	pu	for	bassu	'bus'
t	for	s	tto	for	so:p	'soap'
			e:ttu	for	so:p	'soap'

2. No correspondence or similarity at all

atta	for	camca	'spoon'
a:kki	for	a:ŋ̃i	'aunty'
o:kki	for	ɕo:pi	'cap'

In the speech of  $C_3$  all the vowels occurred in initial position. The following vowels do not occur in medial and final position. Note that these are all nasalized vowels and

occur as independent utterances by themselves.

Note the pattern of distribution of vowels is not the same as found in normal spoken language.

Note also that nasalized vowels are not found

in normal spoken Kannada. Thirdly the pattern of distribution of vowels found in C<sub>3</sub> is different from patterns found in spastics children of the study.

The following vowels do not occur or occur very rarely in the medial position.

The half front vowels i and -e , and u

i - only in one instance ba:yil for ba:gilu 'door'

u - only in munnu for mu:ru 'three'

The rest of the vowels occur in initial, medial and final position. The long vowels occur in the final position also which is very rarely seen in normal spoken Kannada.

a:tta: for a:toriksa 'Autorikshaw'

Consonant distribution is also affected in C .

k, g occur initially and medially. They also occur in gemination medially. The other stops c, j, t, d, t, and d do not occur initially. They occur medially as well as in gemination medially. Note that this is unlike the pattern in the normal spoken Kannada. Note that this is also different from the pattern of distribution found in speech of spastic subjects.

icci for kaccidea 'has bitten'

utti for kurci 'chair'

This -tt- pattern is very frequent in C<sub>3</sub>'s speech.

p occurs initially and medially and also in gemination medially.

b occurs initially only and not medially. Note that this pattern of distribution is also unlike pattern in normal spoken Kannada.

ba:yi for ba:ɽe 'banana'

v occurs initially and medially.

y occurs medially and also in gemination medially.

va:tti for ba:ɽal 'bottle', a:yi for na:yi 'dog'

ba:yi for ba:vi 'well', iyye for kudire 'horse'

l occurs only medially and not initially.

a:llu for ha:lu 'milk'

ɽ occurs medially and only in gemination.

iɽɽa for u:ta 'food'

d occurs only initially and not medially.

dabbe for dabba 'box'

Among the nasals surprisingly m, n, ŋ, ɳ are all present. This phenomenon is not found in most of the spastic subjects in the study. Note that all nasal sounds of normal spoken Kannada except n are found in C<sub>3</sub>'s speech.

m, n are used both initially and medially.

They are also found in gemination medially.

amma 'mother'  
 inna for anna 'rice'

n and ṅ are found only medially and in gemination only.

inni for 'go:li 'marble'  
 unnu for haṅṅu 'fruit'

Note that the geminated occurrence of n found in normal Kannada at all. These sounds, n and ṅ, are however, not found used consistently and wherever necessary.

The speech sounds are heavily simplified in C<sub>3</sub> 's speech more than in any spastic or other athetoid children in the study. The simplification procedures, however, are widely varying, and regular patterns are extremely difficult to establish. In spite of these freevariation an attempt was made to identify as many patterns as possible in the speech corpus. These are given below.

1. Multisyllabic words are reduced to monosyllables and very rarely disyllabic forms.

tto for so:p 'soap'  
 ne: for mane 'house'  
 atte for ma:dta: ide '(That) is doing'  
 a:tti for mo:sambi 'sweet lime'

2. Replacement/substitution of one sound by another.

e:ttu for so:pu 'soap'  
udde for nidde 'sleep'

3. The sounds, whether available in his repertoire or not, are deleted completely in the reduction process.

a:te for va:rte 'news'  
pa for bassu 'bus'

4. The non-identical clusters in the normal speech are made into, identical clusters. This is of two types.

- (a) Retention of one sound of the non-identical cluster and modification of the same into a geminated one in place of the non-identical cluster.

a:kke for ca:kle:ç 'chocolate'  
onnu for ondu 'one'

- (b) Substitution by a simpler sound and conversion of this simpler sound into a geminated one in place of the non-identical cluster.

tnni for angdi 'shop'  
a:ttu for ba:çlu 'bottle'

5. The use of an entirely different utterance for the normally spoken utterance.

a:kku for kə:reç 'carrot'  
innu for erdu 'two'

C<sub>3</sub>, an athetoid, engages himself in less number of simplification processes, when compared with C<sub>2</sub>, a spastic case (Twelve regular patterns have been identified for C<sub>2</sub>) In spite of the lesser number of simplification processes, the speech of C<sub>3</sub> fails to approximate the normal spoken Kannada for at least two reasons:

- (i) C<sub>3</sub> engages himself more in deletion which results in the retention of only one syllable.
- (ii) Heavy distortions of all sounds.

### **Paralinguistic Features**

C<sub>3</sub> has a voice that is low in pitch with pitch breaks (voice very often goes high), hoarse quality and loudness.

### **Clarity of Speech**

Clarity of speech is extremely affected in case of C<sub>3</sub> There are severe misarticulations due to dysarthria, highly abnormal stress on syllables, inappropriate pauses that affect the understandability of speech. A listener would have great difficulty, with several repetitions even, to understand C<sub>3</sub>'s speech. Even the knowledge of target word will not be help much. Clarity is also affected because of the inability to adhere to adult sandhi rules, inability to produce homorganic clusters sounds, and deviant phonemic distribution. It is also affected because of incorrect production of certain consonant sounds, incomplete forms and pauses and gaps between utterances.



### **Speech Rate**

C<sub>3</sub> has a rate of speech that is extremely slow compared to normals or other spastic children. Expressive difficulties in the form of longer response times, inappropriate pauses and stress given on syllable contribute to the extremely lower rate of speech.

Another factor is that the speech of C<sub>3</sub> is only consisting of single words or single syllabic utterances and the rate of speech in running speech cannot be estimated.

### **Quantity of Speech**

C<sub>3</sub> produced an extremely less amount of speech. He does not initiate speech on his own but attempts to produce speech on imitation. His utterances are all single syllabled and very rarely disyllabic.

### **Pauses**

C<sub>3</sub> has pauses in speech that are abnormal and inappropriate. They are present in the beginning of the utterances as well as between the syllables. The intersyllabic pause rate/prolongation is much larger than normal.

### **Intonations**

The utterances are all single syllable or single-word utterances. Even the intonation on single words is inappropriate as seen by inappropriate stress given on these syllables.

### Morphological Profile of C<sub>3</sub>

C<sub>3</sub> does not initiate speech on his own. He does not show any affixation processes. There is no indication of case suffixes/relation, no indication of the gender and number, no indication of time, manner and location and no indication of various other qualitative characteristics in C<sub>3</sub>'s speech. In short, conveying semantic notions of time, quality, gender, number, etc., is not explicit in the speech of C<sub>3</sub>. Inferences of such notions is left to listener's understanding of the situation and familiarity of the listener with the speech of the C<sub>3</sub>.

C<sub>3</sub>'s speech also does not specifically distinguish, in any explicit manner, nouns, verbs, adverbs and adjectives. Since the speech consists mainly of single word utterances, indication that he has notions of grammatical categories is to be inferred from two word or multiple word utterances which, unfortunately are not at all found in C<sub>3</sub>'s speech. Hence any grammatical or semantic notions are to be imposed by the listener on the single word utterances, based on the context of situation.

Among the utterances, nouns are much greater in proportion than verbs, adverbs, adjectives or any other category.

Another feature is that the verbs, even when very rarely uttered, appear in their root form or imperative form only.

Yet another feature is that even the single word utterances are reduced to mono or di-syllabic utterances with the final (which is more common) syllable or the initial syllable (less common) retained. However, even these minimally retained syllables or either abbreviated/distorted/substituted by other sounds.

In essence, C<sub>3</sub> has a morphologic system that is extremely primitive and not well equipped. Details of these characteristics with the illustrations are given in subsequent sections.

### Grammatical Categories

The utterances can be arranged in the following descending order of frequency.

(i) Nouns

(ii) Very rarely verbs. These are illustrated in the section on verbs.

The above two are not inflected at all either in noun form or verb root form.

pu	for	bassalli	'by bus'
amma.	for	amma	'mother'

These will be further detailed in the following sections.

**.Pronouns**

C<sub>3</sub> does not use any pronouns at all.

**Gender Concept**

No notion of gender is acquired yet by C<sub>3</sub>. No gender suffixes are seen.

*Even* distinguishing pictures of male and female is not done appropriately.

**Number**

C<sub>3</sub> does not use any number suffixes. He does not also match number with their denotant actual number of objects. He does not distinguish between single or multiple objects as seen in a recognition task also. Plurality is also not implied in the verbs since there is no PNG marking.

uṅṅu for haṅṅugaḷu 'fruits'

**Case**

No case markers are used. Case relations are also not implied in the constructions.

nnu for manjuge 'for Manju'  
(dat)

uttu for kurci:li 'in the chair'  
(loc)

### Conjunctions

C<sub>3</sub> does not use any conjunction in his speech but comprehends matte 'then/and' in others' speech while naming things consecutively.

a:tu for va:cu 'watch'

This was produced after the interjection matte ('then' by the investigator).

### Verbs

Use of verbs is very rare in C<sub>3</sub>'s speech. However, when verbs occur, they occur as single word utterances only. They do not occur in the 2nd position even in the rare occurrence of two word utterances.

ma:v for ma:dta 'is doing'

Verbs as independent utterances resemble-imperative forms. See the above illustration.

There is a process of simplification in the occurrence of verbal forms, phonologically. In such cases one or two syllables, either final or initial, are retained. This phonological simplification is listed elsewhere.

The verb is not inflected for tense, PNG, conditional markers, etc. In essence, there is no explicit formal marker and, except by way of semantic interpretation, the very few

verbal forms behave and look almost like nouns only,

uyu for kudiyutte 'the child drinks'

The very few verbs used by C<sub>3</sub> relate to acts by himself or in pictures. See above for illustration.

No intransitive verb has been used and the used ones are all transitive as seen in earlier paragraphs.

He does not use causative, double causative, and reflexive verb types at all.

### **Numerals**

C<sub>3</sub>, repeats the numerals one, two and three, but does not use them at all, even mnemonically so. He also does not match the numbers with their denotants. He has difficulty in repeating double digit numbers or beyond. He does not also make ordinal and cardinal distinction.

C<sub>3</sub>'s numeral system is very primitive and is in consonance with the poor development in other aspects of language.

### **Tense**

C<sub>3</sub> does not make past-non-past distinction at all. No tense suffixes are seen in verbal expressions also.

### **Adverbs**

No adverbs are used or implied.

**Interrogation**

C<sub>3</sub> does not use any interrogative marker at all. Even the most basic -a: or e:nu 'what' are not found used at all. He, however, comprehends interrogation and attempts to respond.

**Negation**

C<sub>3</sub> uses negation in the following manner.

- (i) Shaking of head horizontally to indicate negative attitude,
- (ii) Use of be:ya 'don't want' only, as seen when his mother asked him whether he would drink water.

**Adjectives**

C<sub>3</sub> does not use any adjectives of quality at all.

**Colour terms**

C<sub>3</sub> attempts to name the colours but fails. He knows colour terms of red and green according to the mother but he did not identify them correctly on testing.

**Kinship terms**

C<sub>3</sub> uses kinship terms as seen in the following lines only.

amma 'mother'

appa 'father'

a:tti 'aunt'

He does not use these for reference. They are only used as address terms when the individuals addressed are present in the immediate environment.

### Reduplication

Reduplicative items are seen in C<sub>3</sub>'s very meagre repertoire. These are in the form of repetition of initial, medial or final syllables. There seems to be no pattern seen in the repetition of syllables.

uttu	utt.i	for	kurci	'chair'
ane	ne	for	mane	'house'

### Onomatopoeia

C<sub>3</sub> does not use any onomatopoeic forms at all.

### Syntactic Profile of C<sub>3</sub>

In C<sub>3</sub>, syntax is most poorly developed. All the words are single word utterances and the severe dysarthria, combined with pauses, abnormal and other deviant vocal parameters, make it difficult to interpret the utterances as two words.

### Single word utterances of C<sub>3</sub>

Almost all responses are single word utterances only. It is difficult to interpret them as words let alone sentences. These single word utterances have the following characteristics.

- (i) They are repetitions of the listener's speech.



- (ii) They are direct and short replies to questions asked.
- (iii) They have unnatural and inconsistent stress on the syllables.
- (iv) They have intermittent, prolonged and abnormal pauses.
- (v) They are extremely unintelligible even though they are made phonologically simpler and shorter.
- (vi) There is an absence of any linking morphs between the single word utterances.
- (vii) They are the most important linguistic items.

The single word utterances have the following communicative function.

- (i) Answers to questions asked.
- (ii) They are object identification utterances.

okki for to:pi 'cap'

- (iii) Perseverative function.

inni ni ni for go:li 'marble'

- (iv) Need-filling function.

be:la for be:da 'do not want'

- (v) They function as subject or object or predicate only.

amma for maneli amma ida:re  
'Mother is there in the house'

(b) pa:pa for pa:pa ku:tide

'the baby is sitting'

(c) tte for noidta: ide

'(Baby) is looking'

- (vi) None have grammatical marking. This aspect has been dealt with elsewhere.
- (vii) All have simplification/distortion/deletion of sounds phonologically. This has been dealt with in the section on Phonology.
- (viii) There is no grammatical contiguity between single word utterances, hence a discourse study is not possible.

There are no two-word utterances, practically nil, excepting the perseverative/reduplicative responses as seen in earlier sections.

#### 4.8. Speech and Language Profile of C<sub>8</sub>

##### Personal information

C<sub>8</sub> is a 10 year old female child who is the first child of three siblings. She is immobile completely since all four limbs are affected with athetosis. In spite of the constant flailing and athetoid movements of the trunk and limbs, she is a bright child with a great interest in picture books.

C<sub>8</sub> uses speech for communication. Though her speech is not very clear it is well understood by the listeners.

C<sub>8</sub> is an athetoid of moderately severe degree according to the neurophysician. Her problem was identified around 3 years of age, though it was present since birth. The parents are educated and belong to the middle socioeconomic class. They speak Kannada at home and they also know English fairly well. The parents take active interest in their daughter's progress. They live in a nuclear single family set up.

The C<sub>8</sub> speech sample for the study was collected from the subjects sitting down on a special chair with strapped limbs position, in which she was most comfortable.

### Phonological Profile

C<sub>8</sub> produces the following sounds.

### Vowels

The following table gives the vowels found in C<sub>8</sub> 's speech.

	Front	Central	Back
High	i		u
	i:		u:
Mid	e		o
	e:		o:
Low		a	
		a:	

The table reveals that C<sub>8</sub> uses all the vowels found in the normal Kannada language. She also uses two diphthongs au and ai as in the use of following.

au paudu for paudar 'powder'  
ai kai 'hand'

### Consonants

C<sub>8</sub> has the following consonants in her speech.

#### 1. Stops and Nasals

	Voiceless		Voiced		Nasal
	un- aspirated	aspirated	un- aspirated	aspirated	
<b>Velar</b>	k		g		<b>ŋ</b>
Palatal	c		j		
Retroflex	t		ɖ		ɳ
Dental	t		d		n
Labial	p		b		m

#### 2. Glides Sibilants Fricatives Laterals Continuants

Pharyngeal

Retroflex

Apico-  
palatal y

Alveolar 1

Labial v

From the above tables it can be seen that C<sub>8</sub> has the following sounds in her repertoire.

Voiceless stops k, c, t, p  
Voiced stops g, j, d, b  
Voiceless and voiced retroflex t, d  
Nasal retroflex n  
Nasal dental and labial n, m  
Glides y, v  
Alveolar lateral l

She does not have the following sounds.

Aspirated sounds  
Sibilants s, z  
Retroflex sibilant sz  
Retroflex lateral ll  
Palatal nasal n~  
Trill r  
Fricatives h, f

Thus the sounds which require deliberate finer manipulations of the articulators, (as discussed in the profiles of C<sub>1</sub> and C<sub>2</sub>) are also absent. The absence of sibilants and fricatives matches both with C<sub>3</sub> who is an athetoid and with other spastic cases. In the latter, however, note that not all the points of articulation of consonant sounds as in the present athetoid case have been exploited.

### Analysis and Distribution of Sounds of C<sub>8</sub>

Most sounds of normal spoken Kannada are present in the repertoire of C<sub>8</sub>. But the sounds available are not used

consistently in individual utterances. There is so much of freevariation between the sounds that it is difficult to establish phonemic status for the sounds. The sounds are inconsistently produced in both isolation as well as in combination with other sounds. The sounds are quite distorted, though not as much as in the case of C<sub>3</sub>.

In spite of the freevariations, some correspondences/overlapping were noticed. They were of the following types.

1. Inconsistent or occasional correspondence.

kuma for suma 'a name'  
 tuma for suma 'a name'  
 ye:di for re:dyo 'radio'

2. Sporadic correspondence where any sound is substituted.

te:pu for pe:par 'paper'  
 i:ka for si:sa 'bottle'

All the vowels listed in the table occurred in initial, medial and final positions which closely follows the normal Kannada pattern. Note that this was not the case with C<sub>3</sub>, another athetoid subject.

In the speech of C<sub>8</sub>, the following stop consonants occurred initially and medially. They also occurred in gemination in the medial position. Some of these are illustrated below.

- k akka for 'elder sister  
tu:ka 'weight'
- g aligu:r for alasu:r 'a place'
- t to:pi for to:pi 'cap'
- d baddanna for prasanna 'a name'
- p pa:pa 'baby'  
appa 'father'
- b ba:yi 'mouth'  
gubbe for gu:be 'owl'

c occurs medially and in gemination only.

pa:pacci 'baby'

j occurs only initially and not medially.

ju:t for ju:s 'juice'

Note that the above patterns are unlike those in normal spoken Kannada. Note also that this pattern is different from those found in the spastic children of the study. Note also that this deviant pattern is rather on par with the case of C<sub>3</sub> who is also an athetoid. That is, while the speech contained all the stop consonants, the distribution of all the consonants did not follow normal spoken Kannada. In addition, the consonants also revealed idiosyncratic distributional patterns only.

The retroflex voiceless and voiced  $\ʈ$ ,  $d$  occur only medially. No gemination is seen in the medial position as against the pattern in normal Kannada.

$\ʈ$  a:ʈa for a:ʈa 'game'  
 d la:di for lo:ri 'lorry'

There are many nasals found in the repertoire of  $C_8$  in comparison with the spastic group in the study.

n, m occur initially and medially and also in gemination medially as found in normal spoken Kannada.

The velar  $\ŋ$  also occurs but only in the medial position.

$\ŋ$  beŋgu:r for bæ:nɡlu:r 'Bangalore'

The retroflex nasal  $\ŋ$  occurs only medially and in gemination only.

$\ŋ$  aŋŋu for haŋŋu 'fruit'

The semivowels y and v occur initially and medially. They also occur in gemination in medial position.

y ye:di 'radio' a:yi for na:yi 'dog'  
 kayyi 'hand'

v va:tu for va:cu 'watch'  
 avvu for ha:vu 'snake'



C<sub>8</sub> also presents the same phonological profile as the preceding athetoid C<sub>3</sub> in that the subjects have more number of consonant sounds, particularly a neat filling in of all the points of articulation for the production of stop consonants and non-occurrence of sibilants and other fricatives. Although C<sub>8</sub> again similar to C<sub>3</sub>, has a complete inventory of stop consonants voiceless and voiced, their distributional pattern is not similar to the normal spoken Kannada.

