ADDIS ABABA UNIVERSITY
SCHOOL OF GRDUATE STUDIES

ASSESSMENT OF SELECTED PHONOLOGICAL ISSUES IN THE SPEECH OF DOWN'S SYNDROME INDIVIDUALS

BY

AMANUEL KEBEDE

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Abstract

Regardless of the language, all children can acquire essential components of their respective language by about the age of three or four. However, not all children can do this. Particularly, among the mentally challenged people, Down's syndrome individuals cannot achieve this level. This is, however, due to some physiological, neurological as well as psychosocial problems.

Amharic mother-tongue Down's syndrome individuals, similar to many other Down's syndrome individuals speaking other languages, are known for their language problems. Although there are important individual differences, it seems possible to specify some language defects holding true for these specific types of people. These kinds of individuals are highly identified with poor articulation as well as stuttering.

It is obvious that good production of speech depends upon the speech organs being the appropriate size and working effectively. Nevertheless, in addition to some problems in nerve coordination, Amharic speaking Down's syndrome individuals do not seem to have 'normal' oral cavity that would result in normal speech. Hence, due to some physiological anomalies in the oral cavity, they commit a number of phonological errors. Particularly, they have great difficulties in articulating some palatal and ejective sounds.

CHAPTER ONE

Introduction

1.1 The Subject Population

The study focuses on the speech of some mentally retarded people. It deals with the transcription and analyses of some phonological skills in the language of mentally retarded adolescents. However, it has to be noted that mental retardation is a broader term. There are several retardation etiologies that could be sorted out under the concept of mental retardation. Among the several kinds of mental retardation etiologies, the most recurrently cited in several literatures are Down's syndrome, William syndrome and fragile X syndrome.

Individuals with these retardation types vary in their language profile and performance. There are some individuals with a specific etiology whose language seems normal and others whose language is drastically affected. Among the several etiologies, individuals with Down's syndrome are those with highly defective language. Contrary to this, there are some mentally retarded individuals with specific etiologies whose language seems nearly as fluent as the speech of a normal human being. For this, people with William syndrome are the best example.

Hence, the present study deals with the assessment of selected phonological skills in the speech of Down's syndrome individuals. As a case study, the research incorporates six Down's syndrome individuals as a sample. These mentally retarded subjects are students (trainees) at two special schools in Addis Ababa. The special schools are the Kassanches and Mekanissa Montessori schools for the Mentally Retarded Children. The

two schools are founded and run by the Ethiopian Evangelical Church of Mekane Yesus (EECMY).

1.2 Background of the Study

The acquisition of language is one of the most remarkable achievements in human beings. Within a time of a few years, children make a transition to become highly communicative individuals. They start to talk about their everyday activities, future plans, hypothetical ideas, feelings, worries, and so on. For normally developing children these accomplishments take place during the pre school years. As indicated by Tager, H. and Sulivan, k. (1998:208) most children acquire the essential components of language by about the age of three or four. However, not all children can do this. According to the report by Leonard Abbeduto and Sheldon Rosenberg (1987:76) mentally retarded individuals experience language and communication problems.

Even though all communications do not necessarily involve language, it is the most widely used means of communication. However, this does not mean that every human being is capable of communicating effectively with others. There are some individuals whose communicative capacity is affected. As studies reveal, most of the mentally retarded individuals are in one way or another affected linguistically. Particularly as several studies point out, among the several etiologies of mental retardation, Down's syndrome individuals show highly deteriorated speech ability. This is due to the psychosocial, neurological as well as physiological problems of the individual for better language production - particularly speech.

Studies associated with the language of mentally retarded individuals in general and Down's syndrome individuals in particular are a recent

phenomenon. Several researches have been conducted on the language skills of the mentally retarded individuals recently. However, almost all of them have been conducted by foreigners. Very few researches have been done on the issues locally. Nevertheless, good efforts are required to deal with this kind of population so as to help them in improving one of the adaptive skills, which is communication.

It is obvious that for effective socialization within the community sufficient language skill is crucial. An individual needs to have proper language with which he/she can express his/her feelings, emotions, worries and so on. But if he/she lacks this skill, he/she can be trained for some specific language skills. However, for efficient training on some specific language skills the problem areas need to be identified very well. However, apart from several attempts from outside, little or no research has been done on the language of Down's syndrome individuals locally. Despite this fact, it is believed that an extensive research has to be conducted in the language of this particular type of unfortunate people. Here, therefore, it would be worth mentioning some studies dealing with the specified type of people carried out in English language.

David Tolleson (1987) conducted a research on language and communication characteristics of children with Down's syndrome. The goal of the study was to document what is known about language acquisition in Down's syndrome people so that improved methods for facilitated language growth and change can be developed. The research revealed that children with Down's syndrome show an increasing linguistic deficit in relation to their non-verbal cognitive status with increasing chronological age. Similarly, Merdith Brown (2004) carried out a research on optional infinitives in the language of Down's syndrome individuals. The aim of this study was to determine whether or not tense morphemes are selectively affected in Down's syndrome individuals. The study compared the

spontaneous speeches of seven Down's syndrome and seven normal children matched for mean length of utterance. The study showed that Down syndrome children omit grammatically specified tense morphemes significantly more often than unimpaired children. But the two groups' performance on morphemes unrelated to tense specification was statistically similar.

Along the same line of research, Terrek, K. and et al (2004) conducted a research on the language use of parents with their developmentally different twins. The study examined interactions of four fathers and four mothers with their twins. Each twin pair had one sibling with, and one without, Down's syndrome. Language samples were taken from the fathers' and mothers' video and audio taped interactions with each twin separately and when the twins were together. The language samples were analyzed for mean length of utterance in words and number and types of utterances. Differences were found among the fathers and mothers, the twins and between the conditions (alone and together).

1.3 Objective of the study

General objective

The general objective of the study is identification and analysis of some basic speech disorders in the language of Down's syndrome individuals.

Specific objectives

Specific objectives include:

- Identifying some possible areas of problems that would result in phonological disorders among individuals with Down's syndrome.

- Suggesting some possible remedies that would possibly help Down's

syndrome individuals in improving some phonological skills of their mother tongue language.

1.4 Significance of the Study

Indeed, you might know that there are language disorders that could easily be remedied. For instance, Fowler (1998:321) pointed out that more than other aspects of language disorders phonological disorders can easily be remedied. Using some structured pathological procedures it is sometimes possible to bring a striking change in the phonological skills of an individual with speech disorder. In this regard, the primary beneficiaries of the study will be the mentally retarded people in general and the Down's syndrome individuals in particular. However, on top of this, the researcher believes that there will be several areas to which the findings of the study would contribute.

Firstly, as this kind of research is very new to the Ethiopian context, the researcher believes that this study can acquaint the society at large and families of those unfortunate individuals in particular about some phonological facts in the language use of the Down's syndrome individuals. Secondly, as the education and training policy of Ethiopia currently gives special attention to the education and training of people with special education needs, the findings of the study might have some contribution that could be used, for example, in the preparations of teaching materials for these unfortunate individuals. Thirdly, the findings may serve the trainers of mentally retarded people to cope up with some challenges that could arise due to defective language use. Last but not least, the findings may also serve as a base for further researches in the area particularly in the Ethiopian context.

1.5 Limitation of the Study

In conducting the study, the researcher depended on articulatoty phonetics. He interviewed some individuals with Down's syndrome. However, arriving at some points of conclusion treating the articulatory phonetics only, would not make the study complete. Had the acoustic aspect of their speech also been treated, several linguistic facts would have been identified concerning the issues under investigation.

As you might know, words are not discretely formed from several phonemes. They are not like beads strung on a string one segment after another. Rather, the phonetic properties of the phonemes found in a particular word are highly intertwined and overlap greatly. As this is the case, depending on articulatory phonetics only, would not enable the researcher to reach at highly accurate results. Nevertheless, as the acoustic phonetics requires highly qualified specialties and an up-to-date tcchnology, the researcher was obliged to limit his means of data collection and analyses on the bases of articulatory phonetics. However, it is highly believed that had the acoustic phonetics been part and parcel of the study, a number of striking facts would have also been identified.

1.6 Definition of Acronyms and Diacritics

The following acronyms and diacritics used in the study stand for the specified concepts and symbols.

ASHA	→	American Speech-Language-Hearing Association
CNS	→	Central Nervous System
EECMY	→	Ethiopian Evangelical Church of Mekane Yesus
NICHCY	→	National Dissemination Center for Children with

Disabilities

PNS	→	Peripheral Nervous System
*	→	Ill-formed words
/ /	→	Phonemic representation
[ ]	→	Phonetic representation

CHAPTER TWO

Review of Related Literature

2 .1 The Concept and Kinds of Language Impairment

As children enter their second year and grow into their third and fourth, they will have a remarkable number of ways to tell adults what they need. Even if the words do not all sound right, a normally developing child will make many efforts to communicate and will make his point effectively. Young children ask so many questions... often exhausting their parents and care providers. Children who do not ask questions or tell adults about what they want may have a language problem. Children with specific language impairments may not produce any word. Particularly, if the impairment is severe, it will be difficult for them to provide/utter words. However, if it is relatively mild, they usually struggle to learn new words and make conversations.

The concept of language impairment is not a new phenomenon. Several individuals have addressed it for centuries. Based on their assessments and investigations several intellectuals in the field have given their own definitions of the concept. To cite few examples, Davis (1999:56) defines the concept as, "the absence of some part of the language faculty". Similarly, according to Crysal (1997:264), language impairment refers to any systematic defect in the way an individual speaks, listens, reads, writes or signs that interferes with his ability to communicate with others.

Many scholars working in the area of language impairment have attempted to identify the various kinds of language impairments that could be found among human beings. In this regard, Davis (1999:56) states that among young children, the very common types of language impairments include: physical disabilities such as cleft palate, emotional states, which cause stammering, and mental

retardations, which slow down normal speech acquisition. On top of this, he also added special conditions such as deafness, aphasia, dyslexia and dysarthria as kinds of language impairments.

Similarly, the National Dissemination Centre for Children with Disabilities (NICHCY)'s report indicates that some causes of speech and language impairments include hearing lose, neurological disorders, brain injury, mental retardation, drug abuse, physical impairments such as cleft lip or palate, and vocal abuse or misuse.

Frequently, the cause of language impairment is unknown (NICHCY: 2004). But it is apparent that a person with language impairment has an impairment of his speech and/or language structures and functions. This means the parts of the body used for speaking and understanding – the brain, nerves, mouth, and throat – may be damaged or not developed/functioning properly.

As several literatures suggest an individual with severe language impairment may result in one or more of the following:

- Not being able to speak.
- Having speech that is very hard to understand.
- Having great difficulties in making sense of speech sounds.
- Not always being able to understand others.
- Not being able to say what he/she wants to say.

2.2 The Concept and Causes of Mental Retardation

Mental retardation is among the several kinds of psychological, physiological and social deprivations that could possibly result in language impairment. Many individuals with various kinds of retardation levels result in a typical kind of language production. The central theme of the study is, therefore, to identify the phonological skills of the mentally retarded individuals. Specifically, it tries to

identify the phonological skills of Down's syndrome individuals. However, as the cart should not precede the horse, it would be advisable to start with the general concept of mental retardation. Hence, this part of the study, as a stepping-stone for the whole work, begins with providing some fundamental facts about the general concept of mental retardation.

Different individuals have addressed the issue of mental retardation at different time and place for various reasons. Several individuals with various views, attitudes, conceptualization, and philosophy have dealt with it. Hence, based on their views, understanding and investigations they have given their own definitions of the concept. But no serious deviation has been observed on the definitions forwarded.

As pointed out by Hallahan and Kauffman (1991:80) "Mental retardation refers to significantly sub-average intellectual functioning resulting in or associated with impairments in adaptive behaviour and manifested during the developmental period." Kirk et al, (1993) similarly define it as "Significantly sub-average general intellectual functioning, existing concurrently with deficits in adaptive behaviour and manifested during the developmental period before age 18."

As cited by Nema Behutie (2000:18) the recently revised definition given by the American Association on Mental Retardation also reads:

> "Mental retardation refers to substantial limitation in present functioning; characterised by sub-average intellectual functioning, existing concurrently with limitations in two or more of the following adaptive behaviour skills areas:
>
> - Communication
> - Self-care
> - Home living
> - Social skills

- Community use
- Self direction
- Health and safety
- Functional academics
- Leisure and work manifest before age 18."

In most cases, especially within the mild instances, it is very difficult to identify the causes of mental retardation (Hallahan and Kauffman 1991:79). But many scholars in the field suggest that it may result from a condition that interfered with cognitive development before birth, during the birth process, or in early childhood. According to the NICHCY's Fact Sheet report, the most common causes of mental retardation are:

- **Genetic conditions.** Sometimes mental retardation is caused by abnormal genes inherited from parents, errors when genes combine, or other reasons. Examples of genetic conditions are Down's syndrome, fragile X syndrome and Phenilketonur.

- **Problems during pregnancy.** Mental retardation can result when the baby doesn't develop inside the mother properly. For example, there may be a problem with the way the baby's cells divide as it grows. A woman who drinks alcohol or gets an infection like rubella during pregnancy may also have a baby with mental retardation.

- **Problems at birth.** If a baby faces problems during labour and birth, such as not getting enough oxygen, he or she may have mental retardation.

- **Health problems.** Disease like whooping cough, measles or meningitis can cause mental retardation. Mental retardation can also be caused by extreme malnutrition, not getting enough medical care or by being exposed to poisons like lead or mercury.

2.3 The Biological Bases of Speech Production

Man thinks first and then expresses his thought in words by some sorts of translations. In other words, it can be said that speech has its origin in the mind of the speaker. As indicated by Fromkin and Ratner (1998:310), speech is produced when appropriate instructions in the form of impulses are sent from the speakers' brain along particular kinds of motor nerves to the muscles of the vocal organs. However, this happens only if there is no any physical hazard on any part of the brain or the nerves that carry the several impulses. Nevertheless, if a particular physical or psychological damage happens to the brain, appropriate instructions from the brain may not be able to reach at the speech organs. For instance, if an individual faces a particular physical damage on a specific area of his brain, he might develop disarthrya. As Gleason and Ratner (1998:G5) write "Dysarthria is a class of disturbances of speech sometimes following brain damage, in which articulation is impaired by paralysis, loss of coordination, or spasticity of the muscles used in speaking."

The human brain incorporates several components that are directly or indirectly involved in speech production. However, it is not a simple matter to exactly specify the function of each component in relation to speech production. But some parts of the brain like the cerebral cortex, basal ganglia, diencephalon, and the cerebellum are involved in one way or another in speech production. For instance, language behaviour is subserved by different cortical areas or loci located within the lobes of the cortex. The basal ganglion, as it plays a major role in the control of movement, has also substantial input in the production of speech. As pointed out by Dingwall (1998:62) the basal ganglion also appears to be involved in cognitive functioning. Damage in the basal ganglia can result in Dysarthria (Ibid, 1998:62). Similarly, the cerebellum plays a part in the proper production of speech. This structure is known to play a major role in motor control in conjunction with the basal ganglia, diencephalons (part of the brain that is a relay station for most sensations and motor functions) and the cortex itself. Thus, dysarthria can also result from damage to the cerebellum (Ibid, 1998:63). Internal capsule and caudate nucleus may also play some role in

motor speech planning and execution. Hence, damage to these areas would also result in dysartheric condition.

In the human nervous system there are two major components:- the central nervous system (CNS) and the peripheral nervous system (PNS). The former encompasses those components of the nervous system that are housed within the bony structure of the skull (cranium) and the vertebral column. On the other hand, the latter encompasses those components of the nervous system that lie outside of the bony coverings of the central nervous system. This includes the cranial nerves (that issue directly from the cranium) and the spinal nerves that originate from the vertebral column.

For the production of speech, there must be a proper coordination of the central as well as peripheral nervous systems. It is not only the damage in any of the components of the central nervous system that results in abnormal speech production, lesion to the motor stripe in the peripheral nervous system can also result in speech dysartheria (cf. Dingwall, 1998:68). Dysartheric patients usually have laborious and inaccurate articulation, even when the ability to formulate language is intact.

As indicated by Dingwall (1998:65) there are 12 pairs of cranial nerves (nerves that originate from the cranium) in humans. It is through these kinds of nerves that speech production is evident. Among the several kinds of cranial nerves some are sensory; some motor and some are both. All cranial nerves, in one way or another, involve in some sort of human communication. However, as the current study is limited in its scope to speech production, it is better to mention those particular kinds of nerves that are responsible for speech production.

As noted by Dingwall (1998:65) the fifth, seventh, tenth and twelfth cranial nerves are by far responsible for speech production in human beings. For instance, the fifth cranial nerve (trigeminal) handles both motor function and sensation for portions of the jaw and face; the seventh (facial) nerve controls motor and sensory functioning of most of the facial musculature, enabling

aspects of articulation and facial expression; the tenth (vagus) controls aspects of laryngeal function necessary for voicing and the twelfth (hypoglossal) controls tongue movements necessary for articulation. The rest cranial nerves are responsible for functions like: auditory, vision, eye movement, smell and so on.

Similarly, in addition to these specific types of nerves that are directly involved in speech production, particular types of muscles that are responsible for specific phonological skills are also found in the speech organs of human beings. For instance, quoting Hardcastle (1976), Moges Yigezu (2001:207) indicated that closure and rounding of the lips are controlled by the orbicularis oris muscles and protrusion by the mentalis muscles.

2.4 The Concept of Language Disorder

Communication is a natural part of our everyday lives that we seldom stop to think about it. Social conversations with families, friends, neighbours etc. seem very simple to everyone, if the individual does not have very destructive experiences in his communication with other people.

It is not exaggerated, if it is said that most of us have a feeling of uncertainty about the adequacy of our speech or language only in stressful or unusual social situations, such as talking to a large audience or being interviewed for a job. However, if we had to worry about communicating, we would worry about every social interaction we have.

When people think of speech and language disorders what usually comes to their mind is stuttering. This is a language disorder that we all might have experienced at least once in life. However, the effect of this in effective communication is negligible. It can easily be solved without an intervention by a pathologist. These can be some obvious logical solutions ("Just slow down"; "Relax, don't worry"; "Think about how to say it"). However, several language disorders need tremendous efforts for interventions. Particularly, if the individual is retarded, disturbed, or has cerebral palsy.

refers to the study of the rules for using the sounds of a language. When a person has difficulty in communicating because he/she does not use speech sounds according to standard rules, the disorder is phonological. It is sometimes difficult to make a clear distinction between these two technical concepts.

Articulation and phonological disorders involve errors in producing words. Quoting Van Riper and Emerick (1984), Shea and Bauer (1994: 214) pointed out that there are four types of articulation errors. These include:

A) Substitution of one phoneme for another, as "mudder" for "mother"
B) Disorder of a phoneme
C) Omission of a sound, as in "mik" for "milk", and
D) Additions, an extra sound is inserted within a word, as "warsh" for "wash".

In the articulation of speech sounds, human beings produce two classes of sounds. These are vowels and consonants. They are produced differently. Their major difference is that consonants are produced with more articulatory movements and more constriction (narrowing in a location in the vocal tract) than are vowels. Unlike the production of consonant sounds, the air flow from the lungs is unobstructed when vowels are produced. Every vowel, however, is produced with a different configuration of tongue and lip movements.

In speech disorders, associated with articulation disorders, the smallest unit might even be smaller than a segment. Fromkin and Ratner (1998:315) state that phonetic features (sometimes also called distinctive features) can independently be disordered. Moreover, Ratner (1998:316) states also another interesting finding regarding phonological feature errors that features of consonants never exchange with or influence the features in vowels and vice versa.

In investigating an articulation or phonological error of an individual a great caution has to be made. Any resilient phonological or articulation error could not be considered as a disorder. There are several criteria that have to be taken in to account in judging the problem. The consistency of the errors, age of the individual under investigation, the speech community in which the individual has grown up and so on have to be taken into consideration.

2.4.2 Fluency disorder

As defined by Shea and Bauer (1994:213) fluency disorder refers to the abnormal flow of verbal expression, characterized by impaired rate and rhythm. "Disfluency includes, repetitions or prolongations of sounds, words, or phrases; hesitations or long pauses; struggle behaviours including distortions of lips and mouth, facial grimaces, eye blinks, and extraneous body movements (Ibid, 1994:213)". Stuttering and cluttering are typical examples of disfluency. Stuttering is a disruption in the timing of speaking; cluttering is a running together in rapid, jumbled speaking of sounds, words and phrases.

In the speech of several individuals many utterances are characterized by hesitations, repetitions, false starts, and "fillers" like um, well, you know etc. Citing Goldman-Eisler (1968), Fromkin and Ratner (1998:313) state that hesitations occur roughly every five words when people describe pictures. However, when speakers are conversing naturally, hesitations may appear every seven to eight words. Thus, such lapses in fluent speech production usually provide valuable insights into the units of speech production and permit us to evaluate how much of speech is mentally planned in advance of its production.

Moreover, as suggested by Fromkin and Ratner (1998:318) hesitations are more likely to occur before content words such as nouns, verbs and modifiers than before function words such as articles, helping verbs and so forth. Furthermore, it has also been mentioned that hesitations are more likely to occur before less commonly used words than more frequently used words in a certain language.

2.4.3 Voice disorder

Voices vary widely in quality. Changes in quality of voice can reveal a person's identity as well as physical and emotional state. The listener through voice quality can identify moods, emotional state, and attitudes. Nevertheless, sometimes there is a problem in the quality of voice that could possibly interfere with effective communication. Some distortions in the voice of the speaker result in a difficulty of identifying the mood, emotional state, attitude --- of an individual.

A voice disorder is defined as the absence or abnormal production of voice quality, pitch, loudness, resonance, and/or duration (Shea and Bauer, 1994:213). As stated by Hallahan and Kauffman (1991:225), "Voice disorders that involve a disfunction within the larynx are referred to as disorders of phonation. Disorders having to do with the disfuncion of the oral and nasal air passage are called disorders of resonance".

2.5 Language and Down's syndrome

Down's syndrome (DS) is a neurodevelopmental disorder caused by the presence of an extra chromosome 21. It is also referred to as trisomy 21. Approximately one baby in every 600 – 700 births is born with Down's syndrome, and about 95 % of DS children have the extra chromosome in every cell (Karmiloff and Karmiloff-Smith 2001:205).

Children with Down's syndrome are among the mentally retarded people that are known for their language problems. Although there are important individual differences, it is possible to specify language defects holding true for the syndrome. As indicated in (http://www.ds-health.com) there are speech and language challenges for most children with Down's syndrome. The linguistic development of children with Down's syndrome is usually characterised as a delayed but otherwise intact version of normal language acquisition (http://www.altonweb.com). This implies that Down's syndrome patients do not

produce any linguistic forms that are not observed in the speech of unimpaired individuals at some stage in life.

Karmiloff and Karmiloff-Smith (2001:205) write:

> "Down's syndrome is associated with severe difficulties with grammar as well as poor articulation. There are very few rare cases reported in the literature in which DS adult's language seem normal. In general the vocabulary and grammatical development of these children remains at a level of about half of their chronological age and then plateau around puberty, failing to progress any further."