In spite of the wide range of freevariations seen, a few simplification patterns could be noticed. It v/as also noticed that these patterns of simplification/abbreviation were not regular or frequent or consistent.

- (i) Multisyllabic forms were reduced to disyllabic one, Note that this is an improvement over C<sub>3</sub>, where multisyllabic utterances were reduced mostly to monosyllabic ones, thus revealing age as an important variable.

ke:t for ka :ret 'carrot'

mako for malkondide 'is sleeping'

- (ii) Substitution of unavailable sounds in the repertoire by the available sound in C<sub>8</sub>'s repertoire.

to:p for so:p 'soap'

- (iii) Substitution of available sound/sounds by the other available sound/sounds in her repertoire.

b for p badanna for prasanna 'a name'  
 t for c ta:ku for ca:ku 'knife'

(iv) Reversal of sounds in the given utterance, usually a cluster.

pyalla for palya 'a vegetable preparation'  
 te:lab for ɽe:bal 'table'

(v) Approximations by repetition of syllable/syllables.

ka ka kai for kai 'hand'

The observations made in C<sub>3</sub> also hold good for this subject in terms of the number and quality of simplification patterns.

### **Paralinguistic Features**

C<sub>8</sub> has a voice that is low pitched but is varying in pitch with lots of pitch breaks, loud and hoarse in quality.

### **Clarity of Speech.**

C<sub>8</sub>'s speech is affected in terms of clarity moderately only. It can be 'understood' with one or two repetitions by an unaccustomed listener. The clarity is affected because of the vocal changes such as the abrupt pitch breaks, misarticulations of sounds due to dysarthria, long pauses between words, incomplete utterances either single word or multiple utterances, deviant phonemic distribution, inadequate/incorrect intonation patterns.

## Speech Rate

C<sub>8</sub> has a rate of speech that is slower and laborious than many other subjects in the study. Longer and abnormal pauses in between syllables and words, and longer responding time for any question reduce the rate of speech. She also has repetitions of syllables before the clear utterance of the word, as if fumbling or word searching.

## Quantity of Speech

C<sub>8</sub> speaks less than normal. This is because the shorter utterances, long and abnormal pauses, hesitations in speech, longer response time. Compared to other subjects of the study, however, the speech output is better.

## Pauses

C<sub>8</sub>'s speech is extremely abundant with pauses. Pauses are frequent after every word as well as after words or phrases. The pauses are longer than the normal pauses and abnormally interspersed with speech. Pauses are present in between the utterances in the following manner.

(i) Pauses between syllables.

ak-ka for akka 'elder-sister'

(ii) Pauses between the words.

tinni t̄innu for tiṇḍi tinti:ni 'I will have the snacks.'

## Intonation

C<sub>8</sub> does not use correct intonation patterns. *She* gives abnormal stress on syllables inappropriately. She also gives audible or inaudible hesitations prior to the utterance of words. She makes the following errors in using intonation patterns. Note also that these patterns of errors are not regularly seen.

(i) Intonation patterns are substituted.

(a) Exclamatory for statement.

maniko! for malkoᅇdide '(Baby) is sleeping.'

(b) Interrogation for statement.

to:ttale? for to:rīsta ida:le 'She is showing.'

(c) Statement for pausing.

pa:pacci for pa:pacci hannu 'Baby (is eating)fruit.'

(ii) Intonation is not at all seen. A non-inflected vocal pattern is uttered quite frequently.

Note that the preceding athetoid subject C<sub>3</sub> did not have any trace of intonations at all. In this sense, even the inadequate, inconsistent and erroneous use of intonations by C<sub>8</sub> is an improvement over C<sub>3</sub>. This may also be considered as evidence for age as a significant variable for the athetoid group.

**Morphological Profile, of****C<sub>8</sub>**

The speech sample of C<sub>8</sub> indicate that C<sub>8</sub> has an affixation process that is inadequate or imperfectly developed.

The suffixes are most of the time used optionally or not used at all. Although most utterances are short words or phrases, 2-3-4 word sentences are also occasionally found.

The optional use of affixation is found in case of nouns, as well as verbs both in the subject as well as predicate slot. Many a time, even if the overt, explicit suffixes are not used, the semantic relations of case relations, tense, gender and number, indication of time, manner and location, are indicated.

There are nouns, verbs, adjectives, adverbs and conjunctions found in C<sub>8</sub>'s speech. The affixation process, however, is very optional in these categories.

The verb and nouns could be distinguished from each other, by the affixation process.

Another feature is the repetition of whole words or syllables frequently which gives the impression that the child is fumbling or having word-finding difficulty.

**Grammatical categories in C<sub>8</sub>**

The utterances can be classified into the following

various categories in the descending order of frequency.

Nouns

Verbs

Adverbs

Colour Adjectives

These will be dealt in detail in the following sections.

The grammatical forms are not retained in full.

Distortions in the grammatical forms are made as in the following manner.

- (i) Nouns are always not retained in full. Case markers or post positions are deleted.

lo:ta for lo:tadalli 'in the glass'

madu for madhu:ge 'to Madhu'

See also section on case markers.

- (ii) Verbs are not uttered in full. Verb endings are deleted or inadequately inflected.

See the section on verbs for illustrations.

### Pronouns

$C_8$  does not use any pronouns. No pronominal suffixes were seen in the data. Since the finite verb endings are also rare, indication of the pronominal system is also not very clear.

## Gender

No gender suffixes are seen in the nouns.

Gender concept is hinted at very occasionally in a few verb endings.

(i) Feminine      no:ttale      '(She) is looking.'

(ii) Neuter        ku:tide        '(Baby) is sitting.'

Masculine gender is not indicated at all.

The masculine and feminine terms, as well as the names, however, are correctly interpreted. But  $C_8$  does not express these on her own.

The absence of gender suffixes in nouns and their occasional presence in the verb predicate is an interesting development, in that the former closely resembles the spastic subjects of our study as well as the athetoid subject  $C_3$  who is 6 years old, the presence of the same in verbal expressions becomes a distinguishing mark of the increasing mastery of the language in athetoids.

## Number

No suffixes are used to indicate plurality of things/objects either in case of nouns or verbal constructions.

kucci    for    kurcigalu    'chairs'

o:tta for makkaḷu o:dutta:re  
'The children are running.'

C<sub>8</sub> would, however, distinguish between single object on multiple object pictures on a comprehension task.

Note that the gender in normal Kannada also is specified only for singular.

The speech corpus of the subject C<sub>8</sub> shows a possibility that the gender and singular number are acquired earlier than the plural.

### **Case**

C<sub>8</sub> uses certain case relations very occasionally. The case relations are overtly expressed occasionally as in the following.

(i) Accusative

pa:puna no:ta for pa:puna no:dta ida:le  
'Baby is being seen.'

(ii) Dative

ba:yige a:ku for ba:yige ha:kta:le  
'To the mouth (she) is putting'

Case relation is implied occasionally.

(i) Locative

ba:ṭal a:lu for ba:ṭalalli ha:lu 'milk in the bottle'



(ii) Nominative

ali for hari 'a proper name'

These are, however, very sparingly used. The other case relations namely instrumental, ablative of motion are not used at all.

### **Conjunction**

C<sub>8</sub> uses the following conjunction.

(i) Explicitly marked a:me:le 'and'

u:ta a:mele 'lunch and then'

(ii) Iterative type in which no overt marker is used.

a:lu ka:pi for ha:lu matte ka:fi 'milk (and) coffee'

### **Verbs**

C<sub>8</sub> uses verbs considerably although the quantity is lesser than that of nouns. Verbs occur both as the single independent item as well as the second item in a stretch of utterances. The preceding first item is a noun which may be a subject or an object.

no:tta '(He is) looking.'

ta:na ma:tta for avaru sna:na ma:dista ida:re  
'They are bathing the child.'

The order in the second illustration is object and predicate which is the same as in normal speech.

The single word verb utterances are also very few, appear more or less in the imperative form, but perform several functions in addition to the imperative. This is due to the , process of simplification in the phonology of C<sub>8</sub>.

There is also a process of reduplication in many cases either wholly or partially.

kudi kudita 'drinking'

The verb is very rarely inflected for tense, PNG and conditional markers.

The verbs C<sub>8</sub> uses are mostly of actions performed either by herself or those seen by her in the pictures.

The intransitive verbs are also occasionally found used along with the more frequent transitive forms.

alta '(She) is crying.'

C<sub>8</sub> does not distinguish between causatives and non-causatives.

### Tense

No past-non-past distinction is seen in C<sub>8</sub>'s speech. No past tense suffixes are found used in verbal expressions. Even the utterances that imply a past event is overtly marked in the present tense.

C<sub>8</sub> does not also use items that have tense inherent in them such as

nenne 'yesterday' and  
 na:ɫe 'tomorrow'

### Numerals

C<sub>8</sub> uses numerals of the cardinal type from 1 to 10 correctly, matching the number with the actual number of objects. She repeats two digit numbers but does not use them on her own.

No ordinal numbers are used.

### Adverbs

C<sub>8</sub> is found to use only one adverb of place or location.

du:ra for mane du:ra ide 'house is there far'

This was the only one instance of use of place adverb. The data does not indicate the use of other adverbs.

### Interrogation

C<sub>8</sub> uses e:nu 'what' occasionally. She does not use other interrogative morphemes at all. The following are not found.

elli 'where'  
 he:ge 'how'  
 ya:vaga 'when'  
 ya:ke 'why'

The use of e:nu 'what' is also restricted to event/object identification only.

## **Negation**

C<sub>8</sub> expresses negation by the use of the following , morphemes as independent utterances.

illa	"	'not here'
alla		'not there'
be:da		'do not want'

The other negative morphemes are not found used.

## **Adjectives**

C<sub>8</sub> does not use any adjectives of quality. However, she uses the colour terms in her speech.

## **Colour Terms**

C<sub>8</sub> uses all basic colour terms correctly. She, however, does not recognize the secondary colours like brown, pink, purple, etc. Very frequently she also has difficulties in naming the colour immediately. After a long fumbling behaviour or circumlocuting description she comes out with the correct word for the colour.

ele	ele	banna	for	hasiru
leaf	leaf	colour		green

## **Kinship Terms**

C<sub>8</sub> uses the following kinship terms.

appa	'father'
------	----------

amma	'mother'
a:ŋɕi	'aunt'
aŋkal	'uncle'

These terms are used both for address and reference. This favours comparably with the other athetoid case who is younger, and with spastic subjects.

### **Reduplication**

C<sub>8</sub> uses reduplication very frequently. It is used both as a phonological phenomenon as well as a morphological phenomenon. Reduplication is either that of 1-2 syllables of a word or the full word.

ma ma	manikon for	malkondide	'(It) is sleeping.'
tippe	tuppe for	sippe	'peel'

The reduplicative process in C<sub>8</sub> involves fumbling. The child begins with a syllable, repeats it several times and completes the utterance with an expanded, of which the initially uttered (and repetitive) syllable is a part. The child may also repeat the full word several times and this reduplication indicates both emphasis and completion of the task of producing the utterance.

### **Onomatopoeia**

Onomatopoeic forms are used by C<sub>8</sub> as in the following.

iyya: 'cat's mew'  
 bau au 'dog's bark'

These were elicited on asking for the animals cries.

### **Syntactic Profile of C<sub>8</sub>**

Most utterances of C<sub>8</sub> are single word. But surprisingly she also uses 3-4 word sentences. However, the inappropriate long pauses make it difficult to differentiate and identify the utterance as a sentence. This characteristic is also shared by the next older athetoid subject who uses 3-4 word utterances with abnormal inappropriate and long pauses.

#### **Single word utterances**

The responses are single words although two or multiple word utterances are also quite abundant. The responses are usually

- (i) Direct answers to the questions asked,
- (ii) interspersed with pauses and
- (iii) crucial linguistic item/items.
- (iv) Because of the pauses there is the possibility of assigning the single utterance to succeeding utterance or to the preceding utterance.
- (v) Phonologically simplifications, reversals and substitutions are seen in the utterances compared to the target utterances.

Single word utterances have the following communicative functions.

(i) Replies to questions asked.

(ii) Object/event identification utterances.

ba:t for ba:ks 'box'

(looking at the picture of a box)

a:kita for pa:pa batte ha:kolta: ide

'The child is putting on clothing'

(iii) Repetitive or Reduplicative utterances.

a: a:lu for ha:lu 'milk'

for pa:pa ha:lu kudi:tide 'The baby is drinking milk'

(iv) Functioning as subject only.

pa:pa 'child' for pa:pa nidde ma:dta: ide

'The baby is sleeping'

(v) Object only.

go:li 'marble' for avaru go:li a:dta: ida:re

'They are playing marbles.'

(vi) Predicate only.

o:tta for hudugi o:dutta ida:le

'The girl is reading'

In the single word utterance, however, semantic sense is difficult to be interpreted since here is only infrequent use of PNG marking, case relations and others.

In the case of C<sub>1</sub>, correct grammatical contiguity can be established by accepting the single word utterances at a stretch as constituting the discourse. The coherence or / cogency between the single word utterances as seen in case of description of pictures. It is also present in continued replies to questions as seen below.

paJpa 'baby' for the question idu ya'ru?  
'Who is this?'

managi for malagide '(The baby) is sleeping'<sup>1</sup>  
This was a response for the following question  
pafpa e:n maidta: ide? 'What is the baby doing?'<sup>1</sup>

bed for bed me:le malkoṇdide

'(The baby is sleeping on the) bed' Note that C<sub>8</sub>  
has used an English word bed 'bed' here.

### Two/multiple word utterances

There were a few two word utterances compared to the single word utterances. These two word or three word utterances have the following relationships.



1. Object predicate relationship

a:ta a:tta for huduga a:ta a:dtida:ne  
'The boy is playing.'

2. Conjunction relationship

ye:di gadiya:da for re:dyo matte gadiya:ra  
'radio and watch'

3. Subject predicate relationship

u:ta ide for te:bal me:le u:ta ide  
'There is food on the table.'

4. Reduplication or repetition

pella pyalla for palya 'a vegetable preparation.'

5. Object-subject relationship

a:lu pa:pa for pa:pa ha:lu kudita:ide  
'The baby is drinking milk.'

6. Subject object relationship.

pa:pa tottali for pa:pa totlalli malkondide  
'Baby is sleeping in the cradle.'

4.9. Speech and Language Profile of C<sub>9</sub>Personal Information

C<sub>9</sub> is a 10+ year old male child who is the first issue of the two siblings. He is immobile because of athetosis. He is an extremely 'brilliant' boy and very curious about the things around him. He has flailing floppy movements of all his four limbs and head. He is comfortable on a special adaptive chair with straps in which position his speech is quite fluent. The collection of speech from C<sub>9</sub> was done in this position.

C<sub>9</sub> uses speech for communication and his speech is well understood by the listeners albeit needing 2-3 repetitions.

The affliction of C<sub>9</sub> is of moderate degree according to neurophysician. He belongs to a family of well educated parents of middle socio-economic class. He is exposed to Kannada since birth. He also knows English through his parents.

Phonological Profile of C<sub>9</sub>

C<sub>9</sub> produces the following sounds.

Vowels

	Front	Central	Back
High	i i:	i	u u:
Mid	e e:æ		o o:
Low	æ: a:	a a:	

C<sub>9</sub> has, in his repertoire, all the vowels found in normal Kannada language. He also has, in addition, the central high vowel i and the front low vowel a and its long counterpart. The latter two sounds occur in borrowed words only. C<sub>9</sub> also uses two diphthongs ai and au as in the following.

kai 'hand'

audu for haudu 'yes'

## Consonants

### 1. Stoos and Nasals

	Voiceless		Voiced		Nasal
	un- aspirated	aspirated	un- aspirated	aspirated	
Velar	k		g		n
Palatal	c		j		
Retroflex	t		ɖ		n
Dental	t		d		n
Labial	p		b		m

### 2. Other Sounds

	Glides	Sibilants	Fricatives	Laterals	Continuants
Pharyngeal					
Retroflex		s		ɭ	
Apico- palatal	y				
Alveolar		s		l	r
Labial	v		f		

From the tables above, it is seen that C<sub>9</sub> has in his repertoire almost all the consonants except the aspirated fricative h sound, the palatal sibilant s and the palatal nasal n~. C<sub>9</sub> has the most well developed consonant repertoire among all the subjects of our study, both spastics and other athetoids

The encircled sounds in tables are more heavily distorted, although distortion is a general feature of his speech as in the case of other subjects. Note that these distorted sounds are not found in other subjects at all – taking spastics and athetoids together.

#### Analysis and Distribution of Sounds in C<sub>9</sub>

C<sub>9</sub> has a very well developed vowel and consonant system when compared to other subjects in the study. He does not seem to have any problem, apart from slight distortions, in producing the sounds such as the retroflex sounds, sibilants and fricatives and the trill, that require deliberate and finer manipulation of the articulators. However, as in C<sub>3</sub> and C<sub>8</sub>, C<sub>9</sub> uses the sounds in irregular patterns. That is to say, he does not use the sounds or their approximations in the same manner as in normals. His use of the sounds is very inconsistent even on imitation tasks, the sounds are not approximated correctly all the time. Freevariations are equally abundant as in C and C<sub>8</sub>. Because of the widely varying picture it is difficult to establish the phonemic status of individual sounds.

However, some correspondences and/or overlappings may be established:

(i) Partial and consistent correspondences

to:p for so:p 'soap'

(ii) Partial and inconsistent correspondences

makku for magu 'child'

titta for tinta '(are) eating'

pau for paudar 'powder'

In the speech of C<sub>9</sub>, all the vowels occur in initial, medial and final positions.

The consonants also occur in initial and medial positions. Most of them also, occur in gemination medially. However, these patterns are not consistently seen wherever necessary. Thus although the normal distributional patterns among the speech sounds are found the patterns are not regular or consistent.

mayak for malagide

malak -do-

malag -do-

Normal spoken Kannada phonemic distributional patterns are found in the speech of C<sub>9</sub> in so far as sounds in isolation are considered. The pattern of distribution of consonants as regards

gemination is also found. But the non-identical cluster distribution pattern is conspicuous by its absence. Even though the available distributional patterns match the corresponding sounds found in normal Kannada heavy distortion of certain sound simplification processes leading on to substitution, deletion, etc., make the linguistic forms/words of C<sub>9</sub> not identical to those of normal language. Also note that C<sub>9</sub> presents a better phonological profile in the sense that unlike the idiosyncratic distributional patterns noticed for individual sounds in C<sub>8</sub> all the consonants in C<sub>9</sub> speech corpus present a shared and uniform distributional pattern.

In C<sub>9</sub>'S speech the speech sounds are simplified in utterances. The simplifications, however, are inconsistent and regular patterns are difficult to establish for individual sounds. The same sound may be subjected to one process of simplification at one place and another process of simplification at another place. The following simplification procedures were noticed.