It has been indicated in a number of literatures that the linguistic deficits of several individuals with Down's syndrome are beyond their cognitive deficits. They usually have very great speech production problems. They usually find it really quite hard to produce spoken words even when they know what they want to say. This, however, might partly be due to some problems in the coordination of the nervous system or it might also be due to some specific anomalies in the organs of speech by the individual.

It is apparent that good production of speech depends upon the speech organs being the appropriate size, position and working effectively. Nevertheless, in addition to some problems in nerve coordination, individuals with Down's syndrome do not seem to have normal organs of speech that would result in normal speech production. Quoting Benda (1949) and Buddenhagen (1971) Randal (1997:167) reports that there are some conditions that could result in defective speech by Down's syndrome. These include "an undersized mouth cavity, a protruding tongue, a larynx often located too high in the neck with a thickening of fibrotic mucosa, an edematous tongue that doesn't groove properly for the distinction between sounds like š and s and is impaired in its motility, hypotonia of the speech muscles [muscles functioning below normal capacity] of the tongue, lips, soft palate and respiratory organs."

Similarly, as displayed in (http://www.altonweb.com), some of the factors that put Down's syndrome individuals at a particular risk for language deficit include the following points. First, there is an increased frequency of middle ear infection, which is frequently associated with hearing problem. Second, the deficits in motor coordination associated with Down's syndrome may adversely affect the synchrony of motor movements required for the speech production system, including respiration, phonation and articulation of the palate, tongue, lips, and jaws. Third, cognitive deficits specific to Down's syndrome may result in language learning problems beyond those commonly associated with mental retardation. And fourth, there can be decreased expectations for performance of mentally retarded individuals, which frequently result in learned incompetence or lack of appropriate experience.

Among individuals with Down's syndrome, their phonological competence grows slowly as compared to normal human beings with comparable age. But the sequence in phonological development is similar to the sequence observed in normal human beings. Moreover, as indicated by Randal (1997:168), most of the phonological errors that are observed in the speech of Down's syndrome individual are similar to the several types of phonological or articulatory errors that are made at some particular stages in normal human beings. The phonological errors that are mainly observed in the speech of Down's syndrome individuals are feature errors, cluster reduction and assimilation.

CHAPTER THREE

A Brief Description of Amharic Phonology

3.1 The Phonemes of Amharic

Amharic is a Semitic language spoken by a large number of native and non-native speakers. It is assumed that over 30 million people in Ethiopia speak Amharic as a first or second language.

According to Leslau (1995:4) the language has 30 consonant phonemes and 7 vowels. Moreover, the language encompasses some very unique phonological features, which are very peculiar to it and some other genetically related languages. One of the most striking features concerning the phonemes of Amharic is the presence of glottalic consonants. Amharic has five voiceless glottolized consonants. Of course, these glottalized consonants are also very common in other Ethiopian languages (cf. Bender et al 1976:77). The glottalic consonants of Amharic are: p', t', s', c' and k'.

Another phonological feature that is common to the language is the presence of palatal consonants. Amharic has six palatal consonants. These are š, ž, č, ǧ, č' and ň. The presence of rounded or labialized consonants is also another phonological feature of Amharic.

Amharic is a language with seven vowels. In addition to the five-vowel system / i, e, a, o, u/ which is the commonest vowel system among the languages of the world, Amharic contains two central vowels /ə/ and /ä / (Cf. Leslau, 1995:31). These respective symbols could be equated with the

symbols /ɨ/and /ə/ that are indicated on the International Phonetic Alphabet.

Table 2 and 3 show the consonant and vowel phonemes of Amharic respectively.

Table 2: Phonemic chart of Amharic consonants adopted from the encyclopedia of Wikipedia. The symbols that deviate from IPA are put in Parentheses

		Bilabial	**Dental**	**Plato-alveolar palatal**	**Velar**	**Glottal**
Stops	Voiceless Voiced Ejectives	P b P'	t d t'		k g k' (q)	?
Affricates	Voiceless Voiced Ejectives		ʦ' (s')	ʧ (č) ʤ (ǧ) ʧ' (č')		h
Fricatives	Voiceless Voiced	f	s z	ʃ (š) ʒ (ž)		
Nasals		m	n	ɲ (ň)		
Liquids		w	l	j (y)		
Flap/Trill			r			

Table 3: Phonemic chart of Amharic vowels (Leslau, 1995:31)

	Front	center	back
High	i	ə (ɨ)	u
Mid	e	ä (ɔ)	o
Low		a	

3.2 Some Phonological Processes in Amharic.

Phonemes of a particular language are combined to form syllables, words, phrases etc. As a result of the combination or neighborhood, a particular phoneme may be assimilated to its adjacent phoneme; it might be lost or displaced. In linguistics these kinds of processes are termed as phonological processes.

Similar to many other languages, there are several phonological processes that take place in the syllables, words, phrases etc. of Amharic. Assimilation, palatalization, gemination, haplology, loss of a syllable, and deletion of a vowel are some of the phonological processes that are found in the language. Thus, as these kinds of phonological processes have great relevance to the present study, a brief description will be given on each.

3.2.1 Assimilation

Assimilation is one of the most common phonological processes found in several languages. In this process, a particular phoneme may resemble to another phoneme as a result of the phoneme near by. The definition given by Crowley (1992: 47) reads, "When one sound causes another sound to

change so that the two sounds end up being more similar to each other in some way, we call this assimilation."

Assimilation can be partial or total. In partial assimilation the changed sound always retains at least one of the original features by which it is distinguished from the unchanged sound. On the other hand, in total assimilation all of the features of a particular sound are changed to match those of another sound, then the two sounds end up being identical and a geminate sound is produced.

Assimilation is common in Amharic. The two types of assimilation are found in the language. According to Leslau (1995:22), total assimilation affects the dentals d, t, t'; the liquids l, r; the sibilants s, z; the velars g and q.

Some of the following rules can be developed based on total assimilation in Amharic.

- The liquid / l / may be assimilated to an initial / r / of the verb.

Eg.			**Gloss**
/alrädam/	>	[arrädam]	'he did not help'
/alrät't'äbäm/	>	[arrät't'äbämm]	'it was not wet'

- The glottalized /t'/ is assimilated to the following /t/ in the gerund.

Eg.

			Gloss
/wät'to/	>	[wätto]	'having gone'

- The dental /d/ becomes assimilated to the following /t/ in the gerund.

E.g.

			Gloss
/nädto/	>	[nätto]	'having driven'
/kädto/	>	[kätto]	'having betrayed'

- /d/ is assimilated to the following /l/.

E.g

			Gloss
/gädlo/	>	[gällo]	'having killed'

The following sample rules can also be stated for the partial assimilation in Amharic according to Leslau (1995).

- The nasal dental /n/ becomes the labial /m/ in contact with labial/ b/.

E.g.

			Gloss
/šɔnbɔra/	>	[šɔmbɔra]	'chickpea'
/zɔnb/	>	[žɔmb]	'fly'

- /nf/ may become /mf/

E.g.

			Gloss
/gänfo/	>	[gämfo]	'porridge'
/qɔrɔnfud/	>	[qɔrɔmfud]	'clove'

- the morpheme tän-, an- becomes täm-, am- in contact with a following labial /b/ or /f/.

E.g.

			Gloss
/tänbäräkkäkä /	>	[tämbäräkkakä]	'kneel'
/tänbäšäbbäšä/	>	[tämbäšäbbäša]	'be abundant'

3.2.2 Palatalization

As defined by Crowley (1992:51) "A non-palatal sound (i.e. a dental, an alveolar, a velar and so on) becomes a palatal sound before the semi-vowel [y]." From this statement we can clearly understand that palatalization is a kind of assimilatory change. It is a process where a non-palatalized sound becomes a palatal sound.

In Amharic palatalization is a very common phonological process. The dentals d, t, t', l and n and the sibilants s, z and s' are palatalized when followed by the vowel –i, -e, or –iy(a) (cf. Leslau 1995:14). The resulting sounds are: di > ğ, ti > č, t'i(s'i)>c', li>y, ni > ň, si>š, zi>ž

.

In Amharic palatalization occurs in verbs and in verbals. It occurs on active participles and instrumental nouns that are derived from a verb. The forms that end –i are the imperfect, jussive, and imperative, the singular second person feminine, and the active participle; the forms that end in –e is the gerund, 1st person singular; and the forms that ends in –ly(a) is the verbal noun.

E.g.

	Gloss
[wəsäğ (i)]	'take'
[kəfäy (i)]	'pay'
[mälləšše]	'I having returned'

[käfəčče]	'I having opened'
[mälqämiya]	'picking material'
[mäkdäňňa]	'lid'

3.2.3 Haplology and loss of syllables

Hartman and Strock (1972:102) define haplology as "the omission in speech of one or more similar sounds in succession." In some languages when very similar sounds come together in succession native speakers usually omit one or more of the sounds in a word. In Amharic this phonological processes is very common. Even sometimes there is an omission of an entire syllable or part of a syllable in some words. The following are some of the words that could be cited in this regard.

E.g.

			Gloss
/addis abäba/	>	[addis aβäβa]	'Addis Ababa'
/fit läfit/	>	[filläfit]	'directly in front of'
/təlant mata/	>	[təlammata]	'yesterday night'
/häyağ /	>	[hağ]	'he who goes'

3.2.4 Gemination

Gemination is most conveniently described as lengthening of the consonants. In Amharic, all the consonants except /? /and /h/ may occur either in a geminated or non-geminated form (cf. Leslau, 1995:11).

Consonant gemination is a very common phonological feature in Amharic. A sentence hardly lacks a geminated consonant. Even a single word might have as many as five geminated consonants. Gemination in Amharic is phonemic. It can result in difference in meaning and occurs at the medial or final position of a word. The following are some words in Amharic that could result in meaning difference as a result of gemination.

E.g.	**Gloss**
[alä]	'he said'
[allä]	'there is'
[gäna]	'still'
[gänna]	'Christmas'
[fɔraš]	'mattress'
[fɔrraš]	'remains, ruin'

3.2.5 Avoiding two vowels coming in succession

As a rule, Amharic avoids the coming together of two vowels in pronunciation as well as in writing. As pointed out by Leslau (1995:35), if two vowels should come together for various morphological reasons, the following may occur.

1. Elision of one of the vowels.
2. Introduction of the glide semivowel /w/ or/ y/ between the two vowels.
3. In words with/a/ this laryngeal may be kept as glottal stop /? /, or there is no glottal stop and the two vowels are pronounced in succession.

The following words of Amharic avoid vowels coming in succession.

E.g.

			Gloss
*/sämma-ačäw/	>	[sämmačäw]	'he heard them'
*/asa-at'mağ/	>	[asat'mağ]	'fisherman'
*/sə-alf/	>	[salf]	'while I pass'
*/mänfäsawi-an/	>	[mänfäsawiʸan]	'religious person'

3.3 Secondary Articulations in Amharic

Most sounds are produced with a single point of articulation. Sounds may, however, be produced involving two points of articulation in which case two articulator possibilities emerge. In this kind of articulation one of the articulations is the dominant one ('the primary articulation').

As stated by Crystal (1997), in a sound produced with two points of articulation, secondary articulation refers to the point of articulation involving the lesser degree of stricture. This means that particular kinds of modified articulation types involving the formation of a primary stricture at some location are accompanied by a secondary more open articulation at some other location. Secondary articulations are indicated by a small subscript symbol for the appropriate approximant. Examples of secondary articulation include: labialization, palatalization, velarization, pharyngealization and nasalization.

Similar to several languages of the world, secondary articulation is common to Amharic. Several phonemes are produced as a result of two strictures. Labialization, palatalization and nasalization can be cited as examples of secondary articulation in Amharic.

3.3.1 Labialization

Labialization is a general term referring to a secondary articulation involving any noticeable lip rounding (Crystal, 1997). It is the addition of lip rounding to any sound that is normally articulated without lip rounding.