1. Multisyllabic utterances are broken into several separate-consecutive units of utterances. These are separated by very frequent pauses usually after every syllable or disyllables. The child makes an attempt to pronounce each and every sound of the target word. Because of dysarthria and because of heavy distortions he utters the syllables of the target word interspersed with pauses.

pa'manna for pra:mannu 'pram' (accus.)

paramanna -do-

va:asta for varesta '(is) cleaning'

2. Replacement/substitution of one sound by another one even when both are present in his repertoire.

to:p for so:p 'soap'

a:ta for a:ta 'play/game'

3. The non-identical clusters are broken into individual units and uttered, although with distortions. .

carkale:t for ca:kle:t 'chocolate'

s...ku:ta for sku:tar 'scooter'

### **Paralinguistic Features**

C<sub>9</sub> has a voice that has frequent variations in pitch (pitch breaks) and hoarse quality.

### **Clarity of Speech**

The clarity of speech is affected moderately. A listener, especially, an unaccustomed one, would need 2-3 repetitions before he can understand C<sub>9</sub>'s speech. This clarity is mainly affected because of unusual pauses after almost every syllable.

### **Speech Rate**

C<sub>9</sub> has a slow rate of speech than normal. This is seen because of phonatory/vocal irregularities, as well as

abnormal pauses which are very frequent occurring almost after every syllable.

### Pauses

C<sub>9</sub> has abnormal pauses in his speaking attempts. Pauses are of two types.

(i) Frequent pauses between syllables

ba-yi-ta for bari'ta:ne '(He is) writing.'

(ii) Pauses between words.

ta:ta-u:ta for ta:ta u'ita ma:dtida:re  
'Grandfather (old man) is eating.'

Note there are two points that should be pointed out here. Multiple word utterances are not many, but are found, more in number, when compared with other subjects, in the speech corpus of C<sub>9</sub>. Secondly, in the speech of C<sub>9</sub> there is a distinction, a fleeting distinction, sought to be made between the uncontrolled/dysarthric pauses that occur invariably between all the syllables, and the controlled/structurally motivated pauses between words. That is, C<sub>9</sub> exhibits, in addition to exhibiting pauses between syllables like all the subjects of our study, has also some qualitatively different pauses between words as found in normal language. The distinction is discernible only in some utterances and has not yet emerged as a regular pattern.



### Quantity of Speech

C<sub>9</sub> speaks less than normal in a given amount of time. However, he speaks more than many other subjects in the study. He also initiates speech on his own unlike other subjects in the study.

### Intonations

Intonations are affected because of abnormal and long pauses.

Although C<sub>9</sub> attempts at imitation of the normal patterns, there is an impression of bizarre intonations because of the interruptions in between due to pauses. Comparatively speaking, however, C<sub>9</sub> has better intonations than C<sub>3</sub> and C<sub>8</sub> and they approximate normal patterns than those of C<sub>3</sub> and C<sub>8</sub> do. Both pictures of inadequacy as well as exaggeration are seen at times with C<sub>9</sub>'s utterances. Because of the abnormal pauses and abnormal stress on some syllables than the others, this varying picture of intonation patterns is exhibited.

### Morphological Profile of C<sub>9</sub>

The C<sub>9</sub> speech shows very well developed affixation processes compared to other athetoids as well as spastics in the study. However, it is still lacking qualitatively and quantitatively on a comparison with normals. There are indications of case suffixes/relations, indications of gender and number, indication of time, manner and location and also other

qualitative characteristics in C<sub>9</sub>'s speech, even though the overt markers are not consistently used. The utterances, however, are severely discontinuant because of the pauses, and many a time the speech sounds more like a whisper. In spite of a developed morphology on comparison with other subjects, C<sub>9</sub>'s speech does not specifically distinguish in an explicit manner nouns, verbs, adverbs and adjectives. Since his speech consists of mainly single word utterances indications that he has notions of grammatical categories is to be inferred from rarer two and multiple word utterances in spite of the discontinuity due to pauses.

Among the utterances nouns are very much greater in proportion than verbs. Though he uses affixation processes in several utterances the verbs are found in the root forms only most of the time.

The single word utterances are also reduced to monosyllabic or disyllabic utterances with the initial syllables retained. Even these minimally retained syllables are either abbreviated or distorted/substituted by other sounds.

The comprehension of morphological affixation as seen on recognition tasks is excellent.

### **Grammatical Categories**

C<sub>9</sub> uses more nouns than verbs.

Nouns: toṭṭal for toṭṭilu 'cradle'

Verbs:        a:ṭa:dt        '(are) playing'

The inflections for the above that is, nouns and verbs are used very optionally.

(With the inflectional suffix)    maguna    'child' (accus)

(Without the inflectional suffix)    magu    'child' (Uttered without the accusative marker although the situation necessitate the use of the inflectional suffix).

Consider the following illustrations.

ma:tta:re        '(They) are doing.'

ma:tta        '(He) is doing.'

These verbs were uttered on two different occasions, where the verb endings in normal language were obligatory. While first illustration has the obligatory endings for PNG, note that the second use of the same verb is devoid of masculine person marker.

The grammatical forms are at times retained in full although generally the inflections are absent or not noticeable. See the additional examples given below for utterances with inflections.

ka:ya    aibitte\_\_\_\_for    kharra    a:qbidutte\_\_\_\_

'will become hot for the tongue'

kudite    for    kudiyutte    'is drinking'

The underlined particles stand for PNG in the utterances.

## Pronouns

C<sub>9</sub> uses personal pronouns. The following are found in the study.

avanu	'he' (remote)
ava u	'she' (remote)
adu	'it' (remote)
idu	'it' (proximate)
ni:vu	'you' (sg.honorific)
na:vu	'we' (Plural)

The others are not found used. They are

na:nu	'I'
ni:nu	'yourself' (singular)
ta:vu	-do- (honorific/plural)
avaru	'they' (-do-)

Note that among the third person pronouns used by C<sub>9</sub>, the preference is predominantly for the remote ones. Note also that in terms of frequency the third person pronouns have a greater frequency and that the first and second person pronouns are rarely used. Also note that the first person noun is significantly absent. Note that C<sub>9</sub>'s use of some pronouns is a significant improvement over the other athetoid cases C<sub>3</sub> and C<sub>8</sub>, who do not use any pronouns at all.

### Gender concept

C<sub>9</sub> has good gender concept. The gender suffixes are seen both in nominal as well as verbal expressions, although not regularly so. Comprehension of the same is well preserved.

vasta ida:le '(She) is cleaning' (III person  
singular, feminine)

The development of gender concept is also evident by the previously seen pronominal system including III person singular masculine and feminine affixes.

### Number

C<sub>9</sub> correctly uses number suffixes in verbal constructions.

ma:tta:re for ma:dta:re '(They) are doing.'

The same in the nominal expressions are not always used specifically with respect to the plural marker -gaḷu.

pennu for pennugalu 'pens'

Note that the use of a plural suffix with a noun to indicate plurality is optional even in the normal Kannada, whereas inflection of the verb for plural when the subject is a plural noun is obligatory. C<sub>9</sub> exhibits good comprehension of the same in recognition tasks.

### Case

C<sub>9</sub> uses case relations of the following type.

1. Dative

avange for avanige 'to him'

2. Accusative

magu:na 'child' (accus)

3. Nominative

ta:ta 'grandfather'

4. Locative

kuccili for kurci:li 'in the chair'

The instrumental/ablative and genitive are not found used.

**Conjunctions**

C<sub>9</sub> uses conjunctions of the following type correctly in case of nouns.

matte te:bal matte kucci 'table and chair'

-u: na:nu: for amma na:nu: 'mother and I'

a:me:le a:me:le avanu 'and he'

Note that these are not used in verbal construction at all.

**Verbs**

C<sub>9</sub> comparatively uses less number of verbs. Verbs are used both independently and as the 2nd item in two word utterances.

a:dta 'is playing'  
 pa:mna talta: '(She) is pushing the pram'

There are many simplifications in the use of verbs, phonologically. These have been included in the section on phonology. In these cases, the initial one or two syllables are retained at first and the rest are unheard or uttered after pauses and hesitations.

kudi for kudita: ide 'is drinking'  
 tit - ta:re for tinta:ta:re - 'they eat'

The verb is inflected for PUG, and tense although the inflections are not used consistently and regularly so.

C<sub>9</sub> uses finite as well as non-finite verb forms.

kuditide 'is drinking'  
 tinnakke 'to eat' infinitive

The following subcategories of verbs are used.

Transitive	ma:tta for ma:dta:ne	'He is doing'
Intransitive	atta:le for alta:le	'She is crying'
Reflexive	mayako for malkottini	'I sleep myself'

### Tense

Tense suffixes are used by C<sub>9</sub>. The past-non-past distinction is fairly well maintained by C<sub>9</sub> although not regularly so.

ma:dta: ide 'is doing'

kaccitu '(it)bit'

The present or non-past suffixes are used wherever necessary but the past tense suffixes are not found used so consistently. The second example above is found very rarely.

### **Numerals**

C<sub>9</sub> correctly uses cardinal numbers. He has difficulty in repeating number beyond twodigits.

He has correct cardinal and ordinal distinction in comprehension/recognition although the ordinal numbers are not used.

ondu 'one'

na:ku for na:lku 'four'

### **Adverbs**

He uses adverbs of place and time although inconsistently so. The adverb of manner is not found used.

alli 'there' location

a:me:le 'then, later' time

These are also used very rarely.

### **Interrogation**

C<sub>9</sub> uses many interrogative markers.



e:nu 'what' is more frequently used than any other.

e:nu 'what'

elli 'where'

ya:ke 'why'

ya:ru 'who'

ya:va:ga 'when' and he:ge 'how' are not used.

The interrogative morphemes found in speech corpus are used as independent utterances only.

### Negation

C<sub>9</sub> uses the following negative morphemes. He uses them as independent utterances.

alla 'no/not'

illa 'not there'

be:da 'do not want'

gottilla 'do not know'

C<sub>9</sub> does not use the following negative forms.

ku:dadu prohibitive negative 'should not'

ba:radu " " -do-

Note that the negative morphemes are not found used in two word utterances.

### Adjectives

C<sub>9</sub> uses correctly adjectives of quality

on pile:nu for ondu ple:nu 'one aeroplane'

He also identifies them on a recognition task correctly.

Colour and number adjectives are correctly used.

biḷi batte 'white cloth'

### Colour Terms

C<sub>9</sub> uses the following colour terms. These are used correctly.

assiyu for hasiru 'green'

kemmpu for kempu 'red'

biḷi 'white'

### Kinship Terms

C<sub>9</sub> uses kinship terms of regular exposure correctly both for address as well as reference.

appa 'father'

amma 'mother'

a:nti 'aunty'

ankai 'uncle'

pa:pa 'child'

magu 'child'

tamma 'younger brother'

tangi 'younger sister'

### **Reduplication**

Reduplication is present occasionally. The initial syllables are usually repeated in such occasions.

ya: ya: ya:ke for ya:ke 'why'

### **Onomatopoeia**

Onomatopoeic forms are not present in C<sub>9</sub>'s speech.

### **Syntactic Profile**

C<sub>9</sub> uses both single word as well as multiple word sentences. However, the pauses in between syllables are so irregular and frequent that it is difficult to establish them as separate sentences. It is only the knowledge of what constitutes sentences in normal spoken Kannada that help one to decipher the utterances and classify them as sentences or parts of sentences. The utterances can be classified into the following types.

- (i) Single word utterances
- (ii) Two/Multiple word utterances.

### **Single word utterances in C<sub>9</sub>**

Almost all responses are single word utterances only. Even when multiple words were present, it was difficult to interpret them as sentences because of the pauses in between the utterances. The characteristics of the utterances are as follows:

- (i) They are replies to question asked.
- (ii) They are interspersed with very frequent and unnatural pauses more than in any other speech of the athetoid or spastic child in the study.
- (iii) They have unnatural and inconsistent stress on syllables.
- (iv) When single word utterances are found at a stretch they lack the linking morphs between them. Hence they appear as elliptical sentences.
- (v) The morphological suffixes are used optionally by C<sub>9</sub> as discussed in the morphology section.

The single word utterances serve the following functions.

- (i) Need-filling function when self initiated.
- (ii) Subject only  
pa:pa for pa:pa ha:lu kudita ide  
'The baby is drinking milk.'
- (iii) Object only  
u:ta for avnu u:ta ma:dtidda:ne  
'He is eating food.'
- (iv) Predicate only.  
kudi for pa:pa ha:lu kuditide  
'The baby is drinking milk'

(v) Action indicators only

o:duta for o:dta: ida:ne  
'(The boy) is running.'

**Two/multiple word utterances**

These utterances have the following functions in C<sub>9</sub>'s speech.

(i) Subject-predicate relationship.

pa:pa makko for pa:pa malkondide  
'The baby is sleeping'

(ii) Object-predicate relationship.

u:ṭa ma:tta ide for na:yi u:ṭa ma:dta: ide  
'(The dog) is eating food.'

(iii) Subject-object relationship.

annu kurci for avanu kurci me:le ku:tida:ne  
'He is (sitting) on the chair.'

(iv) Adjective-noun relationship

bili baṭṭe  
'white cloth'

## Part II

### Section I

#### 5. General Speech and Language Characteristics of Spastics

##### 5.1. General Variables

###### 5.1.1. Age

The profiles give a confusing picture as regards the status of age as a variable for speech and language acquisition in the spastic children. If we consider the spastics group alone, they can be ordered into an increasing pattern of age as follows. C<sub>1</sub> (4 years), C<sub>2</sub> (5 years), C<sub>4</sub> (7 years), C<sub>5</sub> and C<sub>6</sub> (8 years each) and C<sub>7</sub> (10 years). This organization in the increasing order of age has shown that age could be a significant factor in some respects in so far as the subjects C<sub>1</sub>, C<sub>2</sub>, C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub> aged 4 years, 7 years, 8 years, 8 years respectively. But this can not be said of the subject C<sub>7</sub> aged 10 years whose speech and language profile is more or less as primitive as C<sub>1</sub> aged 4 years. The increasing order of complexity though not very impressive can be seen in the use of the following and/or the additions to the following in relation to the increasing age of the subjects upto C<sub>6</sub> only.

1. Clarity of utterances produced.
2. There is a change in the number and kinds of consonants produced although the number and kinds of vowels do not change significantly.

3. Approximations to the normal spoken forms as attested in the ability to utter syllables clearly, phonemic distribution and reduction in phonological simplifications.
4. Improvement in the quality of paralinguistic features.
5. Production of more number of multiple word utterances.
6. Quantity of speech output.

The increase listed above does not cover morphological and syntactic characteristics. The increase which is less impressive is seen only in the areas facilitating ease of utterance and is not a qualitative change in the phonological, morphological and syntactic inventories and their use. Even in terms of length of utterances, there is no correlation found between the increase in age and the length of utterance at a stretch in the six spastic children studied. In almost all the cases, including the oldest child C<sub>7</sub> (10 years) very few went beyond the single word utterances. Whenever a subject gave utterances longer than the single word, it was either an attempt during the imitation task or one of the rarer occurrences. The self-initiated conversation went beyond single words although rarely so in C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub>. Note, however, that these subjects (C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub>) were younger in age to the subject C<sub>7</sub> aged 10 years but were found to utter multi word utterances which C<sub>7</sub> did not. Thus there is no definite correlation between age and length of utterances either way we look at it. At the same time one could also conclude that

since multiple word utterances are few and generally not found in the self-initiated conversations, the spastic children are at home usually with single word utterances and do not generally go beyond single word utterances.

Related to this is the question whether the milestones of speech and language acquisition of the spastic children do have any correspondence with the speech and language acquisition of normal children. As already observed in sections on individual profiles, there is no pivotal and open class distinction maintained by any of subjects we have studied. Furthermore no discernible stages in the acquisition of phonology and morphology could be identified and compared with the stages of normal language acquisition. There are however certain uniform accretions to phonology, namely, the acquisition of retroflex stop like sounds as in the cases of C<sub>2</sub>, C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub> and sibilants as in C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub> yet remaining as distorted sounds in all the subjects. The youngest subject C<sub>1</sub> does not have retroflex stops and sibilants whereas in others there is a gradual access to the same although with distortion. Note that in none of these subjects despite the increase in age, complete mastery takes place.

Distribution patterns of sounds in the spastic subjects has also remained the same across children of varying ages in the sense that all the spastic children adopt simplification processes of one kind or the other with regard to clusters and they have not mastered the normal Kannada



clusters in spite of the increase in age. Other processes of overlapping/correspondences also remain the same. Even when an increase in the number of consonants across  $C_1$  to  $C_6$  is noticed, the quality of distributional patterns and paralinguistic features remain the same among all the subjects. Thus, a phonological disability remains a constant feature even across the increasing ages.

Similar condition holds good for morphology as well. Although there is an increase in the number of morphological categories such as pronouns (for instance,  $C_1$  and  $C_2$  the younger subjects do not have pronouns while  $C_4$ ,  $C_5$  and  $C_6$  use some pronouns), the quality of their use does not reveal any significant uniform betterment in the sense that none of these subjects master completely the characteristics of these categories as in pronouns nor have they shown any uniform pattern of acquisition. For example,  $C_4$  aged 7 years uses only selected I and III person pronouns,  $C_5$  and  $C_6$  aged 8 years used only selected III person neuter pronouns. Note that the younger subject has more number of personal pronouns than the older, subjects. Compare this with the information that the still younger subject  $C_1$  who does not have any pronouns stabilized used *ni:nu* the second person singular pronoun in place of I person singular pronoun. In the case of several other morphological categories as well, all the spastic subjects revealed the lack of mastery of the category coupled with a lack of uniform pattern of acquisition.

This profile of partial increase in phonological and morphological characteristics is upset by a regressive picture one notices in the case of C<sub>7</sub> aged 10 years. This regressive picture is seen in the non-occurrence of phonological and morphological categories such as retroflex stops, sibilants, fricatives and case suffixes, pronominal forms, tense, number, gender forms. It is also found in the quality of categories shared between C<sub>7</sub> and other spastic subjects as in the use of the above.

Thus one may conclude that age may not be a significant indicator of quality of speech and language of spastic cases as found in our study. There is neither a hierarchical, linear or homogeneous increase in the linguistic inventories and their use with increase in age.

#### 5.1.2. Severity

All our nine subjects were chosen falling within the range of mild to moderately severe group of disability, including spastics and athetoid categories. A hierarchy of decreasing order of severity can be arranged as follows for the six spastic subjects in the study.

C<sub>7</sub> - C<sub>5</sub> - C<sub>6</sub> - C<sub>2</sub> - C<sub>1</sub> - C<sub>4</sub>

Mobility was also taken as a detrimental factor of severity of neurological problem.