In Amharic, labialization is a common phonological process. It occurs as a result of the back vowels /o/ and /u/. When a particular sound is followed by either of these vowels the sound gets labialized. Labialization occurs in consonants and it is indicated by a subscript symbol /w/.
The following Amharic words contain a labialized consonant.

E.g.

	Gloss
[dʷulät]	'a kind of meal'
[šʷola]	'name of a place'
[t'ʷom]	'fast'
[lʷomi]	'lemon'

3.3.2 Palatalization as a secondary articulation

In Amharic this phonological process is very common. When a particular sound come proceeding either of the front vowels /i/ or /e/, it becomes palatalized. A palatal /y/ sound is added to it.

The following words of Amharic have a palatalized consonant.

E.g.

	Gloss
[bʸet]	'house'

[sʸet]	'woman'
[fʸit]	'face'

3.3.3 Nasalization

Nasalization is giving the quality of nasality to a non-nasal sound. Most commonly this is a modification given to vowels. But it is also applicable to consonants. For nasalized sounds, the soft palate is lowered and part of the air stream is diverted through the nose. Nasalized sounds are transcribed with [~] above the symbol.

The following words contain a nasalized vowel.

E.g.

	Gloss
[ãnd]	'one'
[w̃ãnd]	'male'

CHAPTER FOUR

Methodology

4.1 Research Design

The study followed particular types of research plans and procedures that would maximally lead to the achievement of reliable results. For this, initially, several items focusing on some phonological issues in Amharic were carefully designed. Next, the several items dealing with the various types of phonological issues were presented to the sample Down's syndrome individuals orally by the researcher and/or some teachers found in two special schools for the mentally retarded children in Addis Ababa. Then, every respondent included in the sample population was given a chance to utter the several items focusing on specific phonological issues. All the interviews conducted with the sample respondents were tape-recorded. Ultimately, the investigations and analyses were made cautiously based on the data collected to assess the several phonological issues.

4.2 The Site

As the research deals with some phonological analyses in the speech of Down's syndrome individuals, getting some Down's syndrome individuals so as to collect information had been the first step. For this, the researcher found two appropriate areas for his study. He found two centers for the mentally retarded children in Addis Ababa. These centers are the Kassanches and Mekanissa montessori schools for the mentally retarded children. Thus, the study conducted with six Down's syndrome individuals who are students of these two special schools. These two centers for the

mentally retarded children are founded and run by the Ethiopian Evangelical Church of Mekane Yesus (EECMY).

4.3 Sampling Procedures

As it has been stated, the subject populations of the study are some Down's syndrome individuals found in Addis Ababa. The study incorporated six sample individuals who could be sorted out as Down's syndrome. Among a population of 96 mentally retarded children found in the two special schools, six sample individuals were recruited to be included in the study.

In selecting the sample population, the researcher followed special methods and procedures that could enable him to identify sample Down's syndrome individuals. As it has been indicated, there were a total of 96 mentally retarded children in the two special montessory schools for the mentally retarded children. However, this population is with diversified mental retardation ethiologies. Hence, to identify the Down's syndrome individuals from the total population, the researcher asked the responsible bodies in the organization if they could provide him with some important information that indicate the retardation type of each member.

Nevertheless, the responsible bodies in the organization could not provide the researcher with the nessessary information conserning the retardation type of every member. Hence, in order to identify the Down's syndrome individuals from the other mental retardation types, the researcher made a literature review on some important sources that could state the physical appearance of this target population. In this regard, the points outlined in the Encyclopodya of Genetic Disorder concerning the physical characterstics of individuals with Down's syndrome were beneficial. Based

on the physical appearances stated there for Down's syndrome individuals, the researcher was able to identify 23 mentally retarded individuals who could be sorted out as Down's syndrome.

As stated in the Encyclopedia of Genetic Disorders (http:// health. enotes.com/childrens-health – encyclopodya /down syndrome) Down's syndrome individuals have two or more of the following physical characteristics:

- A flat appearing face,
- A small head,
- A flat bridge of the nose,
- A smaller than normal, low-set of nose,
- A small mouth, which causes the tongue to stick out and to appear overtly large,
- Upward slanting eyes,
- Extra folds of skin located at the inside corner of each eye and near the nose,
- Rounded cheeks,
- Small misshapen ear,
- Small wide hands,
- An inwardly curved little finger,
- A wide space between the great and the second toes,
- Unusual crease on the sole of the feet,
- Overtly flexible joints and
- Shorter than normal stature.

However, all of the 23 Down's syndrome individuals were not included in the study. As a case study, the research took only six sample individuals. It took into regard the criteria outlined below in selecting the sample

individuals. However, the six sample individuals are not the only ones that fulfill the criteria. The criteria taken into regard include:

- Age of the individual. All individuals are found in the age range of 12 to 18.
- First language. Individuals who speak Amharic as their first language have been included.
- Home environment. Individuals who live at home environment within which Amharic is dominantly spoken have been recruited for the study.
- Degree of severity. The study attempted to incorporate individual with different degrees of severities.

4.4 Bio-Data of the Sample Population

The study included six Down's syndrome individuals. These individuals are knowen by the names: Abenezer Kalekirstos, Bezawit Tsegaye, Blen Tadesse, Dorka Nigusse, Krubel Abera and Wagaye Bayssa.

Thus, this section outlines the bio-data of every member of the population.

Abenezer

1) Sex - male
2) Age - 14
3) He has a flat appearing face.
4) He has relatively normal bridge of nose.
5) He has unproperly arrenged teeth.
6) He has wide palms with relatively

Bezawit

1) Sex - female
2) Age - 16
3) She has a flat apearing face.
4) She has a small nose.
5) She has wide palms of hand.
6) She has relatively small tongue relatively proportional to her oral cavity.

thick fingers.

7) He has relatively small size of tongue.
8) He has a flat tongue (not edematous).
9) He stutters some.
10) He salivates very little.

7) She salivates a little.
8) She stutters a little.

Blen

1) Sex - female
2) Age - 12
3) She has a flat apearing face.
4) She has a flat bridge of the nose.
5) She has a small nose.
6) She has normal size palms of hand.
7) She has medium size of tongue as compared to the other Down's syndrome individuals.
8) She stutters more.
9) She salivates some.

Dorka

1) Sex - femal
2) Age - 18
3) She has a flat appearing face.
4) She has a small nose.
5) She has long tongue.
6) She has relatively flat tongue.
7) She stutters less.
8) She salivates less.

Krubel

1) Sex - male
2) Age - 13
3) He has a flat appearing face.
4) He has flat bridge of the nose.
5) He has small nose.
6) He has narrow oral cavity which

Wagaye

1) Sex - female
2) Age - 14
3) She has a flat appearing face.
4) She has a flat bridge of the nose.
5) She has a small nose.
6) She has very scattered teeth.
7) She has wide palms of hand.

causes the tongue to protrude.
7) He has scattered teeth.
8) He has wide palms of hand.
9) He has very long and thick tongue.
10) He stutters some.
11) He salivates some.

8) She has very thick and long tongue.
9) She stutters more.
10) She salivates some.

4.5 Methods of Data Collection

In doing a particular research several methodologies can be employed. Thus, a researcher usually selects the best methodology for his research. The accuracy and reliability of any research relies upon the availability and use of best methodologies.

Accordingly, in collecting data for the study, the researcher designed some interview questions that would possibly result in the identification of some specific language disorders found in the speech of Down's syndrome individuals. Several issues focusing on specific phonological skills were carefully structured and presented to assess if these particular phonological skills are found in the speech of Down's syndrome individuals. Several words and phrases were cautiously structured and used during the interview in such a way that they could bring very useful information on some phonological issues like assimilation, palatalization, gemination, haplology and loss of a syllable as well as avoiding two vowels coming in succession.

Similarly, some specific phonological skills focusing on secondary articulations in Amharic like: labialization, palatalization (as secondary articulation) and nasalization have also been assessed. Moreover, 67 words of Amharic containing all the consonant and vowel phonemes of the language were systematically structured (see appendix-A) in order to assess if the Down's syndrome individuals can properly utter all the phonemes of Amharic.

During the interview, every sample individual was given a chance to utter every utterance three times. And out of the three utterances the one that was said exactly twice was included in the transcription. In addition to the stated words and phrases, the interviews made with the sample individuals also contained some open-ended questions to assess how the sample individual's speech looks like when he/she is engaged in spontaneous conversations. This particularly helped the researcher to collect data on fluency disorder. Because individuals who seem normal in articulating a single phoneme, word or a phrase might be at high risk in producing some segments of speech containing complex phrases and/or sentences. Hence, for the accomplishment of the research, this kind of guided interview was conducted and the results were analyzed based on the interviews.

In conducting the interviews four persons participated. These were the researcher and three trainers of the mentally retarded individuals. Particularly, in conducting interviews with very shay Down's syndrome individuals, interviews conducted by the trainers were found to be fruitful. The trainers involved in the interview were Emawayish Teka and Haimanot Teferi (both from Kassanches Special Montessori School for the Mentally Retarded Children), and Hirut Kebede from Mechanisa Special Montessori School for the Mentally Retarded Children.

CHAPTER FIVE

Presentations and Analyses of the Data

5.1 Presentations and Analyses of the Data on Phonemes of Amharic

According to Leslau (1995:4), Amharic has 30 consonant and 7 vowel phonemes. And an adult native to Amharic language can utter all the phonemes without any difficulty. This is not, however, the case that all phonemes of Amharic can accurately be uttered by all speakers of the language. Individuals with specific language problems might have great difficulties in articulating several phonemes.

Thus, to assess whether all the phonemes of Amharic can accurately be uttered by individuals with Down's syndrome or not a specific strategy was designed. Sixty seven words incorporating all the consonant and vowel phonemes of the language (see appendix-A) were systematically presented to the subject population for the assessment of the proper articulation of every phoneme. Every word in citation form was made to be uttered by the sample population three times and the word that was uttered exactly twice was used in the investigation for the proper articulation of every phoneme.

The results in table 4 reveal the consonant phonemes that are usually disarticulated by the Down's syndrome individuals. The arrow indicates the sound that a particular phoneme usually changes to.

Table 4: Phonemes of Amharic that are mostly misarticulated by the sample population

Abenezer	Bezawit	Blen	Dorka	Krubel	Wagaye
P' → b	P' → b	P' → b	P' → b	P' → b	P' → b
		s' → s		s' → s	
				k' → k	k' → k
			t' → t	t' → t	
				č' → t	č' → č
ž → ǧ	ž → š		ž → š	ž → z	ž → š
			č → š	č → t	č → š
				š → s	
				ǧ → d	
		z → s		z → s	
		k → k'			
			ň → n	ň → n	ň → n
				r → l	r → l
			l → n		

As it can be seen from table 4, Down's syndrome individuals usually disarticulate some consonant phonemes of Amharic. The result indicated in the table show that all members of the sample made articulatory errors. None of the sample individuals utter all the consonant phonemes correctly. However, the errors that mostly seen are feature errors. They usually change phonetic features of a particular sound. Nevertheless, the major interesting finding regarding feature errors is that features of consonants never exchange with features of vowels and vise versa. But as no tree is exactly like another tree, every individual has his individuality about the particular kinds of feature errors he/she commits.

To assess the proper articulation of the consonant phonemes of Amharic, several words in citation form were made to be uttered by the

sample respondents. The phonetic environment for most of the sounds was the initial position. However, an attempt has also been made to asses the proper articulation of some phoneme at middle and final positions of words. Particularly, some structured conversations conducted between the researcher and the sample population, enabled the researcher to assess the proper articulation of some phonemes when they come at the medial and final positions.

Thus, based on the results collected from the utterances of the words in citation forms and the observations on several spontaneous speeches, the researcher dears to say there is no serious deviation that would arise from phonetic environment. The phonemes that are usually disarticulated when they come in initial positions of a word seem to be articulated wrongly at the other phonetic environments as well. For instance, most of the ejectives and the palatal sound /y/ are usually disarticulated regardless of the phonetic environment.

Sounds of a particular language can be classified in several ways. One of the points that can be used to categorize sounds is place of articulation which refers to the point at which a particular sound is produced in the vocal tract. The other point is the type of constriction created by articulators during the production of a particular sound. Thus, table 5 summarizes the disarticulated consonant phonemes of Amharic based on places and manners of Articulations.

Table 5: Summary of the misarticulated consonant phonemes based on places and manners of articulations

		Bilabial	Dental	Plato-alveolar palatal	Velar
Plosives	Voiceless				k
	Voiced				
	Ejectives	P'	t'		k'
Affricates	Voiceless		s'	č	
	Voiced			ǧ	
	Ejectives			č'	
Fricatives	Voiceless			š	
	Voiced		z	ž	
Nasals				ň	
Liquids			l	y	
Flap/Trill			r		

As it can be observed from table 5, most of the disarticulated phonemes can be seen being categorized into several phonological groups. Some of the major phonological groupings are: ejectives, fricatives, affricates, liquids and flap/trill. Thus, here a brief explanation has been presented as to why some phonemes found in these specific categories are disarticulated by several Down's syndrome individuals.

A) Ejectives: As it can be seen from table 5, most Down's syndrome individuals disarticulate several ejective sounds. This is mainly due to the physiological make-up of their oral cavity. As indicated by Randal (1997:167) Down's syndrome individuals have a larynx often located too

high in the neck. Hence, as this is the case, they are not capable of producing several ejective sounds. Because, for the production of ejective sounds, the larynx needs to move upward so as to build sufficient glottalic air pressure that would enable to form ejective sounds. However, as the larynx of the Down's syndrome individuals is usually located too high in the neck and can not sufficiently be raised in order to build sufficient air pressure, the Down's syndrome individuals usually disarticulate several ejective sounds. However, this is not the only case that contributes to the disarticulation of the ejective sounds in the speech of Down's syndrome individuals. Problems in nerve coordination, particularly problems with the tenth (vagus) cranial nerve that controls the functions of the laryngeal cavity, might also have their own impact on the disarticulation of several ejective sounds.

B) Fricatives: Fricative sounds are also among the most disarticulated sounds by the Down's syndrome individuals. The reason for this is similarly associated with the physiological make-up of the oral cavity.

In the production of fricative sounds, the passage in the mouth through which the air must pass becomes narrow so as to cause turbulent air flow. The air particles are pushed against one another in order to produce the several kinds of fricative sounds. However, so as to produce the fricative sounds several modifications have to be made on the oral cavity. Particularly, the tongue must be as flexible as possible and capable of grooving properly for the production of several fricative sounds. Nevertheless, as pointed out by Randal (1997:167), Down's syndrome individuals have an edematous tongue that does not groove properly. Hence, this might be the biggest reason for the disarticulation of the several fricative sounds by the Down's syndrome individuals.

Moreover, the high secretion of saliva observed among Down's syndrome individuals can also be potential contributor for the disarticulation of several fricative sounds. If the narrow air passage is filled with too much

saliva this might have its own impact on the disarticulation or distortion of several fricative sounds. High concentration of saliva in the mouth can even block the flow of turbulent air.

C) Affricates: The disarticulation of affricate sounds is also associated with the physiology of the Down's syndrome individuals. Most of the reasons that could be cited for the disarticulation of fricative sounds can also be applicable to affricate sounds. Because, affricate sounds are produced by a stop closure followed immediately by a slow release of the closure which is the characteristics of fricative sounds.

D) Liquids: As it has been indicated in the encyclopedia of Wikipedia, liquids in Amharic include the phonemes /w/, /l/ and /y/. However, though most Down's syndrome individuals do not have serious difficulty with the articulation of the phonemes /w/ and /l/, several Down's syndrome individuals seem to be with great problems concerning the articulation of the phoneme /y/. This, however, is attributed to the physiology of the Down's syndrome individuals. Particularly, it is associated with the physiological make-up of the oral cavity.

As it has been indicated above, Down's syndrome individuals have relatively thicker and longer tongue than normal human beings. Hence, this might create great problems in the proper articulation of the palatal consonant /y/. Because, for the articulation of this sound the body of the tongue must be bulge up to the palate and the tongue must totally be contained in the mouth. However, the thickness and length of the tongue of most Down's syndrome individuals does not allow this to happen.

E) Flap/Trill: In Amharic the flap or trill /r/ is very common. Normal native speakers of the language utter the word without any difficulty. However, among the Down's syndrome individuals it is the highly disarticulated phoneme. The reason for this is highly associated with the

physiological make-up of the oral cavity. It is mainly associated with the tongue of the Down's syndrome individuals.

The phoneme /r/ is produced in different ways. The flap /r/ is produced when the loosely held tongue tip makes a single tap against the upper teeth or the alveolar ridge. Similarly, the alveolar trill /r/ is produced when the tip of the tongue vibrates against the alveolar ridge. Unfortunately, as the tongue of most Down's syndrome individuals is very thick and long, it can not easily make a flap or a trill.

Unlike the production of consonant sounds, the airflow from the lungs is unobstructed when vowels are produced. However, this does not indicate that Down's syndrome individuals can utter all vowels of Amharic accurately. There are several instances in which problems in articulating vowel phonemes are clearly observed. Although, it is highly difficult to exactly specify the phonetic environment, there are some vowel phonemes that are usually disarticulated by several Down's syndrome individuals.

The utterances indicated in table 6 are some of the words taken from the several utterances in the study. Thus, as these words indicate, there are some vowel phonemes that are usually disarticulated by Down's syndrome individuals.

Table 6: Amharic vowels usually disarticulated by Down syndrome individuals

Nomal Utterance	Abenezer	Dorka	Krubel	Wagaye	Gloss	Remark
[kəfäč]		/käfäči/		/äfäti/	'open!'	/ə/>/ ä/
[kəfäyi]		/käfäyi/			'pay'	/ə/>/ä/
[mälləš]		/mäläši/		/mäläši/	'return'	/ə/> /ä/
[fərraš]				/färas/	'ruin'	/ə/> /ä/
[filläfit]	/fələfit/		/fələfət/		'directly in front of'	/i/ > /ə/
[səmme]				/səmmä/	'having kissed'	/e/> /ä/

As it can be seen from table 6, Down's syndrome individuals usually commit two types of errors regarding Amharic vowels. These can be seen being classified into two phonological processes. The first is lowering the position of the tongue and the second is changing the position of vowels from front to central position.

As it could be observed from the data, Down's syndrome individuals usually lower the high central vowel /ə/ to mid central vowel /ä /. Moreover, they also sometimes replace the high front vowel /i/ and the mid front vowel /e/ with the high central vowel /ə/ and the mid central vowel /ä/ respectively.

Previously it has been indicated that the oral cavity of Down's syndrome individuals is relatively narrower than normal human beings. This being the case, it is difficult for several Down's syndrome individuals to

produce all the vowels of Amharic accurately. For instance, for the production of the vowel /ə/ the center of the tongue needs to bulge up the maximum height to the roof of the mouth. However, with relatively narrower oral cavity this is sometimes difficult to happen. Similarly, the disarticulation created on the front vowels /i/ and /e/ is also attributed to physiological make-up of the oral cavity. Most Down's syndrome individuals relatively have longer and thicker tongue that would sometimes not enable them to form a bunch on the front part of the tongue that is crucial for the articulation of these specific vowels.

5.2 Presentation and Analyses of the Data Dealing with Some Phonological Processes in Amharic

5.2.1 Assimilation

Assimilation is one of the common phonological processes in Amharic. As it can be read from several literatures, partial and complete types of assimilations are prevalent in the language. According to Leslau (1995:22) some of the following rules could be developed based on total or partial assimilation in Amharic.

A. Some rules for total assimilation in Amharic are:

- The liquid /l/ may be assimilated to an initial /r/ of the verb.

			Gloss
/alrädam/	>	[arrädam]	'he did not help'
/alrät't'äbäm]	>	[arrät't'äbäm]	'it was not wet'

- The glottalized /t'/ is assimilated to the following /t/ in the gerund.

			Gloss
/wät'to/	>	[wätto]	'having gone'

- The dental /d/ becomes assimilated to the following /t/ in the gerund.

			Gloss
/nedto/	>	[nätto]	'he driving'
/kädto/	>	[kätto]	'he driving'

- /d/ is assimilated to the following /l/.

			Gloss
/gädlo/	>	[gällo]	'having killed'

B. The following sample rules can also be developed for the partial assimilation in Amharic.

- The dental nasal /n/ becomes the labial /m/ in contact with the labial /b/.

			Gloss
/šəbəra/	>	[šəmbəra]	'chickpeas'
/zənb/	>	[žəmb]	'fly'

- /nf/ may become /mf /

			Gloss
/gänfo/	>	[gämfo]	'porridge'
/qərənfud/	>	[qərəmfud]	'clove'

- The morphemes tän-, an- become täm-, am- in contact with a following labial /b/ or /f/.

			Gloss
/tänbäräkkäkä/	>	[tämbäräkkakä]	'he knelt down'
/tänbäšäbbäšä/	>	[tämbäšäbbäša]	'be abundant'

In the speech of native speakers of Amharic, assimilation is one of the commonest phonological processes. In the speeches of fluent speakers of

the language, we observe several sounds being assimilated partially or totally to adjacent sounds. The native speakers do this without any difficulty. Hence, this phonological process was assessed in the speech of Down's syndrome individuals. Based on the interview conducted the results that are represented in table 7 have been identified.

Table 7: Data on the concept of assimilation

Normal Utterance	Responses of the sample Respondents						
	Abenezer	Bezawit	Blen	Dorka	Krubel	Wagaye	Gloss
[alräddam]	/arädam	/arädamm/	/a.....aläddam/	/arädam/	/arädam/	/aräda/	'he didn't help'
[alrät't'äbäm]	/arät'äbäm/	/arät't'äbäm/	/a...arät'äbäm/	/arät'äbäm/	/alätäbäm/	/arät'äbäm/	'it didn't get wet'
[aszämmätä]	/azämätä/	/azzämmätä/	/a...azämätä/	/azämätä/	/azämätä/	/azämätä/	'have someone go on campaign'
[assällämä]	/aššälämä/	/aššällämä/	/ašälämä/	/ašälämä/	/asälämä/	/asälämä/	'have someone decorated'
[sigädl]	/sigäll/	/sigäll/	/si...sigäll/	/sigäll/	/sigäll/	/sigäll/	'when he kills'
[särräqk]	/säräkk/	/säräq/	/säläkk/	/särräqk/	/sälläk/	/sälläk/	'you stole'
[wät'to]	/wätto/	/wätto/	/wä...wätto/	/wätto/	/wätto/	/wätto/	'he going out'
[wänbär]	/wämbär/	/wämbär/	/wämbäl/	/wämbär/	/wämbäl/	/wämbäl/	'chair'
[tänbäräkkäkä]	/täbäräkäkä/	/täbäräkäkä/	/täbäräkäkä/	/tämbäräkäkä/	/tämbäräkäkä/	/täbäräkäkä/	' kneel'

N.B The three dots that are found in the data collected from the speech of Blen stands for the initial sounds of words that are usually repeated.

As it can be seen from table 7, assimilation seems impossible in some instances in the speech of Down's syndrome individuals. As it can be inferred from the data, in case of total assimilations, Down's syndrome individuals usually commit several assimilatory errors.

In total assimilations a double sound is created. However, as it could be observed from specific words on the data, the sample individuals seem to face great difficulties in doubling some phonemes that could be created as a result of total kinds of assimilations. Some possible reasons for this are given in 5.2.4.