A comparison of the above listed cases indicates that the ease of speech production is related proportionately to the degree of severity. As a consequence, C<sub>4</sub> is less dysarthric and C<sub>7</sub> has worst dysarthria. This holds good also for the intelligibility of speech uttered. That is C<sub>4</sub> is most intelligible and C<sub>7</sub> the least. While severity of neurological disability does not get reflected in inventory of vowels in terms of numbers the degree of severity shows itself in the number of consonants acquired. As for example C<sub>4</sub>, the least severe and C<sub>7</sub> the most severe both share the same number of vowels, whereas C<sub>7</sub> has a lesser number of consonants in her inventory. There is yet another dimension in that the degree of severity also seems to affect liprounding and retroflexion fricatives which require finer manipulation of points of articulation as discussed in C<sub>1</sub> and C<sub>2</sub> profiles. Even if the sounds are retained in many severe cases certain phonological features such as liprounding, retroflexion are affected if not totally absent. Compare the performance of C<sub>7</sub> and C<sub>5</sub> with C<sub>4</sub> and C<sub>1</sub>

The quantity of speech output is also affected by the degree of severity. Thus the speech output of C<sub>7</sub> is very much less than that produced by C<sub>4</sub> and other cases. This is reflected also in the imitation task on which C<sub>7</sub> performed very poorly than the other cases. As already pointed out several characteristics of the normal speech and language could be produced despite the heavy distortions by our subjects except C<sub>7</sub> in the imitation task only such as the past tense forms, pluralized forms, ordinal numerals, pronominal forms.

Severity also relates to degree of distortion as a way of phonological simplification. Thus, even though all the cases had distortions,  $C_4$  who is the least in terms of severity performed significantly better than  $C_7$ .

Speech rate and quantity are also related to the degree of severity.  $C_7$  had much less speech output and slower rate than found in  $C_4$  with the other cases performing in corresponding grades of severity. There is also an improvement in the rate of speech with the decrease in severity. That is, rate of speech is inversely proportional to the degree of severity as seen in the range from  $C_4$  to  $C_7$ . Note, however, that the intonation on the single word utterance in the most severely affected  $C_7$  comparatively speaking has a better approximation to the intonations used in normal speech, this amidst the poorer picture in all other characteristics.

Severity has some relationship with the morphological and syntactic levels in the sense that in some of the morphological categories such as pronouns, gender, tense, number, case, adverbs and conjunctions are not found in the most severely affected  $C_7$  who is aged 10 years.

The severity is related as regards the syntactic profiles also. The most severely affected subject  $C_7$  has less number of two-word utterances and thus less number of syntactic functions than other subjects. And yet at the same time some of the severely affected subjects next in decreasing order to  $C_7$  for example  $C_5$  have better syntactic functions as seen in

the more number of two and multiple word utterances and use of single word utterances appropriately in response to queries as found in the correct use of negative forms. There is also a better use of case affixation than in the other less severely affected cases. Note, however, that when mobility is taken as a measure of severity C<sub>5</sub> is rated as more severe among the moderately affected subjects. His better performance as explained above in spite of his status as the most severe among the moderately affected subjects of our study brings out the fact that there may be other factors than severity alone contributing towards speech and language characteristics exhibited by the spastic subjects.

### 5.1.3. Sex

Our study had only one female in each group of neurological disability. In terms of the degree of severity, and age they do not show any deviation from other subjects. Since we have only one female studied in the spastics group, it is difficult to make generalizations as to the sex variable. Incidentally, however, C<sub>7</sub> the most severe in the group happens to be a female in the study.

## 5.2. Phonology

### 5.2.1 Vowels

All the spastic subjects showed a more or less similar pattern of vowels, in terms of their number, their

distribution, height, part of the tongue involved, and lip-rounding. A general characteristic is that all the spastic children acquired a 'sort of' cardinal pattern of high, mid and low vis-a-vis front, back and central vowels. Since the Kannada language also has adopted more or less the 'cardinal' vowel positions (Schiffman, 1979) there is a better match between the vowels of normal speech and the vowels of disordered speech. It will be interesting to see whether the spastic children exposed to languages such as Kodava or Tamil (two other languages of the South Dravidian group of language as does Kannada, the language of the subjects of the present study) which have variations from the basic cardinal vowels in terms of height, part of the tongue involved and liprounding, would still acquire only the basic cardinal pattern. Although the vowels of normal speech are preserved more or less in the same position, apart from distortion noticed, their distribution closely approximating the normal speech, their retention in the utterances in proper places is not found as in the normal utterances. This is due mainly because of failure to retain the shape and form of the syllables and produce them correctly at a stretch in a sequence. The tendency to distort, delete and substitute syllables marks the use of vowels, while retaining the distributional characteristics of individual syllables similar to those found in normal speech.

#### 5.2.2.

As regards consonants, the chief characteristics shared by most cases are as follows:

- (a) Non-production of aspirated sounds even in imitation task and after coaching. In normal Kannada also the occurrence and use of aspirated sounds is infrequent, (and, historically speaking, aspiration does not form part of the original substitution of Kannada phonology). However the normal subjects could be prompted to produce the same in imitation task and after coaching.
- (b) Absence and/or difficulty with the production and use of retroflex sounds.
- (c) Absence and/or difficulty with sibilants and other fricatives.
- (d) Absence and/or difficulty with continuants.
- (e) Absence and/or difficulty with most of the nasals, especially the palatal, velar and retroflex nasals.
- (f) In some subjects as in C<sub>1</sub>, there is absence or some difficulty with the production of 'palatal stops' which could be considered phonetically as affricates in Kannada. This later possibility, the phonetic nature of 'palatal stops' (treated as stops at the phonemic level in normal Kannada), perhaps explains the absence or the difficulty the spastic child has for the production of these sounds.

Free, non-interrupted and open characteristics of the oral tract for the production of vowel sounds and the total closure of the oral tract in the production of stop consonants

are better controlled by the spastic children. In a way, the stops resemble the cardinal pattern of vowels as far as the spastic child is concerned. Further deviations from this total closure such as leaving a narrow aperture as in the case of fricatives, opening in the sides of tongue in the oral tract as in the case of laterals, manipulating an articulator as in the case of trills and retroflex sounds, closure of the entire oral tract and opening of the nasal cavity as in the production of nasal sounds are not managed at all or managed poorly by the spastic child.

### 5.2.3. Distribution

There are several characteristics as regards the status of individual sounds and allophones. First of all in several cases, due to distortion, it is difficult to correctly describe the phonetic nature of the sounds involved. It is only with the help of investigator's knowledge of normal spoken Kannada, context of situation in which the data was recorded and with the help of the mothers who, in most cases, have something or other to say by way of interpreting and correctly assigning meanings to the utterances of the child, that the investigator was able to describe the phonetic features of an utterance/word. Secondly, it was difficult to work out a strict distributional pattern for the sounds involved, keeping the utterances intact or assuming that the particular utterances are uttered with the same form whenever they were uttered. That is, a particular item/the label for an object/event etc.,



had many variations for the same form and these variations were not made necessarily with phonetically similar elements. For example, the object 'moon' is referred to with the following forms, tanta, atta, canna (from C<sub>1</sub>) all corresponding to the form candra in normal Kannada by the subject C .

Minimal and analogous pairs of contrasts were difficult to identify in spontaneous speech as the speech itself is very sparse. It is only with the help of the imitation task one could work out minimal and analogous phonemic contrasts. As such contrasts reflect more the potentiality of the child than his actual use. Another factor one should consider here is that in adult Kannada speech as well there are very few allophones (Schiffman 1979, Upadhyaya, 1972, Nayak 1967). Secondly in the CP speech as seen in the study one always notices a range of poor clarity to better clarity within the same points and manner of articulation. It will be interesting however to observe the CP children with Tamil or Kodava as their mother tongue (which sound in regular allophonic patterns in its consonants) in order to check whether they are able to make finer and varied manipulation to master and use allophonic differences and distribution. Moreover, the few contrasts found in the speech of the spastics is not comparable to normal language, in the sense that these contrasts do not go into the making of creative lexicon. These contrasts restricted by the CP condition are not built into a creative scheme for the coinage and use of new vocabulary. As a result, the CP speech exhibits homophonous forms which do get dissolved with

increasing age. On the contrary use of an increase in homophonous forms becomes a characteristic of CP speech. In view of the above reasons, the investigator has to conclude that it may not be advisable or useful to resort to any phonemic analysis centring around only contrasts. The distributional pattern noticed in the data for all the six subjects cannot be assumed to reflect the adult pattern and yet as in the vowels, the phonemic distribution of individual consonants is such that it closely resembles shorter version of the adult phonemic distribution. The major characteristics of this pattern as found in spastics speech are as follows.

- (i) The distribution of consonant phonemes in spastic speech closely resembles that of normal spoken Kannada in the sense that the individual phonemes follow the same distributional pattern of the normal spoken Kannada.
- (ii) While all the phonemes are produced with distortion, comparatively speaking the initial syllables/sounds/phonemes are produced with less distortion as in the subjects C<sub>2</sub>, C<sub>4</sub> and C<sub>5</sub>. In some it is the last syllable or the phonemes that are uttered with least distortion, deleting or distorting heavily the preceding syllables as in the cases of C<sub>7</sub> and C<sub>1</sub>
- (iii) It is useful to analyse the speech as consisting of syllables rather than as phonemes.
- (iv) The spastic speech has gemination but very few non-identical clusters.

- (v) Spastic speech tends to change the non-identical clusters in the normal spoken Kannada to identical clusters.
- (vi) The processes of making the non-identical cluster into identical cluster are varied and not all the subjects follow all the procedures. The specific details of these processes are discussed in the profiles of individual cases.
- (vii) In general, multisyllabic words are reduced to monosyllabic and very rarely disyllabic forms.
- (viii) Generally the sounds of normal language that do not form part of phonology of spastic children will be totally deleted, distorted modified or substituted by other sounds from the repertoire of spastic children. This also holds good for the gemination of a consonant phoneme in normal speech which does not form part of spastic speech.
- (ix) Retention of the initial syllable and addition of another syllable or syllables to stand for the deleted sounds from the normal spoken form is another characteristic of the spastic speech.

While the above characteristics are treated as common features of the distribution of phonemes/syllables in spastic speech there are other subject-specific characteristics which are widely varying in their distribution among the subjects.

5.2.4. As regards paralinguistic features, there is a direct correlation between severity of the disorder of spasticity and clarity of speech as found in the cases of C<sub>7</sub> which is most severely affected and C<sub>4</sub> which is less severely affected.

The paralinguistic features present in the spastics inadequate and deviant when compared to normal speech. They are very poorly represented in spastic speech. The paralinguistic features that leave some trace in the spastic speech are as follows.

- (i) All of the subjects have low pitched, loud voice with hoarseness and harsh quality of voice.
- (ii) All of them have poor clarity of speech.
- (iii) All of them have a slower rate of speech.
- (iv) All spastics have reduced and deviant intonations. Individual single utterances that have inherent intonation are also uttered in a non-inflected manner.
- (v) In the spastic speech generously prolonged pauses of intermittent nature are present.
- (vi) Spastics have poor speech output in terms of quantity and quality.

In general, inadequacy of paralinguistic features coupled with the strenuous effort to master the same by the spastic child marks the spastic speech.

We had six subjects of varying ages and varying degrees of severity. However, the phonological profile that emerges from these six subjects taken together is one of less variation amongst them in most items of phonology such as number and kinds of vowels, number and kinds of consonants, the quality of absent and problematic sounds and overall distributional patterns of these sounds/phonemes, in contrast to normal spoken Kannada. Taken together, in some sense, these six subjects of varying ages and severity within the selected range present their coherent whole constituting the the notion of 'spastic speech' as a separate and distinct entity, while at the same time providing for subject-specific variations. This separate and distinct entity, however, is deficient quantitatively as well as qualitatively when compared to normal speech.

### 5.3. **Morphology**

#### 5.3.1. **General**

A chief characteristic of spastic speech is the lack of affixation process. None of our six subjects gave a complete picture of affixation. All of them showed either none or partial attempts at affixation in their speech. Even on imitation there were only poor attempts which retained some semblance of affixation in some items.

Not all the morphological characteristics found in normal Kannada are used in the spastic speech. While this is but expected in a disorder, what is significant here is that the spastic speech did not present mastery of any of the grammatical

categories selected and used in the spastic speech fully.

The grammatical categories present in our subjects in an overall pattern are as follows:

Nouns  
Pronouns  
Gender  
Number  
Case  
Conjunction  
Verbs  
Tense  
Adjectives  
Numerals  
Adverbs  
Interrogation  
Negation  
Kinship  
Reduplication  
Onomatopoeia

Even as all these categories were not found in all the six subjects, the subjects exhibited only inadequate competence in all the grammatical categories each of them had.

It was observed in general that, though inadequate in itself, the comprehension of these morphological processes/categories was much better than expression of the same.

While nouns were found more in number, the grammatical behaviour of all the categories was more or less noun like.

Some of the categories when present were used almost invariably incorrectly. For example, in the case of the pronouns while the pronominal forms were found only partly, none of the subjects exhibited the mastery of the use of the available forms. In other words, the presence of a grammatical category is divorced from its correct use. In some cases, like the nouns which have more number of items within the category, some forms may be used correctly and some may not be used correctly. In some cases, as in the case of the pronouns, all the forms may be used incorrectly. In other words, there is a limited potentiality demonstrated to acquire forms. Within this limited potentiality there is an inability to put the acquired forms to proper use.

A chief characteristic of spastic speech is that it usually presents a blend of three different morphological strategies to derive lexical items. Spastic speech has groups of utterances which retain partial similarity with normal spoken Kannada though selective processes such as

- (a) the retention of initial syllables and correspondence in gemination.
- (b) Groups of utterance which have similarity with the target utterance though some correspondences. In this case some consistent use of the correspondences is noticed.

(c) The use of neologisms or entirely different items.

Our data does not show which of the three has the dominant role. It appears from the mother's responses that given the context of situation and familiarity, the listeners would on their own workout correspondences for all the three categories with normal Kannada. For the uninitiated, in the beginning, most of the utterances appeared to be neologisms or alien utterances because of the phonological deformities. While poor speech rate and poor phonology also contribute to the poor affixation processes, it cannot be said that poor phonology contributes to the inadequate number of grammatical categories and their poor mastery in the morphology of spastic speech.

### 5.3.2. Pronouns

1. No single subject of our study has acquired all the primary pronoun forms.
2. No subject of our study has acquired inflected pronoun forms even as individual words.
3. There is no uniformity seen in the acquisition of pronominal forms of the six subjects in the group.
4. Not even one pronoun form is correctly used consistently in the six subjects.
5. There are also at times confusions or reversals of pronouns noticed as in the case of C<sub>1</sub> , C<sub>2</sub> and C<sub>7</sub>. Whether this is a



reversal proper or incorrect usage is difficult to establish.

6. While the pronominal forms may not be found used correctly in all the subjects consistently on all occasions of their occurrence, in some utterances as in C<sub>6</sub> C<sub>5</sub>, C<sub>4</sub> and C<sub>2</sub>; the form in the verb slot may include indication of the pronoun. These forms are very rare and are used as individual independent words rather than as a form inflected for person. They do not reveal any regular pattern in the sense that such 'inflections' do not cover other verbal forms in any regular manner, nor are these 'inflected forms' substantial in number.
7. The profile of inadequacy of pronominal usage has a direct consequence for the occurrence of other grammatical categories such as gender and number. It may be further pointed out that the use of pronominal system in Kannada is also related to PNG markers in the finite verbs. The non-availability of the pronoun forms for PNG in the verbs can not be considered as purely influenced by inability to affixation process since almost all of the spastic children have demonstrated their ability to utter two word subject predicate relationship sentences. Hence the non-use of pronoun forms may be a consequence of cognitive inadequacy or a function of developmental stages in which these children are currently placed. This is perhaps another indication that these children's speech and language is conditioned not

only by their degree of dysarthria but also by their level of cognitive attainments, which in turn is deficient.

Thus, even though in the spastic speech, grammatical category of pronouns is identified, it is deficient in at least two ways, namely, that not all the pronouns are found and that the pronoun forms found are not used correctly.

### 5.3.3. Gender

1. Gender for sex identification as well as gender for grammatical construction are not used in these spastic children.
2. Many of the subjects (C<sub>7</sub>, C<sub>1</sub>, and C<sub>5</sub>) did not distinguish pictures of males and females correctly. They also did not distinguish between masculine and feminine names.
3. The gender in kinship however is correctly distinguished by most of the subjects (C<sub>1</sub>, C<sub>2</sub>, C<sub>4</sub>, C<sub>5</sub>, and C<sub>6</sub>).
4. The spastic subjects exhibit difficulties in mastering words that would distinguish sex of the members of the same species. Cow and bull, for example, could not be distinguished; the child would use one and the same term, namely, amba, for referring to both (C<sub>1</sub>, C<sub>2</sub>, and C<sub>5</sub>). While this is a feature associated also with the normal child language acquisition the prevalence of this picture even in older spastic children makes it a characteristic of the spastic speech.

5. The absence of gender concept in all except the kinship terms is reflected also in the absence of PNG markers which in its turn may be related also to non-availability of affixation processes.

Thus, while there is no gender concept development evident in nominal or verbal expressions in the spastic speech and while such general distinctions were not demonstrated even at the picture recognition level, in many cases the spastic speech maintains gender distinction at the kinship terms. This pattern resembles the pattern found for many other grammatical categories in the sense that even as a category at the formal level is present its proper use is either not attested or is restricted to a particular, small domain within the scope of the category. Incomplete mastery of a category and inadequate extension of its use compared with normal language mark the morphology of spastic speech.

#### **5.3.4. Number**

1. No distinction between the singular and plural is seen both in the nominal and verbal expressions.
2. The suffixes for number marking are not found either in the nominal or verbal constructions. These are also not found, or if found, are distorted on imitation.
3. Number as a concept is generally not found even in comprehension tasks seen when pictures containing single and multiple objects are shown.

4. In some cases, where the singular-plural distinction is partly present, it is present at comprehension level only (see C<sub>4</sub>, C<sub>5</sub>, and C<sub>6</sub>) as seen in the recognition of pictures containing single and multiple objects.

Thus there is a general dearth of devices for indicating plurality in spastic speech. The general picture is one of inadequacy in the use of number system. While non-availability of number in the nominal and verbal constructions may be linked with the absence of affixation processes, which may or may not in their turn be linked with difficulties of production of speech, the absence or failure to recognize plural number on comprehension tasks cannot be assigned to difficulties with production and affixation processes. Thus, the failure to use number concept may be viewed more as a cognitive deficiency as in the case of pronouns.

#### 5.3.5. Case

1. All the case markers/relations found in normal Kannada are not found in any spastic subject of our study.
2. Explicit case markers are not at all used. In some infrequent cases, some utterances are found with the case markers as in C<sub>5</sub> and C<sub>6</sub>. Note that in these cases as well there is no separate use of an explicit case marker forming a pattern. Even the items with explicit case markers are not consistently and frequently used. Since the use is restricted to individual words only, in the absence of a pattern, we are

forced to consider such occurrences as independent words, with no specific productive function assigned to the case marker.

3. There are, however, case relations implied in the rarer two or multiple word utterances. This implication is arrived at through the listeners' knowledge of normally spoken Kannada, basing the interpretation on the context of utterance.

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4. 11 the spastic subjects under study showed the use of one or the other implied case relations.
5. Note that the subjects did not share all the implied case relations thus identified except nominative, locative, and accusative. There is wide variation, however, in the use of implied case relations chosen by the subjects:

C<sub>1</sub> Nominative

C<sub>2</sub> Nominative, Dative, Accusative, Locative.