However, in case of partial assimilation the data relatively show similar results as the normal utterances do. Disarticulations are less likely to occur concerning this type of assimilation. For instance, look at the word /wänbär/ from the data.

5.2.2 Palatalization

One of the most striking features that are common to the languages spoken in Ethiopia is the presence of palatal consonants. Regardless of the language family, most of the languages spoken in Ethiopian have palatal consonants. The palatal consonants of Amharic include: š, ž, č, ğ, č' and ñ.

According to Leslau (1995), there is a particular kind of phonological assimilation in Amharic. Some non-palatal phonemes found in particular groups of words are usually palatalized. When a non-palatal sound usually comes preceding a particular kind of vowel it is usually changed to a palatal sound. As it is commonly observed in the language, the non-palatal sounds /d, t, ť, l, n/ and the sibilants /s, z, s'/ are usually substituted by a palatal sound when they are followed by either of the vowels -i,-e or -iy (a).

In Amharic this type of phonological process occurs in verbs and in verbals. It occurs in verbs expressing active participle and in instrumental nouns that are derived from a verb.

According to Leslau (1995:14), the forms that end in: -

- /-i/are the imperfect, jussive, and imperative forms of the singular 2nd person feminine and the active participle;
- /-e/ indicates the gerund, 1st person singular; and
- /- iy (a)/ express the verbal noun.

Assuming that this phonological feature is common in the speech of native speakers of Amharic, the speech of Down's syndrome individuals was assessed for the prevalence of this particular kind of phonological issue. Ultimately, concerning this phonological issue, the results that are displayed at table 8 have been collected.

Table 8: Data on the concept of palatalization

Normal Utterance	Responses of the sample respondents						
	Abenezer	**Bezawit**	**Blen**	**Dorka**	**Krubel**	**Wagaye**	**Gloss**
[wɔsäği]	/wɔsäği/	/wɔsäği/	/wɔsäği /	/wɔsäği/	/wɔsädi/	/wäsäti/	'take!'
[kɔfäči]	/kɔfäči/	/kɔfäči/	/kɔ...kɔfäči/	/käfäči/	/kɔfäti/	/käfäti/	'open!'
[kɔfäyi]	/kɔfe/	/kɔfäyi/	/k'ɔ...kɔfäyi/	/käfäyi/	/kɔfe/	/kɔfäy/	'pay!'
[mällɔši]	/mänɔši/	/mälɔši/	/mɔ...mälɔši/	/mäläši/	/mälɔsi/	/mäläši/	'return!'
[gɔži]	/gɔži/	/gɔži/	/gɔ...gɔži/	/gɔži/	/gɔzi/	/gaži/	'buy!'
[mälqämiya]	/mälqämɔya/	/mɔlqämya/	/mɔ...mälqamya/	/mäläqämäya/	/malakäma/	/mäkämya/	'picking material'
[mäkdaňňa]	/mäkɔdaňňa/	/mäkdaňň/	/mɔ...mäkdaňň/	/mäkäňňa/	/makɔdäna/	/mäkäňa/	'lid'
[mällɔšše]	/mälɔšše/	/mällɔšše/	/mɔ...mälɔše/	/mälášše/	/mälɔsse/	/mälɔše/	'I having returned'
[käfɔčče]	/käfɔčče/	/käfɔčče/	/Kɔ...käfɔčče/	/käfäče/	/käfɔtte/	/käfäte/	'I having opened'
[šäč'č'e]	/šäč'č'e/	/šäč'č'e/	/šɔ... šäčče/	/šänt'e/	/šäče/	/šäč'e/	'I having sold'

As the results represented in table 8 illustrate, palatalization is very common phonological feature in the speech of Down's syndrome individuals. Nevertheless, the results also depict that there are some Down's syndrome individuals with which this type of particular phonological property is almost non-existent in their speech. In this regard, the data collected from the speech of Krubel is the best examples. Similarly, the data collected from the speech of Wagaye on the same issue has also some phonological truth for the absence of this particular phonological competence in the speech of some Down's syndrome individuals. However, the reason for this depends on the physiology of the Down's syndrome individuals.

As it has been indicated in the review section of this study, Down's syndrome individuals have an impaired motility of tongue due to weaknesses of speech muscles. Besides, it has also been mentioned that their tongue is relatively thick and long. Thus, as this is the case, they have great difficulties with the proper articulation of several palatal sounds.

As the data on table 8 shows, Down's syndrome individuals with relatively thicker and longer tongue seem to have the highest articulation problems with palatal sounds. In this regard, Krubel and Wagaye can be cited as examples. For the articulation of palatal sounds, the body of the tongue must bulge up to the palate and the tongue must totally be contained in the mouth. However, as the tongue of Krubel and Wagaye is very thick and long it is not capable of doing this easily.

5.2.3 Haplology and loss of syllables

For some reasons, people find it difficult to pronounce sounds when they are near other sounds that are identical or very similar. Hartman and Strock (1972:102) define haplology as "the omission in speech of one or more similar sounds in succession." When very similar sounds come together in succession native speakers usually omit one or more of the sounds in a word. However, this does not result in difficulty to be understood by speakers of that particular language.

Nevertheless, in languages it is not only the case that the omitted sound is a single sound (sounds). Even in some instances native speakers omit an entire syllable of a word in their speech. This, however, also does not prevent the individual's speech from being understood by speakers of that particular language.

In this regard native speakers of Amharic usually omit some sounds that are usually found in a word succeeding or preceding other similar

sounds. They sometimes even omit an entire syllable of a particular word. But this does not preclude the individual from effective communication. Rather, it facilitates the communication process. Hence, this phonological process was assessed in the speech of Down's syndrome individuals. For this, several words that incorporate some sounds or syllables that are usually omitted in speeches of normal individuals were presented and the results were assessed accordingly. Thus, based on the investigations conducted on this issue, the results that are presented in table 9 have been identified.

Table 9: Data on the concept of haplology and loss of a syllable

Normal Utterance	Responses of the sample Respondents						
	Abenezer	**Bezawit**	**Blen**	**Dorka**	**Krubel**	**Wagaye**	**Gloss**
[addis a ä a]	/addis abä/	/addis aba/	/addis aba/	/adisaba/	/adisababa/	/ädisaba/	'Addis Ababa'
[filäfit]	/fələfit/	/filäfit/	/fə....fəläfit/	/filäfət/	/fələfət/	/fitləfä/	'directly, in front of'
[miazia]	/miyaza/	/miyazəya/	/mə...mäyaza/	/mayay/	/masəya/	/mayasa/	'April'
[hağ]		/hağ/	/hği/	/hag/	/hatt/	/hağ/	'he who goes'
[mayyəm]	/nayəm/	/mayyəm/	/mə....mayəm/	/mayəm/	/mayəm/	/nayäm/	'illiterat'

As it can be seen from the data on table 9, haplology and loss of syllables are common phonological processes among individuals with Down's syndrome. As the data show, similar to the normal native Amharic speakers, Down's syndrome individuals drop particular sounds or syllables for the sake of simplicity in their speech. This, hence, facilitates their communication. Concerning these phonological issues, most of the Down's syndrome individuals seem to have no physiological anomalies that preclude them from having these particular phonological skills.

5.2.4 Gemination

In many languages, duration contrasts exist in the group of vowels, as in Hawaiian, or in the group of consonants, as in Italian, or both, as in Finnish and Japanese (Guessenhove and Jacobs, 1998:13). However, at the phonological level, i.e. with reference to specific languages, gemination usually refers to the lengthening of consonants.

Like many other languages, gemination is a particular type of phonological feature in Amharic. A particular phoneme can be found either as a geminated or non-geminated form. As indicated by Leslau (1995:11) all the Amharic consonants except [ʔ] and [h] may occur either as a geminated or non-geminated form. However, gemination is not the property of vowels. No Amharic vowels are found as a geminated form.

In Amharic gemination is phonemic. It can result in meaning difference. Concerning the position of geminated consonants in the language, Leslau (1995:12) writes, "Gemination occurs only in medial or final position".

As it has been indicated, gemination of consonants is one of the major phonological features in Amharic. As a result, an assessment has been conducted to identify this phonological property in the speech of Down's syndrome individuals. Thus, the results that are displayed in table 10 were collected concerning this phonological issue.

Table 10: Data on Amharic gemination

Normal Utterance	Responses of the sample respondents						
	Abenezr	**Bezawit**	**Blen**	**Dorka**	**Kurbel**	**Wagaye**	**Gloss**
[gäna]	/gäna/	/gäna/	/gäna/	/gäna/	/gäna/	/gäna/	'still'
[gänna]	/gänna/	/gänna/	/gänna/	/gänna/	/gänna/	/gänna/	'Christmas'
[alä]	/alä/	/alä/	/alä/	/alä/	/alä/	/alä/	'he said'
[allä]	/allä/	/allä/	/allä/	/allä/	/allä/	/allä/	'there is'
[šəfəta]	/səʃ...səʃfita/	/šəfəta/	/šəʃ...šəfəta/	/šəfəta/	/šəfəta/	/čəfta/	'outlaw'
[šəffəta]	/šəffəta/	/šəfəta/	/šəʃ...šəfəta/	/šäffəta/	/šəʃ...šəfəta/	/čäffta/	'rash'
[fəraš]	/fəʃ... fəraš/	/fəraš/	/fəʃ...fəlaš/	/färaš/	/fəlas/	/färäs/	'mattress'
[fərraš]	/fəʃ...fərraš/	/fəraš/	/fəʃ...fəlaš/	/fərašh/	/fəras/	/färäs/	''ruin'
[wät']	/wät'/	/wät'/	/wat'/	/wät/	/wät'/	/wät/	'cook'
[wät't']	/wät't'/	/wät't'/	/wat'/	/watt/	/watt/	/wät/	'homogenous'
[səme]	/səme/	/səme/	/səʃ...səmme/	/säme/	/səme/	/səmä/	'my name'
[səmme]	/səʃ..səmme/	/səmme/	/səʃ...səmme/	/sämme/	/səmmi/	/səmmä/	'having kissed'

As table 10 shows, consonant gemination seems common phonological feature in the speech of Down's syndrome individuals. Because the words used to asses this specific skill are very commonly used words in natural speech and the sample individuals are highly accustomed with these words. However, as several rarely used words collected for the study indicate, degemination is a highly observed phonological property in the speech of Down's syndrome individuals. This is, however, attributed to the weaknesses of the muscles that are responsible for speech production.

From an articulatory point of view, it is by maintaining the closure for a long period of time that a particular consonant is made long or, in other words, geminated. But this to happen, it requires strong muscular strength and energy. However, as mentioned above most Down's

syndrome individuals do not have strong muscular strength in their speech organs.

As indicated by Randal (1997:167), Down's syndrome individuals have weaknesses in the speech muscles including the tongue, lips, soft palate and respiratory organs. With slack and weak speech muscles it is sometimes difficult to produce geminated sounds. Moreover, the physiological anomalies of the oral cavity of the Down's syndrome individuals have also their own contributions for the disarticulation of several gaminated sounds.

5.2.5 Avoiding two vowels coming in succession

A fluent speaker of Amharic usually avoids the coming together of two vowels in his speech. According to Leslau (1995) when two vowels come in succession for some morphological reasons any of the following three points may occur:-

A) One of the vowels is elided.

B) The glide semivowel /w/ or /y/ is inserted between the two vowels.

C) In words with /a/ this laryngeal may be kept as a glottal stop /? /, or there is no glottal stop and the two vowels are pronounced in succession.

To assess this particular phonological feature of Amharic, several words in citation form were provided to Down syndrome individuals and the Down syndrome individuals were made to utter the words.

According to Leslau (1995), a semivowel /w/ or /y/ is inserted under the following conditions:-

1) If the first vowel is a back vowel /u/ or /o/, the semivowel /w/ is inserted.

2) If the first vowel is a front vowel /i/ or /e/ and the second

vowel is the central vowel /a/, the semi vowel /y/ is inserted.

3) If the first vowel is a front vowel /i/ or /e/ and the second vowel is the back vowel /o/, a semivowel /w/ or /y/ is inserted.
4) If the first vowel is a central vowel and the second vowel is the back vowel /o/, a semivowel /w/ is inserted.

The results represented in table 11 indicate the utterances of the sample respondents on this issue.

Table 11: Data on the avoidance of vowels coming in succession

Normal Utterance	Responses of the sample respondents						
	Abenezer	**Bezawit**	**Blen**	**Dorka**	**Krubel**	**Wagaye**	**Gloss**
[sämmaccäw]	/sämmaccо/	/sämmaccäw/	/sämaco/	/ämmaccо/	/sämaccо/	/sämaccо/	'he heard them'
[asat'mağ]	/asat'ɔmağ/	/asat'ämağ/	/asabat'mağ/	/asat'/	/asadämad/	/asat'ɔmak/	'fisher man'
[bäqlocču]	/boqlocču/	/bäqlocču/	/bɔ...bäqlocču/	/bäqolocču/	/bälokocču/	/bäkuloču/	'the mules'
[yammarɔňňa]	/yamaräňa/	/yammarɔňňa/	/a...ammalɔňňa/	/yamarɔňňa/	/ämɔlɔna/	/yamalɔňa/	'of Amharic'
[salf]	/salf/	/salf/	/sɔ....salf/	/sar/	/saff/	/saff/	'while I pass'
[nägro^{w}at]	/nägro^{w}at/	/nägro^{w}at/	/näglo^{w}at/	/nägäro^{w}at/	/näglo^{w}at/	/nägo^{w}at/	'having told her'
[tämari^{y}accɔn]	/tämaračɔn/	/tämariaccɔn/	/tɔ...tämaraccɔn/	/tämaračɔn/	/tämaladɔn/	/tämaračɔn/	'our student'
[bäre^{y}accɔn]	/bäraccɔn/	/bäryaccɔn/	/bɔ...bäračin/	/bäračɔn/	/bälate/	/bäracči/	'our ox'

As can be seen from the data presented on table 11, some of the phonological rules stated earlier seem prevalent in the speech of Down's syndrome individuals. As it can be seen from the sample utterances, the pronunciation of vowels coming in succession seems impossible in the speech of Down's syndrome individuals. Like the speech of normal

human beings, when two vowels come in succession either one of the vowels is omitted or a semivowel is inserted between the two vowels.

Concerning the phonological rule that requires the omission of one of the vowels, the Down's syndrome individuals do not commit any articulatory errors. Similarly, in words that need the insertion of the semivowel /w/ for some morphological reasons the sample individuals also do not usually commit any articulatory errors. The difficulty in proper articulation is, however, mainly associated with the words that require the insertion of the semivowel /y/.

In Amharic when two vowels come in succession for some morphological reasons, the semivowel /y/ is inserted between the two vowels. When the front vowels /i/ or /e/ comes in succession with the vowel /a/, the semivowel /y/ is inserted between the two vowels. For example, the following two Amharic words **tämari-aččɔn* ('our student') and **bäre-aččɔn* ('our ox') *are* usually pronounced as *tämareʸaččɔn* and *bäreʸaččɔn* respectively. The semivowel /y/ is usually inserted between the two vowels. However, as it can be seen from the data collected from the speech of the Down's syndrome individuals, the addition of the semivowel /y/ seems almost none existent. This is because the phoneme /y/ is a palatal sound.

As it has been indicated in the review section as well as 5.2.2, Down's syndrome individuals have very long and thick tongue with highly impaired flexibility. Thus, as this might be the case, the Down's syndrome individuals could not produce and insert the palatal sound /y/ in words that require this particular epenthetic glide.

5.3 Presentations and Analyses of the Data on Secondary Articulations in Amharic

Most sounds of a language are produced with a single point of articulation. However, languages may also produce several sounds as a result of articulations at two places in the vocal tract. As stated by Crystal (1997), in a sound produced with two points of articulations, the secondary articulation refers to the point of articulation involving the lesser degree of stricture. This means particular kinds of modified articulation types involving the formation of a primary stricture at some locations are accompanied by a secondary more opened stricture at some other location. Instances of secondary articulations that are commonly prevalent in natural languages include: labialization, palatalization, velarization and nasalization.

Thus, similar to some other natural languages, this particular phonological feature is also very common in Amharic. We observe three types of secondary articulations in the language. These are: labialization, palatalization and nasalization. In the speeches of native speakers of Amharic, we usually find labialized, palatalized or nasalized phonemes.

Hence, this phonological property has been assessed in the speech of Down's syndrome individuals. To assess this particular phonological skill several words containing any of the three secondary articulation types were provided to the Down's syndrome individuals. Ultimately the results that are represented under each of the following secondary articulation types have been identified.

5.3.1 Labialization

As defined by Crystal (1997) labialization refers to a secondary articulation involving any noticeable lip-rounding. It is the addition of lip rounding to any sound that is normally articulated without lip rounding. To asses this particular skill in the speech of Down's syndrome individuals, the following words were provided to the sample individuals and the data presented in table 12 has been collected on the issue.

Table 12 contains utterances of the Down's syndrome individuals dealing with the concept of labialization.

Table 12: Utterances of the sample respondents on the concept of labialization

Normal Utterance	Responses of the sample respondents						Gloss
	Abenezer	Bezawit	Blen	Dorka	Krubel	Wagaye	
[dʷulät]	/dʷulät/	/dʷulät/	/dʷulät/	/dʷulät/	/dʷulät/	/tʷulät/	'a kind of flesh meal'
[šʷola]	/ šʷola/	/šʷola/	/šʷola/	/šʷola/	/šʷola/	/šʷola/	'name of a place'
[tˈʷom]	/tˈʷom/	/tˈʷom/	/tˈʷom/	/tˈʷom/	/dʷom/	/tˈʷom/	'fast'
[sʷofa]	/sʷofa/	/sʷofa/	/sə....sʷofa/	/sʷofa/	/sʷofa/	/sʷofa/	'sofa'
[lʷomi]	/nʷomi/	/lʷomi/	/lʷomi/	/lʷomi/	/lʷomi/	/lʷomi/	'lemon'
[dʷoro]	/dʷoro/	/dʷoro/	/dʷoro/	/dʷoro/	/dʷolo/	/dʷoro/	'hen'
[mʷorrädä]	/mʷorädä/	/mʷorädä/	/mə....mʷolädä/	/mʷoräda/	/mʷolädä/	/mʷorädä/	'sharpen'

As it can be seen from table 12, labialization seems common phonological feature in the speech of Down's syndrome individuals. It is apparent that in the production of labialized consonant the orbicularis

oris muscle of the lip needs to be strong enough in contracting the mouth in order to produce labialized phonemes (cf. Moges Yigezu, 2001:207). Moreover, this particular phonological property to happen, the seventh cranial nerve (facial nerve) needs to be intact. As pointed out by Dingwall (1998:65), the seventh cranial nerve controls the motor and sensory functions of most of the facial musculatures that are responsible for some aspects of articulations and facial expressions.

In this regard, the sample Down's syndrome individuals seem to have strong orbicularis oris muscle that would enable them to form a rounded lip that could serve as a secondary articulation and they also seem to have an intact facial nerves. Nevertheless, having this very scanty data the researcher does not dare to say all Down's syndrome individuals have strong orbicularis oris muscle as well as facial nerves. With greater sample size, opposite results might be identified.

5.3.2 Palatalization as a secondary articulation

In the previous section of this work (5.2.2) it has been stated that in Amharic some non-palatal sounds like d, t, t', l, s, z, and s' are palatalized when they are followed by either of the vowels -i, -e or –ly(a). In this kind of phonological process, a particular non-palatal sound is assimilated into a palatal sound as a result of the succeeding vowel coming following it. At this kind of phonological process a particular sound is assimilated into another sound.

In some words of Amharic, a particular consonant phoneme is palatalized when it comes preceding the front vowels /e/ or/i/. In this particular kind of sound formation, in addition to the main articulation for the particular phoneme, another very lesser constriction is created as a result of the specific vowels coming following it. Thus, as it involves two places of articulations for the production of the sound, it is considered as secondary articulation.

For the formation of palatalized consonants, in addition to particular constrictions somewhere in the vocal tract, the body of the tongue is raised as a secondary articulation. Concerning the issues on palatalization, the results represented in table 13 have been collected.

Table 13 shows the concept of palatalization (as a secondary articulation) in the speech of Down's syndrome individuals.

Table 13: Responses of the sample respondents on palatalization

Normal Utterance	Responses of the sample respondents						Gloss
	Abenezer	Bezawit	Blen	Dorka	Krubel	Wagaye	
[b^{y}et]	/b^{y}et/	/b^{y}et/	/b^{y}et/	/b^{y}et/	/b^{y}et/	/b^{y}et/	'house'
[s^{y}et]	/s^{y}et/	/s^{y}et/	/s^{y}et/	/s^{y}et/	/s^{y}et/	/sät/	'female'
[f^{y}it]	/f^{y}it/	/f^{y}it/	/f^{y}it/	/f^{y}it/	/fɔt/	/f^{y}et/	'face'
[q^{y}im]	/q^{y}im/	/q^{y}im/	/q^{y}im/	/q^{y}im/	/gɔm/	/k^{y}im/	'malice'
[t'ɔq^{y}it]	/t'ɔq^{y}it/	/t'ɔq^{y}it/	/t'ɔq^{y}it/	/qɔt'it/	/dɔg^{y}it/	/t'ɔkɔt/	'few'
[baq^{y}ela]	/baq^{y}ela/	/baq^{y}ela/	/bq^{y}ela/	/bäq^{y}ela/	/bak^{y}ela/	/bak^{y}ela/	'bea'
[t'^{y}ef]	/t'^{y}ef/	/t'^{y}ef/	/t'^{y}ef/	/t'^{y}ef/	/t^{y}ef/	/täf/	'teff'

As it can be seen from the data on table 13, the concept of palatalization seems very common phonological property in the speech of Down's syndrome individuals. However, the results collected from some of the sample respondents' clue that there are some Down's syndrome individuals whose pallatalization skill is highly deteriorated. In this regard, Krubel and Wagaye can be cited as best examples. These individuals usually commit several articulatory errors concerning this particular phonological skill.

It has been indicated earlier that Krubel and Wagaye have relatively longer and thicker tongue than the other sample individuals. Thus, the disarticulation created might probably be due to the physiology of their

tongue. Because, for the articulation of the palatal sound /y/ the body of the tongue has to be maximally raised to the palate and the tongue must totally be contained within the mouth.

5.3.3 Nasalization

Nasalization is giving the quality of nasality to a non-nasal sounds. Most commonly this is a modification given to vowels. It is also applicable to consonants. For nasalized sounds, the soft palate is lowered and part of the air stream is diverted through the nose. To asses this particular phonological property in the speech of Down's syndrome individuals, some words that contain nasalized vowels of Amharic were presented and every member of the sample were made to utter the words. Thus, based on the assessment conducted, the following results have been gathered.

Table 14 show the data concerning the concept of nasalization in the speech of Down's syndrome individuals.