C<sub>4</sub> Nominative, Dative, Accusative, Locative

C<sub>5</sub> Nominative, Locative, Dative, Accusative

C<sub>6</sub> Nominative, Accusative, Locative, Dative

C<sub>7</sub> Nominative, Dative, Locative

6. The following case relations are not at all found, overt or implied.

Genitive, instrumental and ablative case relations.

Since some case relations are found implied, we may infer that the constraints imposed on affixation processes are not fully relevant to explain the choice and use of some selected implied case relations and not the others. While the absence of overt case markers may be explained with reference to constraints on affixation process based on production difficulties, the use of certain implied case relations indicates the availability of case as a concept in the spastic child. The use of certain relations as against non use of other relations, that is, the inadequacy of the mastery of the system, and the wide variation in the use and non-use of specific case relation in individual subjects fall within the general pattern we have identified for several other grammatical categories. Thus, there is a general picture of inadequacy even when a grammatical category is present in strength.

One may also argue that this may perhaps be characteristic of current developmental stage of CP children. In other words, of the several case relations, the CP child seems to acquire some and relegates the others for a later day acquisition, or he may not acquire such relations at all.

### **5.3.6. Conjunctions**

Conjunction is generally used in normal spoken Kannada in multiple word utterances. This is so because conjunction by its very nature is a process connecting two or more items. However, as discussed in the section on  $C_1$ , there are also cases

in which single word utterances themselves could also imply conjunction. In the spastic speech under investigation here, conjunction is found used in one way or the other by five out of the six subjects. One subject, namely, C<sub>7</sub> aged 10 years, oldest of the subjects and falling within moderately severe degree, did not have conjunction at all.

Even in the case of other subjects overt use of conjunction is generally not found. Only by way of adjacent placement of utterances and by way of such utterances being interpreted by the listeners as indicating a conjunctive sense with the help of context of utterance, conjunctive sense is identified.

Some subjects like C<sub>4</sub>, C<sub>5</sub> , C<sub>6</sub> comprehend conjunction while the others did not.

The general picture that emerge as regards conjunction is that C<sub>1</sub> as well as C<sub>7</sub> which are less severely affected and most severely affected do not have conjunctions. The moderate cases have conjunctive relations but no overt marker of the conjunctive relations. Iterative conjunction is more commonly shared by the subjects.

The absence of overt conjunctive marker may be related to difficulties with affixation process and production whereas the inadequate implied conjunctive relations may be related to cognitive deficits.

Syntactically conjunction may be viewed as a syntagmatic process, a chain of linear contiguity whereas semantically the items that are linked with conjunction form a paradigmatic class, a class formed by a process of vertical substitutability. The absence of overt conjunctive markers indicates the break in linear contiguity but the implied conjunctive relations based on adjacent relationship in two/multiple word utterances, indicates that this linear chain of contiguity is rather retained through a paradigmatic process. In any case, the presence of implied conjunctive relations shows the availability of the concept in the spastic speech and its limited application shows that the concept is inadequately acquired.

#### 5.3.7. Verbs

1. The spastic speech is characterized by a lesser quantity of verbs when compared with the nouns, so much so that it gives the impression that the spastic speech has only nouns
2. Coupled with an infrequency of the verb, there is a stringent tendency not to inflect a verb with affixes for tense, person, number, gender and other categories as done in normal spoken Kannada.
3. Simplifications are abundant even on single word imperative verb forms. Simplifications included abbreviation, deletion or substitution as listed in the phonology section of individual profiles.



4. Once the verbs are shorn off the usual affixes, only the initial or two syllables remain in the spastic speech. With distortions and with the predominance of single and two-word utterances with pauses the verb begins to look like a noun. Since there is modification of original verb/verb root, many a times the listener has to supplement for himself the missing elements of the verb in the particular context.
5. Single word verb utterances are very few. This, however, is against the tendency in normal spoken Kannada where single word verb utterances are allowed and more easily resorted to. In normal spoken Kannada without a subject or an object noun, the verb alone with PNG markers would bring in a complete sense, whereas in the absence of such affixes a single word utterance, purported to be consisting only of a verb, will not have that facility in the spastic speech.
6. Verbs occur both as a second item in a two-word construction and as a single word utterance.
7. The preceding first item in a two word construction with verb as a constituent is a noun which may either be a subject or an object.
8. There are no utterances identified in the data where, in a two word utterance, both the words are verbs. Thus the basic positional characteristic of verb in Kannada is mastered and reflected in the spastic speech.

9. There are some subject specific characteristics such as reduplication and onomatopoeia to derive verbal sense. Examples with reference to C<sub>1</sub> etc.
10. The verbs used relate to immediate personal acts.
11. The verbs used in the spastic speech of our six subjects fall mostly under the finite sense category, although the PNG markers that are generally used with a verb to express the finite sense are deleted. Among the finite sense the spastic languages has a preference for imperatives. A few modals are also used. The non-finite forms are not used at all. That is, only a part of the verb system is acquired. This picture is in conformity with the nature of acquisition and use of other grammatical categories in spastic speech.
12. Both transitive verb form and intransitive verb forms are used in spastic speech. Other subcategories of verbs such as causative, reflexive are not used.
13. Use of verbal nouns

The data of almost all the six subjects showed the use of verbal nouns or nominalized verbs. The data of C<sub>2</sub>, C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub> showed these instances for naming tasks. These were usually responses to questions such as idu e:nu? 'what is this?'. The subjects instead of giving directly the required nouns, resorted to a verbal noun to refer to the object.

tinnadu one that is for eating  
 for chokale:ṭ 'chocolate'  
 (illustrated from C<sub>2</sub>)

This bears resemblance to the circumlocutory expressions seen in word-finding difficulties in certain aphasics (Osgood and Miron 1963; Sies 1974). The spastic subjects who gave this kind of responses did use the correspondent nouns as well for the same objects in other contexts. That is, although C<sub>2</sub> defines chocolate as 'one that is for eating', tinnadu, on some occasions, on other occasions the subject used the word ta:ke 'chocolate' straightaway. This indicates perhaps that the difficulty in spastics is more with the immediate retrieval of the relevant word in immediate context than the availability of the terms. However, this needs further exploration.

#### 5.3.8. Tense

1. There are two observations one could make.

- (a) Tense distinction is not at all explicitly stated or even implicitly understood. Because there is no affixation process, explicit tense marker is not found. With the deletion and abbreviation of syllables only the verb root generally remains and is used. Hence, tense is not marked overtly.
- (b) In some small number of cases certain utterances are made with present tense marker. These utterances may be considered as independent words, without the child

implying or meaning the tense. This decision is supported by the fact that no regular inflection is resorted to in other verb roots. The same utterance could also be said without the tense marker.

2. No past tense is ever used.
3. Most subjects except C<sub>6</sub> and C<sub>4</sub> do not also distinguish between the three words.

nenne	'yesterday'
na:le	'tomorrow'
ivattu	'today'

which have inherent time specified. Even when these words are used as in the subjects C<sub>4</sub>, and C<sub>5</sub>, they do not convey the sense intended.

4. No other mode is used by the spastic child to indicate time, present, elapsed and future. The time is not distinguished even on picture recognition. Thus one may conclude that a characteristic of spastic speech is its lack of provision for time both at formal and semantic levels.

#### 5.3.9. Numerals

All the subjects used the numerals with their respective distortions and simplifications.

ondu	'one'
erdu	'two'
mu:ru	'three'

But none of these words was used in the same sense as found in normal spoken Kannada. In other words, the numerals do not have their numeral value in the spastic speech. They are also not used for iteration. These words were also used mnemonically all alone, and objects not with any nouns to indicate the number

No ordinal and cardinal distinctions are seen in any of the spastic children.

No ordinal numeral is used.

In the picture recognition tasks only two (C<sub>5</sub> and C<sub>6</sub>) subjects correctly recognized collectivity. This position is indicated in the lack of PNG markers also (discussed under verbs). As a consequence, honorific singular, which is expressed through the inflection of verb for plural, is not used.

#### 5.3.10. Adverbs

The analysis of the data revealed the following.

1. Time adverbs are not used at all in spastic speech.
2. Occasionally, place and, very rarely, manner adverbs are used. These two are also very infrequently used and not by all subjects. C<sub>5</sub> uses location only, C<sub>4</sub> uses location only, C<sub>6</sub> uses location as well as manner while C<sub>1</sub>, C<sub>2</sub> and C<sub>7</sub> do not use any. There is an attempt at the production of all these three types of adverbs on imitation although not successfully so.

5.3.11. Interrogation

Comparison of the six subjects in the spastic group revealed the following.

1. The interrogative marker e:nu 'what' was found used in C<sub>2</sub> C<sub>4</sub>, and C<sub>5</sub>
2. No other interrogative marker like the following are used.

elli	'where'
ya:va:ga	'when'
he:ge	'how'

3. The interrogation is also not expressed in the intonational variations.
4. The use of e:nu 'what' is restricted to object identification only.
5. The use of e:nu 'what' for event identification is very minimal among the 4 cases who show the use of the same.
6. The simplest interrogative marker -a: which can be attached to any sentential constituent is not found used by any of the subjects in the study.

The lack of interrogative suffixes is in consonance with the lack of affixation processes in the spastic children.

The lack of interrogative markers is also indicative of the general lack of explorative tendencies in the spastic children.

The use of nonverbal gestures that are at the easy disposal of the subjects to indicate interrogation is also not employed by all the subjects.

The other functions of interrogation such as the exploration of causal relationships, and spatiotemporal identification/location are not found exploited fully by any of the subjects.

#### 5.3.12. Negation

Continuing the general profile of the grammatical categories discussed so far, the use of grammatical category negation also presents a similar picture, in the sense that some spastic subjects use certain forms of negation, while others do not use any.

All the spastic subjects use one form of negation or the other only. That is, not all the forms of negation are used by all the spastic subjects..

There is also a possibility of arranging these forms hierarchically as given below, in terms of their use and frequency of use by spastic subjects.

illa	'no/not there'
alla	'no/not that'
be:da	'do not want'

Note that the prohibitive and other forms of negation are not used at all. Under these come the following.

ku:dadu 'should not'

ba:radu -do-

These forms are invariably used as part of a tightly knit construction in which the first element is generally an infinitive form of verb, followed by the prohibitive form of negation (Schiffman 1979). Even when the prohibitive form ku:dadu occurs as an independent form, it implies an infinitive form of verb preceding it.

This picture of not using the some negative forms while maintaining a trace of the acquisition of the notion of negation through the use of some negative forms is fully in consonance with the picture of the linguistic ability of the spastic child we have already identified for the use of other grammatical categories. The spastic child exhibits a knowledge of an ability to use a grammatical category but in doing so, he simplifies the category or selects and uses the simplest characteristic of the category which do not involve other elements. He drops the more complicated elements of a category and retains only the simplest. In the present case, all spastic subjects use one or the other forms of illa, alla or be:da 'do not want' which negate directly and independently the nouns or the nominal expressions. They do not show an ability to use other forms which negate acts and which involve use of other linguistic forms and linguistic processes.



Thus nominal negation which involves existential negation, and modal negation are chosen and retained over the negation of verbal acts.

### 5.3.13. Adjectives

The spastic subjects of our study use very infrequently and almost rarely, adjectives of quality referring to colour and number. The adjectives of quality are not used as productive elements. They are attached to some nouns and the entire construction acts as single words. For example, C<sub>6</sub> uses two constructions.

kappu na:yi 'black dog'  
 ondu pa:pa 'one baby'

which could not be changed into ondu na:yi 'one dog', kappu pa:pa 'black baby' in his speech. If we treat kappu 'black' and ondu 'one' as independent words, not attached to the following words in the utterance then, the frequency of these independent words is nil.

Colour terms, however, are used as independent words. And yet they are not appropriately matched with the colours they indicate.

The spastic children misname the colours and numbers all the time, in the picture recognition task.

**5.3.14. Kinship terms**

All the cases use the following kinship terms as address terms.

appa	'father'
amma	'mother'
a:ṅṅi, cikkamma	'aunt'
unkal, cikkappa	'uncle'
akka	'elder sister'
aṅṅa	'elder brother'

Except by C<sub>1</sub>, C<sub>5</sub> and C<sub>7</sub> these are also used for reference.

The following conclusions may be arrived at.

1. The spastic children use certain kinship terms correctly as address terms.
2. These address terms fall within the semantic domain of individuals within the immediate environment who are either living under the same roof or visit and take care of the child frequently.
3. Not all the address terms are used as reference terms as well by spastic children. C<sub>1</sub>, C<sub>5</sub> and C<sub>7</sub> who do not use the address terms for reference at all. It is quite possible that since the children are exposed to these terms from early childhood they acquire these as labels habitually along with or without their semantic denotations. All these children, however, had difficulty in explaining the meanings

of these labels or to transfer and apply such notions to those falling under the same relationship.

Even those subjects who use address terms as reference terms do not use all the address terms as reference terms as in the case of C<sub>2</sub>, C<sub>6</sub> and C<sub>4</sub> who used only appa 'father' and aunt; C<sub>6</sub> used only appa 'father'; C<sub>4</sub> used only appa 'father' as reference terms.

4. Use of the kinship terms for generalization and reference to different individuals in similar context is not attested. for example, aunt and uncle in normal spoken Kannada are used as general terms to refer to many individuals known/lesser known, familiar or unfamiliar. This generalize use of a term to address or refer to individuals falling under the same relationship is not found.

The picture that emerges as regards kinship terms is similar to the picture we have seen for other grammatical categories. The spastic child is able to acquire a grammatical category or a structured lexicon only to some extent, as if it were his intention to establish his position/knowledge but he is unable to either master all the characteristics or use even the characteristics he has acquired adequately. The language information in different parts is recognized by the child but not mastered, it is accessible to him in an overall manner as an introduction but not mastered by him adequately.

His acquisition of grammar is deficient in two respects, firstly he acquires only a few of the grammatical categories and not all as done by a normal child. He engages himself in selection of categories; while this selection appears to be partly shared by all the spastic children, they also have exhibited tendencies to select individually without reference to the commonly shared features.

The second deficiency in the speech and language of spastic child is that he does not acquire all the elements of a grammatical category found in his repertoire. There is a general tendency to acquire the rudimentary aspects of the category. He fails to acquire manipulation of other aspects which may be considered the higher order of the category.

#### 5.3.15. Reduplication

Some subjects  $C_1$ ,  $C_2$ ,  $C_4$ , and  $C_7$  demonstrate reduplication of utterances. Some subjects  $C_6$  and  $C_5$  do not demonstrate reduplication. The reduplication occurs more on initial syllables in  $C_1$  and with words in  $C_2$  and  $C_5$ . It is difficult to establish the purposes of reduplication as the data is meagre. But one could suspect that some subjects like  $C_2$  and  $C_4$  used reduplication for emphasis and to convey a sense of completion.

The reduplication seen in subjects except  $C_1$  cannot be termed as babbling or self-talking, since they are individual, isolated utterances. Also the reduplicative terms seen in  $C_1$  and  $C_5$  bear a resemblance to the stage of non-fluency (Berry and

Eisenson, 1962) noticed frequently in normal children around 2 years of age which is said to be a function of inadequate language acquisition. In several cases it is seen related to the subsequent development of stuttering (Van Riper, 1978). In the present case it is likely that C, 's reduplication is reflective of the stage of non-fluency abutted by the CP condition whereas it may not be so in other older subjects. In older cases it could be simulated to mild stuttering like blocks augmented by the Cp condition

#### **5.3.16. Onomatopoeia**

Onomatopoeia is found in some spastic children as a strategy for acquiring new words as in C<sub>1</sub>, C<sub>6</sub> and C<sub>5</sub>.

In some spastic children as in C , onomatopoeia is not found used at all.

Where onomatopoeia is found it is used for labelling an object usually animate. However, the labelling function is also not acquired by some subject such as C<sub>2</sub> as seen in the lack of onomatopoeic forms. He would use the name of the object as in the case of 'dog', rather than the corresponding onomatopoeic label. The use of onomatopoeia is another indication that language acquisition is aimed at by some CP children through onomatopoeia, which, in a way, may be considered an easier task, since there are less constraints of distribution, etc., although in a limited nature. In normal language acquisition children do use onomatopoeia at a beginning stage

but they would soon outgrow it and onomatopoeia comes to play other functions.

The importance of onomatopoeia for the understanding of spastic speech is derived from the fact that the spastic speech is more or less a single word utterance and each utterance has only very limited syllables, mostly single or disyllabic, an ideal situation for indulging in reduplication and/or onomatopoeia as a strategy for augmenting one's vocabulary. The spastic child, however, does not seize upon this opportunity as an alternative to overcome the constraints imposed on it by dysarthria. He does not even half exploit the processes of reduplication and onomatopoeia found in normal spoken Kannada, perhaps because onomatopoeia involves, apart from easier phonological tasks, some measure of cognition. Again, the picture is the same as we find in the other grammatical categories wherein a spastic child makes a beginning with the acquisition of a category but not fully masters the manipulation of the category.

#### **5.4. Syntactic Profiles in Spastics**

A major problem of syntactic analysis of spastic speech is the difficulty in identifying sentences that form part of their utterances. Even in normal speech, analysis of a stretch of utterance into independent sentences is done with the help of intonations, the knowledge of grammar that prescribes the type of endings in terms of lexical items chosen which in their turn characterize the end of a sentence, the

knowledge what begins a sentence, what ends it, the meaning, complete or incomplete nature of the sense conveyed, pauses that are prescribed to mark one utterance as a distinct sentence from the other and so on. When a linguist works on a language with which he is not yet familiar, he slowly acquires a sensitivity to the characteristics of a sentence he is exposed to and this helps him to arrive at the formal characteristics of the sentence slowly. In all these cases a sentence sense is assumed to be prevalent in the language and this sentence sense is shared by the speakers of the language. In the case of the spastic speech one may not say that this sentence sense is absent but one is right if she says that this sentence sense varies from the normal spoken language on the one hand and from one individual spastic child to another.

The spastic speech is characterized by frequent pauses between utterances which are mostly single word utterances. The spastic speech is also characterized by lack of intonations and paralinguistic features which help identification of a stretch of utterance as a distinct sentence. The spastic speech does not, as we have already seen, have any provision for affixation, which means the usual inflectional endings that mark one sentence as distinct from another, and that indicate inclusive conditions for constituents of a sentence are not found in spastic speech. The frequent pauses give a feeling that each multiple word uttered may be a separate sentences, but in sense collocation two or three individual single word utterances with pauses between them may also function as a

separate sentence. Thus, very often, the investigator has to resort to the context of situation of the utterances, to arrive at a conclusion, as to whether a stretch of single word utterances does constitute a single sentence or several ones. In this effort help from the mother as well as the knowledge of target utterances were found very useful.

The following sentence patterns are identified.

1. Single word utterances.
2. Two and/or multiple word utterances.

#### 5.4.1. Single Word Utterances

General characteristics of the single word utterances were identified in the six subjects of the group. The single word utterances among the six spastic subjects of the study shared a few or some of the following characteristics.

1. The single word utterances were direct responses to questions asked.
2. They were repetitions after another speaker in several contexts ( $C_1$ ,  $C_2$  and  $C_4$ ).
3. They were perseveratory responses occasionally ( $C_1$ ,  $C_2$  and  $C_5$ ).
4. They are usually monotonous or non-inflected.



4. They are made phonologically simpler than the target word.
5. They are usually crucial linguistic items in the sentence.
6. They serve the need filling function when spontaneously spoken.
7. None or very little coherence between the stretches of single word utterances seen on spontaneous speech.
8. Either one word or part of it is chosen from among the target sentences.
9. They are interspersed with pauses.
10. Affixations, when occurred, are usually affected by way of deletion/distortion.

The single word utterances served the following syntactic functions. The illustrations are given earlier under individual sections.

1. The single word utterances were all object/event identification responses.
2. Subject only.
3. Object only.
4. Predicate only.

All these four functions were identified in all the six subjects of the spastic group.

Given a description as above, note that the spastic children exhibit the use of general functions found in normal spoken Kannada. The difference lies, however, in the fact that the mastery is totally inadequate - spatiotemporal relationships, interpersonal relationships, implicational sense assertion, negation, etc., are also expressed through these general functions of single word utterances in normal spoken Kannada. While the child has acquired the basic characteristic functions his mastery does not reveal many aspects of the same functions.

#### 5.4.2. Two and/or Multiple word utterances

The two/multiple word utterances are fewer in number. As given in the description of C<sub>2</sub> the two/multiple word utterance is similar in some respects to the two/multiple word utterance given by normal children in their early language development stage such as lack of affixation, lack of linking morphemes, meaning retrieval made possible mostly by implications etc. They are also different from the latter in some aspects. There is no pivotal and open class distinction seen in the constructions. That is, each utterance, either single/two/multiple word, functions as a sentence. As a consequence the two/multiple word utterances can be said to function as elliptical sentences/utterances.

The familiarity of the context of situation on the part of the listener generally makes comprehension of these two-word utterances possible. Other grammatical processes,

namely, transformational relations, etc., could not be identified in the data. No linking morphs between the utterances are seen. Thus, there are no discourse indicators seen generally when these utterances are self-initiated.

When these are responses to instigated speech, a cogency between the utterances can be established in almost all cases except C<sub>7</sub> in the spastic group.

In normal language, the syntax generally includes only the individual sentential structure. Thus the study of individual sentential structure becomes the focus of the grammatical study. Inter-sentential structure of independent sentences is conducted as study of discourse. In a study of CP speech, however, it seems that we should consider the study of relationship between independent sentences where short utterances serve as sentence, as grammatical study.

The rarer two/multiple word utterances reveal the following syntactic relations in the speech of the spastic children.

1. Object-predicate relationship.
2. Conjunction relationship.
3. Subject-predicate relationship.
4. Adjective-Noun relationship.
5. Object-subject relationship.

6. Subject-object relationship.
7. Reduplication or repetition.

These are described in the individual profiles.

Thus the special characteristics of spastic speech are that the spastic speech is more or less a response to others' prompting and not usually self-initiated comprising of mostly single word utterances, and aiming at object or event identifications. The syntax also includes rudimentary functions based on formal adjacency of utterances and contextual sense imposed on the utterances by the people around. Like the characteristics we noticed at the phonological and morphological level, in the syntactic level also the spastic child exhibits a knowledge of several functions mastered, however, inadequately,

## Part II

### Section II

#### 6, Speech and Language of Athetoids

##### 6.1. General

##### 6.1.1. Age

There were three athetoid subjects aged 6 years ( $C_3$ ), 10 years ( $C_8$ ), 10+ years ( $C_9$ ). On a scrutinization of all the three subjects, it was found that the phonological profiles of these three subjects improved with increasing age in the following manner.

1. Number of consonants found increased. Sibilants were not found in  $C_3$  while they were present in  $C_8$  and  $C_9$ . Some retroflex sounds such as the lateral  $\text{ɻ}$  and the sibilant  $s$  were not present in  $C_3$  and  $C_8$  but were found to be present in  $C_9$ . The continuant trill  $r$  was not found in  $C_3$  and  $C_8$  while it was present in  $C_9$ . The fricative  $f$  was not present in  $C_3$  and  $C_8$  while it was found to be present in  $C_9$ .
2. Reduction in distortion of sounds.
3. Improvement in the distributional patterns of vowels and consonants.
4. Improvement in the retention of syllables of target words.

5. Clarity of speech, rate of speech, quantity of speech output and intonations improved.
6. Affixation processes were found to improve in general.
7. Consecutive improvements in the use of gender concept.
8. Some improvements over the acquisition of pronouns, case suffixes/relations.
9. Consecutive increase in the use of conjunctions.
10. Improvement in the number and use of verbs.
11. There is an improvement in the use of number, adverbs, adjectives and tense from C<sub>3</sub> to C<sub>9</sub>, but no improvement is seen on these in the performance of C<sub>8</sub>.
12. Use of numerals, kinship terms, reduplicative forms.
13. Consecutive improvement in terms of interrogation and negation.
14. Syntactically, in terms of the speech output.
15. Increase in the number of single and two/multiple word utterances.
16. Improvement in the sentential relations.

As seen from the above, most of the items were achieved consecutively but some linguistic items appear to be isolated in terms of improvement such as conjunctions than

adverbs, adjectives or number. There seems to be, however, a lopsided improvement in favour of C<sub>9</sub> and hence, the change from C<sub>3</sub> to C<sub>9</sub> appears to be dramatic in terms of an enormous improvement of speech and language characteristics.

### 6.1.2 Severity

The three athetoid subjects of our study were all rated alike as moderately severe. They were all immobile and had athetoid movements of the limbs and the head. Since we did not have subjects having varying severity we cannot come to any conclusion regarding significance of severity as a variable. However, since the ratings indicated that these subjects are all belonging to the moderately severe group, one may investigate as to whether there was, even within this group, a varying speech and language picture. The answer to this question is that there was indeed, variation/improvement across subjects within this group, but as already pointed out this improvement could be attributed to age also.

### 6.1.3. Sex

The study had only one female in the athetoid group. The performance on speech and language skills did not show any difference compared to the other subjects in the group. However, an interesting picture emerges when the speech and language of the athetoid female child of our study is compared with that of the female subject in the spastic group. The athetoid female performed much better than the spastic female in all the speech

and language characteristics studied. Note that both the female subjects were aged above 9 years.

## 6.2. Phonology

6.2.1. All the vowels of the normal Kannada language were present in all the three athetoid subjects. In addition, they also exhibited certain characteristics in the vowels not found in normal Kannada. These include nasalization ( $C_3$ ) and unrounded front low vowels as  $\text{æ}$  as seen in  $C_9$  and the central high unrounded vowel  $\text{ɪ}$  that is there in  $C_3$  and  $C_9$ .

Abnormality of the vowels is reflected also in the distorted production and their distribution for all the three.

The phonemic status for vowels was difficult to establish because of irregularity, inconsistency, freevariation and distortion in production. To exemplify, a given vowel is not found on all occasions wherever necessary in a word and is substituted by one or the other vowel almost all the time in addition to the distortion, whenever present.

6.2.2. In terms of distribution of sounds the most noticeable significant point is that although the consonants are found in full strength in all the three subjects, their distributional patterns are different from those of normal Kannada. This is true for most consonants including stop consonants and the nasals. With regards to nasals the athetoid speech presents a picture of better acquisition in that there are four nasals .



viz.,  $\eta$ ,  $\eta$ ,  $n$ ,  $m$  seen in all the three subjects although  $C_3$  has two of these nasals ( $\eta$  and  $\eta$ ) heavily distorted. Sibilants, on the other hand, offer a mild improvement in that  $C_3$  and  $C_8$  do not have sibilants, whereas  $C_9$  has two, of which one retroflex is heavily distorted. Then, in general, athetoid subjects also do not have fricatives except  $C_9$  who has a sibilant in his repertoire. Alveolar lateral is found in all the subjects.  $C_9$  also has a retroflex lateral which is not distorted.  $C_3$  and  $C_8$  do not have a trill sound whereas  $C_9$  has heavily distorted alveolar trill. All the three subjects have front and back semivowels  $v$  and  $y$ . Note that the sound  $v$  is not articulated as a fricative but only as a glide.

Thus, in the case of athetoid subjects stop consonants (both voiceless and voiced) are better acquired and preserved whereas the fricatives are least acquired and preserved. When a sound involves a single and total constriction, the subjects perform better whereas for a sound which involves not a total constriction and stoppage but a narrow aperture maintenance of this position for a longer duration, the athetoid subjects do not perform well. Yet, the number of sounds of athetoid subjects is greater than the spastics and the normal Kannada tables for both vowels and consonants are better filled in, in the athetoid speech.

In spite of the freevariations, inconsistency and irregularity, all the subjects showed three major correspondences/overlapping between the sounds.

1. Inconsistent and partial correspondence, as in C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub>.
2. No correspondence at all, as seen in C<sub>3</sub> and C<sub>8</sub>.
3. Sporadic correspondence where any sound is substituted, as seen in C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub> .

The pattern of distribution of sounds changes in correspondence with the age. In C<sub>3</sub> all the vowels did not occur in all the three positions unlike in C<sub>8</sub> and C<sub>9</sub> which closely approximate normal Kannada for the distribution of vowels. However, in terms of the overall impression given by these three subjects the occurrence of additional vowels in the speech of these subjects as in C<sub>3</sub> and infrequent use of the u ending whose occurrence is normal in Kannada, the speech corpus retains the disordered appearance. Although the vowels are found distributed appropriately as in normal language, there was inconsistency in the use of these, as the vowels did not occur the same way wherever necessary as in normal language. That is to say that the athetoid words may not have the same vowels for the corresponding words in normal Kannada.

There are three characteristics of distribution of consonant sounds in the athetoid speech.

1. The distributional patterns found in the three subjects are different from those found in normal Kannada. For example, c occurs medially and only in gemination in C<sub>8</sub> (example

cited in individual section on C<sub>8</sub>) whereas it occurs in both initial and medial positions as well as in gemination in medial position in normal spoken Kannada.

2. Another picture of deviance is found when the target sound concerned is either modified deleted or substituted by another sound.

ju:t for ju:s 'juice'

(Illustrated from C<sub>8</sub>)

These are dealt with in detail in the individual profiles under phonology section.

3. All the three athetoid subjects have more consonant sounds than the spastic children. This has not resulted in reduction of simplification processes in all the athetoid subjects. However, only some of the simplification processes can be identified as regular patterns, while the other processes occur in a sporadic manner. The following are the simplifications in which some regularity could be established. The rest are all sporadic and no regularity could be seen.

1. Multisyllabic forms were reduced to monosyllables and, very rarely, disyllabic ones as in C<sub>3</sub> C<sub>8</sub> and C<sub>9</sub>.
2. Substitution/replacement of one sound by another regardless of whether the substituted sounds are available or not in their repertoire as seen in all the three subjects.

3. The non-identical clusters are made into identical clusters as in C<sub>3</sub> and C<sub>8</sub>.
4. The non-identical clusters are broken into separate, individual units although distorted as in C<sub>9</sub>.
5. Reversals of sounds in the given utterance as in C<sub>8</sub>.

One of the athetoid subjects C<sub>9</sub>, unlike the other CP children, had a process in which multisyllabic utterances are broken into several consecutive units of utterances which were separated by very frequent pauses usually after every syllable what is to be noticed here is the closer approximation of the C<sub>9</sub> utterance to the number of syllables of the target word. While this approximation is achieved or sought to be achieved, the inherent dysarthria does not allow a proper conjoining of syllables as done in normal language. The frequent pauses, which characterize the CP speech and which hamper the quality and quantum of speech and language produced, become a tool in the hands of the athetoid child in her efforts to approximate normal language. However the pauses between syllables are retained and this continues to retain the impression of the disorder.

### **6.2.3. Paralinguistic Features**

All the three athetoid subjects have a similar vocal characteristics in that they all have severe variation in pitch, seen as pitch breaks and harsh and hoarse quality.

All the subjects have very poor clarity of speech, although an increasing gradation of better clarity can be established for C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub> and this gradation could be correlated with increasing age. In all these subjects the clarity of speech is affected because of frequent abnormal pauses.

All the three subjects had a discontinuous, slower and laborious speech rate. All the three subjects had longer response time, longer pauses between syllables and inappropriate stress thus reducing the rate of speech. See for pauses in the individual profiles.

Quantity of speech output is inadequate in all the three athetoid compared to normals. The quality of speech could also be graded from C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub> in the increasing order of speech output. Note that this could also be attributed to the increase in age. One of the athetoid subjects, C<sub>9</sub>, initiates speech on his own whereas none of the other subjects in the study could do this.

All the subjects in the athetoid group had inappropriate intonations. However, the intonation presents a picture of growth in the sense that C<sub>3</sub> had no intonation, C<sub>8</sub> and C<sub>9</sub> had inappropriate intonations.

### 6.3. Morphology

Lack of affixation was seen in all the three subjects. Out of the three subjects, two older ones, C<sub>8</sub> and C<sub>9</sub>, had

affixation processes, although they were both inadequate and imperfect. Note that the processes did not extend to include all the morphological categories found in the speech of C<sub>8</sub> and C<sub>9</sub>. Again, although the two subjects demonstrated use of affixation process, the process was optionally resorted to. This was seen in case of nouns as well as verbs in both the subject and predicate slots. Pnis may be due to dysarthric constraints as well as that the affixation process is not fully established. The presence of the affixation process may be considered as an indication of its cognitive importance recognized by the child. This is more so when the child is able to overcome the dysarthric constraints and uses the relevant - affixes at times. However the picture is similar to the acquisition and use of other units of language such as the consonants where they may acquire stop consonants in full strength but may not have mastered all the characteristics of their use.

The speech corpus of the athetoid subjects of our study had the following morphological categories.

#### 6.3.1. Nouns

All the athetoid subjects had more nouns than verbs. They were all, however, concrete nouns, and kinship terms. The objects nouns were all terms denoting objects in the immediate environment; they were not self initiated and were used for object identification and not for reference. In all the three

language in athetoid subjects of the study.

#### 6.3.4. **Number**

Of the three athetoid subjects, C<sub>8</sub> and C<sub>9</sub>, the older-ones, had comprehension of the number concept in recognition tasks. C<sub>3</sub> and C<sub>8</sub> did not have any number suffixes in nouns or verbal constructions, whereas C<sub>9</sub> had the same in some of the verbal constructions only.

Note that in normal Kannada the nouns are unmarked for singular and marked optionally for plural whereas the verbs are obligatorily marked for plural in finite verb constructions. The data shows that C<sub>9</sub> is also beginning to acquire the number marking in verbal constructions.

#### 6.3.5. **Case**

C<sub>3</sub> does not use any case marker nor does he imply any case relations. Implication of case relations is to be forced on the single word utterances by the context of situation by the listeners.

C<sub>8</sub> and C<sub>9</sub> exhibit use of case suffixes partially (C<sub>8</sub> uses 2 overt case markers and C<sub>9</sub> uses 4 overt case markers). Both imply case relations of various sorts but they do not use at all the instrumental ablative and genitive case relations. This picture is similar to the picture available elsewhere wherein the subjects acquire some categories but never fully master their use in all the aspects. That C<sub>3</sub> did not have

overt case markers is explained by the lack of affixation process.

#### 6.3.6. Conjunction

C<sub>3</sub> does not use any markers for conjunction but comprehends one marker *matte* 'and', whereas C<sub>8</sub> shows the use of one marker, *a:me:le* 'then/and' and C<sub>9</sub> uses three markers *matte* 'and' , *a:me:le* 'then' and *-u* 'also' respectively. The conjunctions are not used at all in verbal constructions in any of the subjects. Note that the comparatively better performing child C<sub>9</sub> also does not have this.

#### 6.3.7. Verbs

All three subjects use less number of verbs compared to nouns.

Of the three subjects, C<sub>3</sub> the youngest has fewer verbs than C<sub>8</sub> and C<sub>9</sub>.

Positionally C<sub>3</sub> uses verb only as a single word utterance whereas C<sub>8</sub> and C<sub>9</sub> use them both as single word utterances as well as the second item in a two word utterance.

The use of verb forms in C<sub>3</sub> and C<sub>8</sub> appear as imperative forms because of the lack of affixation.

All the athetoid subjects have difficulties in inflecting verbs for tense and PNG. While this is the case uniformly with C<sub>3</sub> and C<sub>8</sub>, C<sub>9</sub> has occasional use of finite verb



forms. The verbs used by all the three subjects relate to actions performed either by themselves or as seen in the pictures.

Among the subcategories of verb transitives are used by all the three subjects, intransitive by C<sub>8</sub> (occasionally) and C<sub>9</sub> only. Reflexives are used by C<sub>9</sub> only. No other subcategories of verbs are used.

C<sub>9</sub> shows evidence of the use of finite and non-finite verb forms while such indication is not seen in C<sub>3</sub> and C<sub>8</sub>. The details are presented in the individual profiles.

#### **6.3.8. Tense**

Of the three athetoid subjects, C<sub>3</sub> and C<sub>8</sub> do not show any tense affixation at all. C<sub>9</sub> showed the past and non-past distinction occasionally. Note that even C<sub>9</sub> has not mastered the tense distinction completely as seen in the lack of consistent and regular usage of the tense affixation in the verbal constructions.

#### **6.3.9. Numerals**

Among the three subjects, C<sub>3</sub> only repeats cardinal numbers from 1-3 in mnemonically, C<sub>8</sub> uses numbers from 1-10 correctly but not beyond, whereas C<sub>9</sub> uses cardinal numbers correctly. In spite of the better mastery over numerals C<sub>9</sub> does not use ordinal numbers nor can he repeat more than three digit numbers.

### 6.3.10. Adverbs

C<sub>3</sub> does not use any adverbs of place, manner or time; C<sub>8</sub> was found to use only one adverb of location/place and C<sub>9</sub> exhibited the use of all the three kinds of adverbs very occasionally. Note that there is a hierarchy in the development of adverbs seen across the three patients in the increasing order of age. Thus C<sub>3</sub> has no adverbs, C<sub>8</sub> has only one and C<sub>9</sub> has all the three types but seen very occasionally. Hence an inadequate development is seen even in the comparatively well developed speech and language of C<sub>9</sub>.

### 6.3.11. Interrogation

Among the three athetoid subjects, C<sub>3</sub> does not use any interrogation markers, C<sub>8</sub> uses only one interrogative marker e:nu 'what?' and C<sub>9</sub> uses four interrogative markers. Even so C<sub>9</sub> does not use many other important interrogative markers. All the three subjects responded to interrogation but in the use of interrogation all the three exhibited an inadequacy in the mastery of interrogation in the descending degree from C<sub>3</sub> to C<sub>9</sub>. Note also that a hierarchy of increasing number of interrogative markers can be seen from C<sub>3</sub> to C<sub>8</sub> to C<sub>9</sub>, although none has mastered the acquisition of interrogation.

### 6.3.12. Negation

C<sub>3</sub> uses one negation marker, C<sub>8</sub> uses three markers and C<sub>9</sub> uses four of the negative markers. All the three used some form of be:da, modal negative, but C<sub>8</sub> used only two more

and C<sub>9</sub> used only three more negation indicators all of them static, negative or modal negatives. Note that a hierarchy of increasing mastery of negative as well as a decreasing order of inadequacy could be seen among the three athetoid subjects.

#### 6.3.13. Adjectives

C<sub>3</sub> does not use any adjectives of quality. C<sub>8</sub> uses a few numbers and basic colour terms but she does not use them as adjectives in her two word utterances, whereas C<sub>9</sub> uses colour and number adjectives only. C<sub>9</sub> uses both colour and number adjectives but very occasionally so although he identifies the colours and two digit numbers on a recognition task.

#### 6.3.14. Colour Terms

C<sub>3</sub> does not use colour terms at all, C<sub>8</sub> uses all basic colour terms except for her grouping or circumlocuting behaviour in naming them; C<sub>9</sub> uses the colour terms correctly. Thus C<sub>9</sub> exhibits a better mastery over the colour concept than C<sub>3</sub>, and C<sub>8</sub>. Here again one can notice the betterment of the language acquisition with increase in age.

#### 6.3.15. Kinship Terms

Among the three athetoid subjects, C<sub>3</sub> uses three kinship terms for address only, C<sub>8</sub> uses four kinship terms for both address as well as reference, whereas C<sub>9</sub> uses many kinship terms both for address as well as reference. Thus, there is a hierarchy seen in the acquisition and use of kinship terms

from C<sub>3</sub>-C<sub>8</sub>-C<sub>9</sub> which is in consonance with the other findings.

#### 6.3.16. Reduplication

All the athetoid subjects, C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub> showed reduplication. C<sub>3</sub> repeated syllables irrespective of the position of the syllables, C<sub>8</sub> repeated one or two syllables or the whole word sometimes whereas C<sub>9</sub> showed reduplication of initial syllables. Thus no hierarchy can be worked out as regards reduplication.

#### 6.3.17. Onomatopoeia

C<sub>3</sub> showed no onomatopoeic forms in consonance with the poor development of speech and language whereas C<sub>8</sub> showed certain onomatopoeic forms although these were used only as the form of indicators of the cries of animals but not as reference terms for the animals. C<sub>8</sub> did not show any onomatopoeic forms at all. One has to make a distinction between the absence of onomatopoeic forms in C<sub>3</sub> and C<sub>9</sub>. The absence of onomatopoeic forms in C<sub>3</sub>'s meagre repertoire can be explained on the basis of general inadequacy of language items whereas C<sub>9</sub> showed no onomatopoeic forms because probably he felt no need for the use of the same as he has access to all the names of the referants of these onomatopoeic forms such as cat (identified by the cry mew), dog (bau bau), bus (bu:) etc.

#### **6.4. Syntactic Profile of Athetoid Subjects**

Majority of utterances of C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub> are single word utterances. The three subjects show an improvement in the syntactic characteristics with an increase in age. Thus C<sub>3</sub> only has single word utterances while C<sub>8</sub> and C<sub>9</sub> have a few two/multi word sentences. However the inappropriate and abnormally long pauses and severe dysarthria, especially in C<sub>3</sub> make it difficult to identify the utterance as one or two word sentences.

Taken C<sub>3</sub> and C<sub>8</sub> together, apart from C<sub>9</sub>, the athetoid subjects have a very poorly developed syntax while C<sub>9</sub> has a better syntactic ability on par with the spastic children in the study in the sense that he has better speech output, increased two/multiple word utterances as well as sentential relations. Even in C<sub>9</sub>, because of the phonological disabilities (segmental as well as suprasegmental), one needs a thorough knowledge of normally spoken Kannada as to what constitutes sentences (as described in the syntactic profile section of Spastic group) to decipher the utterances and classify them as sentences or parts of sentences.

The following sentence patterns were identified.

1. Single word utterances.
2. Two word utterances.

##### **6.4.1. Single word utterances**

The 3 subjects in the athetoid group showed the

following characteristics.

- 1a. They are repetitions of another speaker's speech.
- 1b. They are object/event identification utterances.
2. They have unnatural and very inconsistent (changing very often) stress on the syllables.
3. They are intermittent with prolonged and abnormal pauses.
4. They are extremely unintelligible because of the phonological deletions and simplifications.
5. There is an absence of any linking morphs between the single word utterances. This was especially significant in the case of C<sub>3</sub> and C<sub>8</sub> than C<sub>9</sub>.
6. C<sub>3</sub> showed no grammatical marking in these single word utterances whereas C<sub>8</sub> showed partial and C<sub>9</sub> a comparatively much better grammatical inflections, in the group.
7. All subjects showed simplification/distortion/deletion of sounds. A special phonological characteristic was the reversals of sounds seen.
8. Discourse study was not at all possible in C<sub>3</sub> difficult in C<sub>8</sub> but comparatively better in C<sub>9</sub>.

The single word utterances had the following communicative functions only.

1. Object identification function.

2. Perseverative function.
3. Need-filling function
4. Subject only
5. Functioned as object only.
6. Functioning as predicate only

This was not seen in C<sub>3</sub> but seen occasionally in C<sub>8</sub> C<sub>9</sub> exhibited a good number of these.

#### 6.4.2. Two/Multiple word utterances

The athetoid subject C<sub>3</sub> showed no two/multiple word utterances while C<sub>8</sub> showed a few two word and C<sub>9</sub> used a better number of two-three word utterances. C<sub>9</sub> even exhibited occasionally 4-word utterances also.

In terms of grammatical contiguity between utterances, C<sub>3</sub> reveals no coherence whereas C<sub>8</sub> and C<sub>9</sub> show some cogency between the utterances. The 2-3 utterances at a stretch resemble elliptical sentences because of poor grammatical marking in case of C<sub>8</sub> and C<sub>9</sub>. In spite of this correct grammatical contiguity can be established by accepting the single word utterances at a stretch as constituting discourse. The coherence across utterances is present when the utterances are continued replies to questions or even when self-initiated as in C<sub>9</sub> (see individual profiles).

The two/multiple word utterances have the following functions in C<sub>8</sub> and C<sub>9</sub>'s speech.

1. Subject-predicate relationship. .
2. Object-predicate relationship.
3. Subject-object relationship.
4. Adjective-noun relationship.
5. Object-subject relationship.
6. Conjunction relationship
7. Reduplication or repetition.

These relationships are illustrated in individual cases of  $C_8$  and  $C_9$ . The subject  $C_9$  performs better than  $C_8$  in terms of the length of utterances as well as with more number of syntactic relationships.



## Part III

### Section I

#### 7. Comparison of Spastics and Athetoid Groups

The distinction that we make here in our study between spastics and athetoid speech is hard to identify in the respective speech behaviour at first instance itself. The distinction is based on finer variations not easily and readily made out. Secondly, these finer variations may or may not have direct consequence for diagnosis and therapy. Generally speaking, the neuromuscular distinction that one generally makes between athetoid and spastic is not extended to cover language and speech in current practice. This also works against recognition of these finer differences. Also in a large number of cases of CP, even at the neurological level, the subjects identified as predominantly spastics may also have athetoid features and vice versa. This difficulty with clear demarcation for obtaining pure cases gets reflected in the speech and language behaviour as well. Thus, the confusion we encounter in the differentiation of speech and language characteristics between the two not so finely distinguishable groups finds support from the previous studies (Berry and Eisenson, 1962, and Singer 1976).

In the following section, an attempt is made to identify the differentiating characteristics, however, minimal in terms of the speech and language characteristics examined in detail for each group so far. The details of these observations are given in the individual profile sections as well as the

description for the groups.

## 7.1. General Variables

### 7.1.1. Age

Age as a significant variable for speech and language abilities gave a confusing picture in spastics while it was found to a significant variable in case of the athetoids. While there was a uniform improvement with age (4-10 years) in terms of the speech and language abilities in athetoids, there was a steady increase upto the age of 8 years only in spastics. An older patient C<sub>7</sub> in the latter group was found to perform on par with the youngest child C<sub>1</sub> in the group.

The improvement in speech and language abilities included the following.

The speech characteristics, namely, paralinguistic features such as clarity of utterances, rate of speech output, quantity of speech output, the segmental features such as number of consonants, retention of syllables, distribution and phonological distortions, the morphological categories such as pronouns, case, verbs, adjectives, numerals, adverbs, interrogation and negation and syntactic features such as the number of single and two word utterances, the sentential relations, ability for discourse, length of utterances and self-initiation of speech. Compare, for example, the correct use of pronouns in C<sub>9</sub> with incorrect use of the same in all the other subjects.

Thus, age-wise improvement was noticed in the athetoid group in terms of both quality and quantity of speech and language characteristics. Whether age would continue to be a significant factor contributing in this manner for acquisition of speech and language skills all through the life span is to be seen yet.

#### **7.1.2. Severity**

Severity was found to play a significant role to a certain extent in case of spastics but it was not found to vary in case of athetoids. All the three athetoid children belonged to the moderately severe group of the disability. The performance in terms of speech and language characteristics also improved from C<sub>3</sub> to C<sub>8</sub> and C<sub>9</sub> but this could be attributed to improvement in age since there was no variation in severity of the neuromuscular disability among C<sub>3</sub>, C<sub>8</sub> and C<sub>9</sub>, while there was an increase in age from C<sub>3</sub> (6 years) to C<sub>8</sub> (10 years) and C<sub>9</sub> (10 years). Since there was no variation in terms of severity among the three athetoid subjects we cannot conclude regarding the significance of severity as a variable.

#### **7.1.3. Sex**

As there was only one female each in the two groups studied it is not possible to conclude regarding the role of sex as a significant variable. However, it is significant to note that the female in the athetoid group C<sub>8</sub> performed much better with due consideration of age and severity of the problem

while C<sub>7</sub> in the spastic group although oldest (age 10 years) in the group performed on par with the younger age group of 7 years only.

## 7.2. Phonology

7.2.1. There is a some variation between the spastic and athetoid groups at the phonological level. All the vowels found in normal spoken Kannada were present in children of both the groups. All the 'cardinal' vowels are acquired by both the groups. While the picture of 'cardinal' vowel patterns were found uniform in the spastic group, the athetoid group showed some abnormalities in terms of the vowel number and distribution, such as the presence of nasalized vowels, half central vowels as well as the distribution of all these vowels. While the distribution of these vowels was almost similar to normal speech in spastics it was highly disturbed in athetoids because of the irregularity, inconsistency, freevariation and distortion in production.

In terms of consonants, while there were not many sounds present in spastics, the athetoids showed the presence of nearly all the sounds found in normal Kannada. Thus, while the spastic children..showed difficulty/absence of the retroflex stops, palatal affricates, some nasals, sibilants and trills, or have them heavily distorted when present, athetoid children had them all in their repertoire. These phonological distortions due to dysarthria, the neurological disability in

articulating sounds affected the intelligibility of speech in both the groups. Although both groups had distortion in the production of the sounds, the degree of distortion was mild to moderate in spastics but severe in athetoids.

While there is a stable picture seen in terms of sound production (even with distortion and mild inconsistency) in spastics, athetoids showed severe inconsistency and a highly unstable picture of production of sounds. This gave rise to a picture of greater unintelligibility in athetoids than in spastics.

While the use of the consonants in terms of distribution of sounds simulated normal Kannada in spastics, it was severely affected in athetoids, i.e., the sounds were not found matching with the normal utterances in terms of the presence of sounds in initial, medial or final position in a given utterance.

Thus, in spite of the greater number of sounds present in athetoid speech than in the spastics, the use of these sounds was highly abnormal in athetoids while it simulated normal phonology in spastics in spite of the picture of inadequacy seen even in the latter group.

Thus the phonological disabilities seen in both the groups. Although there is a more stable picture of phonological disability in spastics than athetoids, it was found to be present even in older cases in this spastics group. Contrarily, the phonological disability was found reduced in the oldest child of the athetoid group. Thus we have reasons to

speculate that phonological disability is a stable feature in spastics even with increasing age. One of the chief characteristics of CP in Kannada is seen to be an inability of the children to produce aspirated sounds, fricatives, sibilants, trills and retroflex sounds. By an extrapolation one may also suggest that this is a characteristic shared in other Indian languages as well, which use these sounds. These sounds may be totally absent or used with heavy phonological distortions in their speech giving rise to dysarthria and poor intelligibility.

#### **7.2.2. Paralinguistic Features**

An extreme variation in vocal characteristics characterizes the speech of athetoid children while the spastic speech gives a more stable picture even in inadequacy and inappropriateness.

While all the spastic subjects had low pitched, loud voice with hoarseness, all the athetoid children showed severe and extreme variations in pitch (pitch breaks), varying loudness and hoarse as well as severe harsh quality of voice.

All the spastic subjects had poor clarity of speech while athetoids exhibited very poor clarity of speech. This picture of greater severity was because of the frequently changing vocal characteristics.

All the spastics as well as athetoid showed poor rate of speech. While that of the spastics simulated normal speech, the athetoids showed slower and bizarre rate of speech. This was because of the highly abnormal and inconsistent pauses.

The spastics exhibited a picture of reduced intonations more than a picture of inappropriateness while the athetoids showed deviant and inappropriate intonations. .

Both the groups showed poor speech output both in terms of quality and quantity. While three 6-8 year spastics out of six subjects showed better speech output in terms of quality and quantity only one of the athetoid (aged 10+ years) out of 3 subjects showed better speech output in terms of quantity and quality.

All the subjects including both the groups had longer response times and longer pauses between syllables but the athetoid group also had in addition, inappropriate and irregular pauses, stress and rate of speech.

In conclusion, the spastic speech, although inadequate in comparison with the normal spoken Kannada, exhibits a tendency towards approximation of the phonology of normal spoken Kannada in terms of distribution of speech sounds both vowels and consonants. The athetoid speech, on the other hand, which has more number of sounds than the spastic speech, exhibits a tendency towards distributional patterns of sounds different from the pattern of distribution found in normal spoken Kannada.

The inadequacy of the spastics speech relates greatly to the lesser number of sounds employed in it, whereas the inadequacy of the athetoid speech relates greatly to the distributional patterns of sounds. It is this pattern which gives the more abnormal and bizarre picture of phonology in athetoids than spastics. In addition, the vocal characteristics that varied greatly in terms of pitch, loudness and quality of voice, clarity of speech, rate of speech, use of inappropriate and deviant intonations, poor speech output and longer and inconsistent pauses and stress patterns contributed greatly to a picture of poorer intelligibility and dysarthria in case of athetoids than spastics in the study.

### 7.3. Morphology

Both the spastic and athetoid groups showed inadequacy as well as deviance in the use of morphological categories. There was not significant differences or variation in terms of morphology and syntax unlike in phonology. Lack of affixation process was a chief characteristic of both the groups. Although none of the six spastic subjects showed a complete picture of affixation, all of them including the youngest C<sub>1</sub> and older C<sub>6</sub> made (while C<sub>7</sub>, the oldest did not) attempts at affixation in their speech. In athetoids, C<sub>3</sub> did not have any affixation while C<sub>8</sub> and C<sub>9</sub> showed partial but increasing processes of affixation.



None of the subjects in either group showed mastery of any grammatical categories fully.

While all the spastic subjects had an adequate comprehension of grammatical categories, thus rendering their language comprehension much better than they could express, in athetoid subjects, however, comprehension was affected in both C<sub>3</sub> and C<sub>8</sub> while the older child C<sub>9</sub> presented good comprehension.

The available literature indicates that between the spastics and athetoid the spastics perform better than the athetoids in speech and language skills. References were made to this position already. The picture that we have also supports the same view, if we compare the C<sub>3</sub> and C<sub>8</sub> in the athetoid group, excluding C<sub>9</sub> the oldest child in the study, with the group of spastics. C<sub>9</sub> performs comparatively well and on par with the C<sub>4</sub>, C<sub>6</sub> and C<sub>5</sub> who are the much better subjects in the spastics group. The spastics tend to perform better in the following areas apart from phonological distribution. Acquisition of morphological categories such as morphological strategies to derive lexical items, pronouns, gender distinction case affixation, conjunction, use of verbs, number, numerals, adverbs, interrogation, adjectives and onomatopoeic forms. In these there was a definite improvement over the spastic subjects of comparable age. However, in terms of tense, negation, kinship terms & reduplication the two groups did not show significant difference.

None of spastics, the better group, revealed complete mastery in terms of acquisition and use of the above morphological categories. For example, while two of the athetoid subjects did not have pronouns, all the spastic subjects demonstrated the use of a few pronouns although in a limited manner. That is, all the pronouns are not used even in the well developed cases,  $C_5$ ,  $C_4$  and  $C_6$  in the spastic group, and by  $C_9$  in the athetoid group. Some are acquired and some are not. This is similar to the overall picture in which both the spastic and athetoid subjects reveal an availability of a category but not all the components that go into the mastery of the category. Secondly, even when a category is available to them, they often do not use them revealing that these patients either due to dysarthria or other cognitive reasons do not attach much importance for certain categories for communicative purposes.

With limited phonology as in the spastic and athetoid groups, using certain lexical categories such as onomatopoeia and reduplication as strategies one could create more lexical items. That this ability is not resorted to by any of our subjects in the two groups indicates some inadequacy at the cognitive level itself.

The retention of nouns predominantly and verbs partly both by spastics and athetoids in their discourse indicates the significance of immediacy and concreteness in their speech. Relevance of immediacy for choice; use and retention of words

is clearly seen in the hierarchy of use of kinship terms. All the subjects in their speech, however, minimal, spoke of objects and individuals present and very rarely about objects and individuals not present. This points out again to an inadequacy of cognitive nature rather than to motor disability seen such as in dysarthria.

The partial acquisition of morphological categories and their inadequate usage was common to both the groups of CP, namely, spastics and athetoids. There was, however, a quantitative predominance on the part of spastics over athetoids in terms of morphological affixation. While even the youngest subjects  $C_1$ ,  $C_2$  of spastic group showed better acquisition of these processes, the youngest in the athetoid group  $C_3$  showed very poor or no ability for morphological processes. While the older  $C_8$  in the athetoid group performed on par with the much younger spastic subjects  $C_1$ ,  $C_2$ , the oldest  $C_9$  in the athetoid group performed on par with the older subjects in the spastic group  $C_4$ ,  $C_5$  and  $C_6$ . Note also that  $C_9$  was the oldest in the study including both the groups. There is no uniform increase in the various morphological categories. Significant predominance of certain categories over the others could not be established in the comparison as a result of confusing or mixed picture that emerged.

Expressive language deficits were glimpsed in both spastics and athetoids. These language deficits included

longer response time, (expressive aphasic tendencies?) word finding difficulty in naming, and pronominal reversal. These were, however, not studied in detail.

#### 7.4. Syntax

The spastic speakers did not show an increase in syntactic abilities with age while athetoid subjects showed a linear increase in syntactic characteristics with increase in age. This increase was in terms of the number of one and two/multiple word utterances as well as the sentential relations.

There were no significant variations between the two groups in terms of syntactic abilities.

Both the groups used more number of single word utterances and less number of two/multiple word utterances. There was a mild quantitative improvement seen in spastics compared to athetoids. While many spastic subjects showed better syntactic abilities, C<sub>3</sub> and C<sub>8</sub> in the athetoid group showed very poor syntactic ability. C<sub>9</sub>, however, in the athetoid group, performed on par with the older subjects C<sub>4</sub>, C<sub>5</sub> and C<sub>6</sub> from the spastic group in terms of the syntactic abilities such as increased production of single word utterances and two word phrases, the sentence/phrase patterns seen and the sentential relations/functions, the length of utterances and discourse ability. It is also worthwhile to note that the discourse ability was found better in C<sub>9</sub> the oldest in the whole of the CP group, including spastics and athetoids to which C<sub>9</sub> belongs.

## Part III

### Section II

#### 8. Cerebral Palsied as a Grouo

We could make the following observation based on the results of speech and language analysis in the study of CP children.

8.1. Speech and language deficits and deviances are significant features of the abnormality in Cerebral Palsy. These features help identify the disability in terms of specific combinations of linguistic and paralinguistic features, although each child should be treated as an individual patient for therapeutic habilitation owing to a wide variation seen between each of the nine subjects in the study.

8.2. Given the same degree of neuromuscular severity, age can be a significant variable as seen in the improvement in terms of speech and language characteristics. Severity also can be considered as an important variable in that mild cases perform better than the moderately severe group of cases.

8.3. Delayed speech and language is prominent in the language disabilities seen in the Cerebral Palsied group. This agrees with most studies in literature (Berry and Eisenson 1962, Irwin 1962, 1967, Kamalashile 1975, Singer 1976).

It was also found that the development in speech and language abilities did not simulate the normal sequential pattern. No correspondence can be established between speech and language development of Cp children and normals for the following reasons: This, presumably, also indicates the basic cognitive inadequacies.

- (i) There is no open-pivotal class distinction seen even in the oldest subject in the study.
- (ii) Within the same subject there is no uniformity of increase in the length and complexity and variety of utterances.
- (iii) There is no proper distribution of phonological and grammatical units and there is no tendency towards distribution of phonological and grammatical units in the same proportion as found in normal language. One linguistic category such as nouns, kinship terms, for example, is found more in number than other categories. Thus, some of the linguistic units are better acquired or more complex while the others are not.

Thus, there is no progressive and steadfast increase in terms of length and complexity of utterances as seen in normal development of speech and language.

8.4. The individual patterns seen in terms of speech and language abilities correspond to a broader profile of the group as a whole, namely, spasticity and Athetosis. This finds

agreement with the previous findings in literature (Platt, 1980a).

8.5. . The differences between the different Cp groups, namely, Spasticity and Athetosis, were found significant at the phonological level and not significant at morphological and syntactic levels. The spastics, in general, tended to perform better quantitatively than the athetoid subjects, especially the younger subjects in the group.

8.6. Dysarthria and poor intelligibility are prominent features of speech in Cerebral Palsy. Although dysarthric errors result mainly from the damage to the functions of speech musculature and the poor articulatory efforts, they appear to be due also to inadequacy at the cognitive level leading on to a phonological disability, as, for example, seen in the deviant distribution of speech sounds in the Cerebral Palsied speech. The details are given in the individual descriptions. Although there were no strict measures, spastics were found to perform better in terms of articulation, and intelligibility than athetoid children. Our observation seems to correspond with the others in the literature Irwin, 1967, Irwin 1972, Wolfe 1950, Clark and Hoops 1980.

8.7. Phonological disability is found even in older cases of CP in the study. Both spastics and athetoids exhibited phonological disturbances in terms of absence or difficulty with sounds and deviant distributions of speech sounds. That

the spastics tended to perform better and had a more stable picture than the athetoids was seen in terms of the phonological disturbances even with increasing age.

8.8. In terms of specific sound mastery athetoids tended to perform better than spastics in that more number of difficult sounds like retroflex fricatives and sibilants were found in athetoids while they were absent in spastics. In distribution and use of their phonological repertoire, however, athetoids were less efficient compared to spastics. This discrepancy is in agreement with others reports (Byrne, 1959, Irwin 1967 and 1972). Thus the phonological characteristics were seen both as differentiating (between subgroups such as spasticity and athetosis) factors as well as demarcating features of CP.

8.9. Vocal characteristics (of spastic and athetoid speech described by Berry and Eisenson (1962) are found valid even in our study, the spastics had low pitched, loud voice with hoarseness and athetoids showed extreme variation in pitch, varying loudness and harsh quality of voice. Both the CP groups had vocal deficits with the spastic group performing slightly better than the athetoids. Thus our study agrees also with the finding that athetoid speech tended towards slower, more jerky speech than the speech of spastic group and it had more loudness more low pitch and breathiness (Rutherford 1944).)



8.10. Morphological affixation was severely affected in both spastics and athetoids. Even in cases where it was found, inadequacy characterized the acquisition as well as the use of morphological suffixes. Because of the lack of affixation the semantic notions involving case relations, tense, gender, number, time, manner, location, and other qualitative characteristics are not indicated explicitly./ The interpretation of such notions is left to the imagination of the listeners based on the context and knowledge of the target utterance/ • utterances.

8.11. The CP speech does not also distinguish clearly between various grammatical categories such as nouns, verbs, adverbs, adjectives and other categories. Nouns are, however, found more than verbs and other categories.

8.12. Single word utterances are found more than two or multiple word utterances.

8.13. The utterances are heavily simplified/distorted/deleted by phonological modifications/operations due to dysarthria caused by the neurological disability as well as by the cognitive inadequacy that could be due to the neuromuscular disability the leadip to inadequate functioning as well as restricted exposure to the environment.

8.14. Besides the delay in speech and language development and inappropriate use of acquired items there were also some very specific language defects noticed such as the following:

Language comprehension was found to be much better than expression in all the CP children studied thus corresponding with the findings in literature (Irwin 1966). On recognition/comprehension the children tended to perform much better while expression was affected in a conspicuous manner. Expressive language difficulties were seen in the form of longer response time that could not be attributed to articulatory difficulty since they could come out with same responses such as naming an object/action, quite quickly at times. This difficulty seemed to be one of central language processing. The word-finding difficulty in the form of groping behaviour was other expressive language difficulty seen. The groping behaviour could not be simulated to stuttering behaviour also as these instances were also found in subjects who did not show any stammering behaviour otherwise. Traces of pronominal reversal neologisms, perseverations were also seen in some of the children. The existence of these phenomena readily find wide agreement with the findings reported in literature (Morley 1973, Lencione 1967 and others). These, however, were not studied in detail.

8.15. The CP children in our study spoke very less in a given amount of time. The speech output was extremely limited and consisted mostly of single word utterances. Whenever two/multiple word utterances were seen they were in the form of elliptical/telegraphic utterances with only nouns or verbs disjoinedly presented. This is in agreement with Singer's (1976) findings that there are both qualitative and quantitative

differences in CP on a comparison with normals. These brain-injured children used lesser number of appropriate and grammatical forms.

We found that incomplete utterances were more predominantly found than the complete sentences in the speech of the Cerebral Palsied. Both spastics and athetoids used single word utterances more than the two/multiple word disjointed utterances. Note that this finding is against the observations made by Irwin (1966) regarding length of utterances in Cerebral Palsied children. He had found that the mean number of words per sentence was significantly larger for the complete than for the incomplete utterances. He had also found that the number of complete declarative sentences was greater than that of incomplete sentences.

Thus, we make the distinction that "Cerebral Palsied" have specific speech and language characteristics that exhibit retarded, deficient as well as defective development in term's of acquisition and use of phonological, morphological and syntactic structures.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

This study aimed at an identification and description of speech and language abilities of the Cerebral Palsied, a group of brain damaged children with neuromuscular disability as a prominent symptom. Nine Cerebral Palsied children falling under two types, namely, Spasticity. and Athetosis were studied (six and three subjects respectively with one female in each group). The subjects ranged in age from 4 to 10+ years. All the children were quadriplegics with the upper limbs slightly better than the lower ones. The degree of severity of the neuromuscular disability was diagnosed as mild-moderate by the neurophysicians/paediatic neurologists. All the children had average or above average intelligence, and normal hearing. The children came from a middle socio-economic background. The speech and language abilities were studied by a subjective evaluation and recording of spontaneous and elicited speech samples by tape recording and diary keeping. The data obtained was transcribed with a broad IPA transcription. This was also aided by diary keeping, observation and testing by the investigator. A detailed description of each case of nine children was made and the profiles of the two groups of Cerebral Palsied children were drawn.

The analysis was made in terms of phonological features – linguistic and paralinguistic, selected morphological features, and selected syntactic abilities. These speech and language characteristics were examined separately for the two groups, namely, Spasticity and Athetosis after working out individual profiles for each subject. A comparison of the two groups was then made. Also the general characteristics CP as a whole in terms of speech and language characteristics were identified.

Thus, besides a description of the speech and language behaviour of each CP subject under study, an intra and inter group comparison of the spastic and athetoid groups. The general observations regarding the whole group of Cerebral Palsied were also made.

The results in brief can be summarized into the following points.

1. Speech and language deficits and deviances are significant distinguishing features of the abnormality in Cerebral Palsy.
2. Both the groups, spastics and athetoids present speech and language deficits/defects.
3. Dysarthria and poor intelligibility are the main speech problems of the Cerebral Palsied.

4. While delayed speech and language development characterize the disorder in the Cerebral Palsied, there are other specific linguistic characteristics as well.

The language of the Cerebral Palsied is marked by the occurrence of only a few limited number of grammatical categories and limited lexicon, besides inadequate and deficient phonology. The categories available are not acquired and used to their maximum extent appropriately. Even among the categories, no single item/unit (none of any grammatical categories) whether of phonology, morphology or of syntax is fully mastered.

5. Besides limited language output, absence of linguistic forms deficient/inadequate language abilities, there are also several language abnormalities seen such as expressive aphasic tendencies as evident in longer response times, word finding difficulties, use of circumlocutory expressions, disfluency in speech, perseveration, pronominal reversal (confusion in use of pronouns) and neologisms (occasional use of new terms). These need to be explored in detail.
6. Language comprehension is much better than expression.
7. There are differences between the two groups of Cerebral Palsied, namely, Spastics and Athetoids in terms of speech and language abilities.

8. The differences between the two groups are highly significant at the phonological level while they are not so very significant at the morphological and syntactic levels.
9. Spastics tend to have better and more stable speech and language characteristics than the athetoids although they are deficient.
10. Phonological deficits are more stable features than the grammatical ones with the growing *CP* children particularly - in Spastics.
11. As the age advances, the language anomalies seem to be rectified only partially, qualitatively and quantitatively, (in terms of the linguistic categories acquired and used although complete mastery may not be achieved) in terms of development/deviance as seen on a group with comparable severity factor.
12. The speech and language defects of each of subjects studied are found to correspond with the overall group patterns identified by this investigation, in spite of the wide variations noticed in terms of speech and language characteristics.

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## Appendix

### 1. Format for assessment of Speech:

#### An Evaluation of the Structure and Function of Speech Mechanism

Date

Name

Age

Type of CP

I Comfortable position in which the speech evaluation was done: lying in prone/supine position/side-lying position/sitting with support/sitting without support.

#### II Evaluation of the head, neck and shoulder movements associated with speech

(a) Can be dissociated from speech movements: Yes/No

(i) Head movements from shoulder movements: Yes/No

(ii) Shoulder movements from head movements: Yes/No

(b) Associated and simultaneous with speech movements: Yes/No

If yes, description:

(c) Voluntary Movements

(i) Shrugging

(ii) Flexing:

To the right:

To the left:

(iii) Raising the Head:

In prone position if lying:

In supine position if lying:

(iv) Lowering the Head:

In prone position if lying:

In supine position if lying:

(v) Lateral movements of the Head:

To the right:

To the left:

(vi) Any other:

### III Breathing Patterns

#### a. Duration

Inspiration:

Short:

Long:

Expiration

Short:

Long:

Inspiration longer than expiration:

Expiration longer than inspiration:

b. Type of Respiration

- Abdominal
- Thoracic
- Thoracic-Abdominal

c. Other Anomalies

- Irregular cycling
- Rib-flaring
- Thoracic-abdominal opposition
- Shallow-breathing
- Noisy/Non-noisy breathing

d. Breathing Rate .. ..

No.of inspirations/minute

e. Voluntary Activities

- Can hold breath voluntarily
- Can extend duration of expiration:  
If yes, by how many seconds?

IV Phonation: Normal/Abnormal .

- a. Can voluntarily phonate: Yes/No
- b. Ability to initiate phonation: P/A
- c. Ability to interrupt phonation:
- d. Ability to sustain phonation:

Deviance

Relaxed!

Strained:

Initiated with difficulty:

Laryngeal Spasms: p/A

Abductor spasms:

Adductor spasms:

Sudden variations in laryngeal tension: P/A

Phonation Duration

Ability to phonate /a/

" . " " /i/

" ' " " /u/

No. of secs, he can sustain each:

Description

Pitch: high/low

Pitch breaks: P/A

Inflection : Normal/Monotone/other

Loudness: loud/soft

Can vary: Yes/No

Quality

Harshness/breathiness/Hoarseness

Masality: p/A

Description of quality

v Oral Mechanism: Appearance and Function

Structure	Position at rest	Appearance on Examination
Lips		
Jaw		
Teeth		
Tongue		
Cheek		
Hard Palate		
Soft Palate		
Uvula		
Pharynx	j	

Articulation (Movement)

Lips

Spastic grin: P/A

Tongue thrust position: P/A

Involuntary movements : P/A

Voluntary Abilities

Smacking

Pursing

Spreading

Speed of movements: rapid/slow/normal

Diadochokinetic rate for /b/

**Tongue**

Tongue thrust swallow: P/A

Pointedness of tonguetip:

Others (such as micro,  
macroglorsia, etc.)

Involuntary movements: P/A

**Voluntary Movements**

Ability to dissociate tongue movement  
from those of the head and shoulder movement: P/A

Protrusion: P/A

Retraction into the mouth

Elevation (touching upper lip & beyond)

Lateral (touching corners of the mouth)

Precision of the tongue movement

Speed of the tongue movement -

Diadochokinetic rate for /ba da ga/:

**Jaw**

Deviated to side Yes/No

Tightly clenched Yes/No

Involuntary movements P/A

**Voluntary Movements**

Can dissociate from head and shoulder movements Yes/No

Opening : P/A

Closing : P/A

**Teeth**                    Normal/Abnormal

Fully developed

Missing teeth

Any others

**Hard Palate**

High arched            Yes/No

Low arched            Yes/No

Any other

**Soft Palate**

Short

Hanging down (curtain palate)

Any other

**Movements**

Elevation while saying /a/

symmetrical/asymmetrical

**Uvula**                    short/elongated

Any other

Pharynx                Normal/abnormal

**VI Vegetative Activities**

**Voluntary Movement**

Sucking                p/A

Swallowing

Biting



**Chewing**

Soft food

Hard food

Blowing

**Oral reflexes**

Sucking P/A

Gag (palatal)

Rooting

Swallowing

**Drooling** P/A

**Speech Related Activities**

**Voluntary Movements**

**Laughing**

Spontaneous P/A

Associated with bodily movements: Yes/No

Initiates easily/with difficulty y

**Coughing** Normal/Abnormal

Associated with bodily movements: Yes/No

**Crying** Normal/Abnormal

Associated with bodily movements

Holds breath while doing so



## 2. Imitation List

Minimal Meaningful Pairs\*

appa - amma	'father' - 'mother'
bale -- ba:le	- 'bangle' - 'banana'
hu:vu - ha:vu	'flower' - 'snake'
katti - katte	'sword' - 'donkey'
o:ta - a:ta	'run' - 'game'
hudugx - huduga	'girl' - 'boy'
ele - ole	'leaf' - 'hearth'
a:ta - u:ta	'game' - 'lunch'
pennu - bennu	'back'
kappe -- katte	'frog' - 'donkey'
o:du - o:du	'read' - 'run'
ja:di - ga:di	'jar' - 'cart'
male - bale	'rain' - 'bangle'
anna - anna	'rice' - 'brother'
ka:su - ka'lu	'coin' - 'leg'
sa^lu - sa:lu	'row' - 'shawl <sup>1</sup> '
koda - kola	'pot <sup>1</sup> ' - 'tank'
halli - halli	'lizard' - 'village'
ka:ru - ka:lu	'car' - 'pulse'

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\* Adapted from Karanth, P (1980) Test of Psycholinguistic Abilities in Kannada, unpublished, Mysore.

ajja	-	ayya	'grandfather'	-	'man'
ba:yi	-	ba:vi	'mouth'	-	'well'
kate	-	katte	'story'	-	'donkey'
magga	-	manga	'loom'	-	'monkey'
bassu	-	bhatru	'bus'	-	'cook'
dana	-	dhana	'bull'	-	'money'

**Words/Phrases/Sentences\***

1. e: 'Hey'
2. ba: 'come'
3. ka 'hand'
4. hu: 'flower'
5. a:ne 'elephant'
6. agasa 'dhobi'
7. ili 'mouse'
8. i:svara 'a name of the God'
9. ungura 'ring'
10. u:ta 'lunch/food'
11. ele 'leaf'
12. e:ni 'ladder'
13. a du 'five'

\*Adapted from Karanth, P (1980) and Thirumalai, M.S. and Gayathri S.G. (forthcoming) Language of the Hearing Impaired. Central Institute of Indian Languages, Mysore.

14.	ole	'hearth'
15.	o:le	'ear stud'
16.	ausada	'medicine'
17.	pustaka	'book'
18.	garagasa	'saw'
19.	mu:gu	'Nnose'
20.	ca:pe	'mat'
21.	ba:canige	'comb'
22.	jana	'people'
23.	su:ji	'needle'
24.	to:pi	'cap'
25.	pata	'picture'
26.	dabba	'box'
27.	ga:di	'cart'
28.	hannu	'fruit'
29.	tale	'head'
30.	ko:ti	'monkey'
31.	kudure	'horse'
32.	na:yi	'dog'
33.	mane	'house'
34.	cappali	'cappals'
35.	ba:gilu	'door'
36.	gombe	'doll'
37.	mara	'tree'
38.	emme	'bullock'
39.	yati	'sage'

40.	rupa:yi	'rupee'
41.	langa	'skirt'
42.	vima:na	'aeroplane'
43.	ba:vuṭa	'flag'
44.	sankha	'conch'
45.	bras	'brush'
46.	sara	'chain'
47.	simha	'lion'
48.	koḷi	'hen'
49.	ba:lehannu	'banana'
50.	mancha	'cot'
51.	dra:kxi	'grapes'
52.	navilu	'peacock'
53.	railu	'train'
54.	kaiyyalli	'in the hand'
55.	ṭe:bal merle	'on the table'
56.	basninda	'from the bus'
57.	nannannu	'me/I (accus)'
58.	marakke	'to the tree' (dat)
59.	eḷani:ru	'tender coconut'
60.	caliga:la	'cold season'
61.	hudugiyaru	'girls'
62.	maragaḷu	'trees'
63.	akkandiru	'elder sisters'
64.	kamala barutta:le	'kamala will be coming'
65.	avaru o:didaru	'they ran'

66. ra:ma ho:gutta:ne 'Rama goes'
67. hasugalu malagidavu 'Cows slept'
68. ni:nu barutti:ya:? 'Will you come?'
69. bekku no:duttade 'Cat is looking.'
70. na:nu barutte:ne 'I will come.'
71. avaru na:le barutta:re 'They will come tomorrow.'
72. sankara ninne banda 'Shankara came yesterday.'
73. si:la monne bandalu 'Sheela came day before yesterday,
74. maguvannu malagisu 'Put the baby to sleep.'
75. pensil mattu ha:le kodu 'Give pencil and paper.'