Table 14: Responses of the sample respondents on nasalization

Normal Utterance	Responses of the sample respondents						Gloss
	Abenezer	Bezawit	Blen	Dorka	Kurbel	Wagaye	
[ãnd]	/ãnd/	/ãnd/	/ãnd/	/ãnd/	/ãnd/	/ãnd/	'one'
[wãnd]	/wãnd/	/wãnd/	/wãnd/	/wãnd/	/wãnd/	/wãnt/	'male'
[šãňňi]	/šə̃ňi/	/šə̃ňi/	/šãňi/	/šãni/	/šãňi/	/šãňi/	'accomp-anier'
[bəlãň]	/bəlãň/	/bəlãň/	/bəlãň/	/balãn/	/bälãň/	/bərãň/	'having told me'
[gãmbit]	/gãmbi/	/gãmbi/	/gãmbi/	/gãm/	/gãmbi/	/gãmbi/	'constructive

As it can be seen from the data, the concept of nasalization as a secondary articulation is very common. Vowels are usually nasalized

when they come preceding a nasal consonant. Indeed, previously it has been stated that Down's syndrome individuals have a smaller than normal nose with a flat bridge. And someone might expect that this physiological make-up might negatively interfere with the concept of nasalization as a secondary articulation. Nevertheless, as it can be seen from the findings, this physical make-up of the Down's syndrome individuals does not preclude the prevalence of the concept of nasalization in their speech. As the results reveal, vowels of Amharic are usually nasalized when they come immediately preceding a nasal consonant.

5.4 General Remarks on the Speech of Down's syndrome Individuals

As the research deals with the identification and analyses of some basic speech disorders among Down's syndrome individuals, the researcher believes that in addition to some of the phonological analyses, it is better to give a general remark on the speech of Down's syndrome individuals. Because this widens further the readers understanding on the speech of Down's syndrome individuals.

Speech is the behavior of forming and sequencing the sounds of oral language. A normal human being can properly sequence the sounds of his respective language to form several words, phrases and sentences with little difficulty. As stated in (http://www.medical-Library.org) children master most of the rules of grammar of their respective languages by the age of six largely without direct instruction. However, not all children can do this. There are some individuals with specific language disorders that cannot achieve this. With this regard, the Down's syndrome individuals that have been taken as a sample in this research can be taken as best examples.

The age of most of the sample individuals that have been included in this study is more than double as compared to the maximum age limit that an individual needs to master the fundamental grammatical rules of his mother-tongue language. However, as it has been seen from the data collected for this research the speech of these individuals cannot be said grammatical.

It is apparent that language functions based on certain linguistic rules. Speakers of respective languages follow particular rules of their language to convey information. However, if they do not construct the words, phrases, and sentences based on the correct rules of their respective languages, it can be said that the individuals have language disorder. Language disorder is described as a failure to employ appropriate rules. One of the implications of language disorder is speech disorder. However, speech disorders, in turn, can also be classified into three. These are: articulation, fluency and voice disorders.

Articulation disorder refers to the abnormal production of speech sounds. As it could be seen from the data, articulation disorder is the major speech disorder among the Down's syndrome individuals. Several phonemes are usually disarticulated by the sample individuals. Moreover, we also observe several phonemes being omitted in several words in the speech of Down's syndrome individuals. Nevertheless, the insertion of an additional sound in a word and disordering of sounds of a word are very rare. This, hence, indicates that part of the brain that is responsible for speech production seems intact and properly sends the right information to the oral cavity through the cranial nerves.

The second major speech disorder that is usually observed from the spontaneous utterances of Down's syndrome individuals is fluency disorder. From several spontaneous utterances it has been observed that there is very great fluency disorder in the speech of Down's syndrome individuals. Quoting ASHA (1982), Shea and Bauer

Lastly, concerning voice disorder it can be said that the speech of most of the Down's syndrome individuals is audible. Quoting ASHA (1982), Shae and Bauer (1992:213) define voice disorder as the absence or abnormal production of voice quality, pitch, loudness, resonance, and /or duration. Nevertheless, as the assessment of voice disorder needs an up-to-date technology and trained specialties, the researcher couldn't identify several linguistic facts on the issue. But the researcher believes that with modern technology and skilled manpower, several interesting phonological disorders would be identified in the speech of Down's syndrome individuals.

CHAPTER SIX

Conclusions and Recommendations

6.1 Conclusions

As it has been observed from the several data of the study, Amharic speaking Down's syndrome individuals commit some phonological errors specific to the language. However, most of the language defects seem applicable to many Down's syndrome individuals across languages. The writer dares to say this because he found very similar findings with what has been stated on the review section of this work. In any case, the following few points could be cited as some points of conclusions for the study.

- Amharic speaking Down's syndrome individuals commit several kinds of articulatory errors. There are some consonant and vowel phonemes of Amharic that the Down's syndrome individuals do not articulate. However, the errors that mostly observed are feature errors. They usually change the phonetic features of a particular sound.

- Amharic mother-tongue Down's syndrome individuals disarticulate ejective sounds. This is due to the physiological make-up of their oral cavity. As they have a larynx often located too high in the neck, several Down's syndrome individuals can not articulate all the ejective sounds accurately.

- Amharic speaking Down's syndrome individuals usually commit two types of articulatory errors regarding Amharic vowels. These are: lowering the position of the tongue and changing the position of vowels from front to central position. Down's syndrome individuals usually lower the high central vowel /ə/ to mid central vowel /ä/. Moreover, they sometimes replace the high front vowel /i /and the mid front vowel /e/ with the high central vowel /ə/and the mid central vowel/ä/ respectively.

- In case of assimilation, Amharic speaking Down syndrome individuals commit several articulatory errors. Although partial kinds of assimilations are common phonological properties in the speech of Down's syndrome individuals, total kinds of assimilations seem impossible. Because, in total kinds of assimilation a geminated sound which most Down's syndrome individuals could not usually articulate it easily is formed.

- As the Down's syndrome individuals have impaired motility of the tongue due to hypotonia of speech muscles as well as the thickness and length of the tongue, they can not accurately produce several palatal sounds. Particularly, the palatal consonant /y/ is difficult for many Down's syndrome individuals. Because, the articulation of this particular palatal sound requires the body of the tongue to bulge up towards the palate and the tongue totally be contained within the mouth.

- Degemination is commonly observed phonological property among Amharic speaking Down's syndrome individuals. This,

however, is a universal feature among Down's syndrome individuals across languages. One major important finding concerning Amharic gemination is that most Down's syndrome individuals are unlikely to utter the flap phoneme /r/ when it comes as a geminated form.

- In the normal speech of Amharic when two vowels come in succession either one of the vowels is omitted or a glide semivowel /w/ or /y/ is inserted between the vowels. However, although the Amharic speaking Down's syndrome individuals can insert the semivowel /w/, the insertion of the semivowel /y/is usually difficult. As most Down's syndrome individuals have very thick and long tongue, they could not insert the semivowel /y/ in some of the words that require the insertion of this particular phoneme.

- The insertion of an additional sound to a word and disordering of some phonemes of a word are rare phenomena among Amharic speaking Down's syndrome. This, however, works also across languages.

- Great fluency disorder is observed among Down's syndrome individuals. There are repetitions and prolongation of sounds; hesitations or long pauses; struggle behaviors including distortions of lips, mouth and so on. Nevertheless, this is not specific to Amharic language speakers. It is a general truth across languages.

6.2 Recommendations

As it could be seen from the whole study, most Down's syndrome individuals have serious problems in articulation as well as fluency. It is observed that almost all Down's syndrome individuals commit articulatory errors and they also stutter. Particularly, they have great difficulty in articulating several ejectives as well as palatal sounds. However, there are some speech therapy possibilities that would help these unfortunate individuals in improving their articulatory skill and/or speech. If the following type of speech therapy is given for someone at the early ages, his speech in general and articulatory skill in particular can be enhanced.

Nevertheless, the speech therapeutic methods given below are not applying to Amharic speaking Down's syndrome individuals only. Most of the procedures and principles can also be applied to several Down's syndrome individuals speaking other languages. Moreover, these principles and procedures are not new findings. They are some of the therapeutic methods that are being employed by several professionals in the field.

The most important aim of speech therapy is to enable and guarantee the best possible communications. This means that the individual can understand people and make himself be understood. This is what speech therapy tries to support. However, speech therapies in general and articulation therapies in particular must be fun for the individual. They must be built on mutual trust, good will and acceptance. If this is not given, the first step is to work on this.

As indicated in (http://www.logopaedie.ch/abc/storkind.htm), in attempting to give articulation therapies, we have to work on these two points first:-

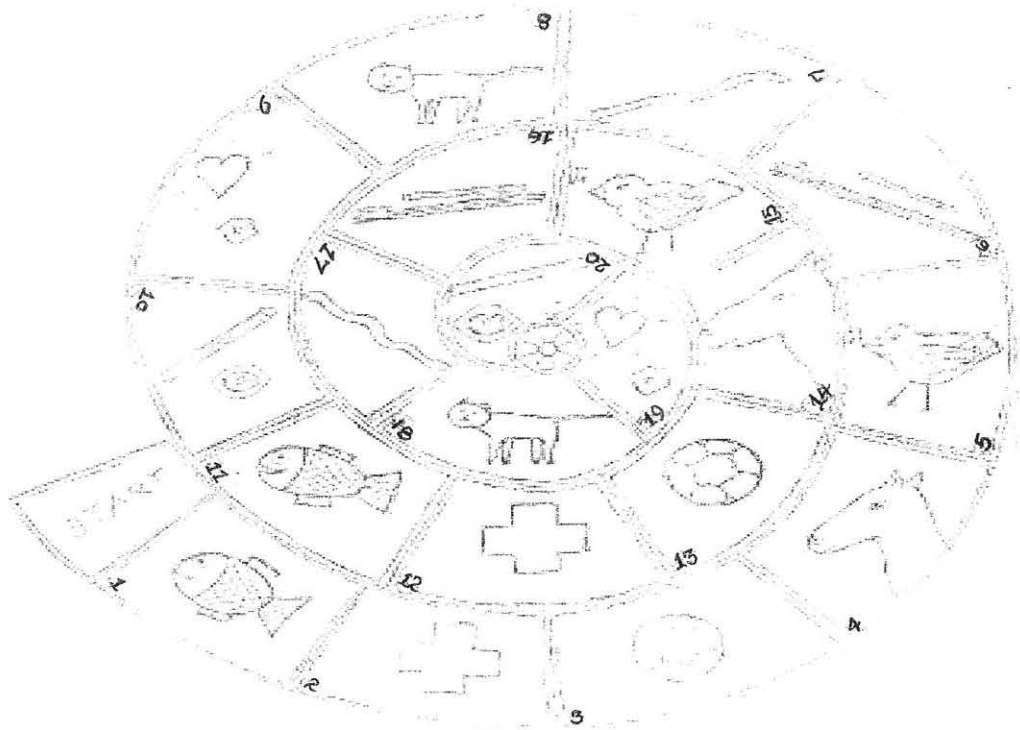
A) Is the problem a specific sound that the individual can not make?

Or

B) Does the individual not use one or more specific sounds, that he/she can make in his/her speech?

After these points have been identified, it may be useful to do some mouth movement exercises. Mouth movement exercises help the oral cavity muscles to be as flexible as possible.

Mouth practice is the first step in any kind of articulatory therapy. Thus, Down's syndrome individuals should make the various kinds of mouth practice exercises represented in the diagram for several times as the orders indicated so as to improve the flexibility of mouth muscles.



Source: http://WWW.logopaedie.ch/abc/storkind.htm

possible to make mouth movement exercises of the Down's syndrome individuals as funny as possible.

Then the next step should be introducing the sound. However, as indicated in (http://www.proinfirmis.ch) introducing the sound has to be done in the following steps:-

A) Drawing and playing with sounds

It is important to start with sounds that the individual can already make. Based on this we can do sound games, ways of making sound visible, becoming aware of sounds:

- We can pass a ball to each other, the one who gets the ball says the sound.
- We can say the sound when doing a specific movement, e.g. when lifting our arms.
- We can combine the sound with a large drawing; chalk on the black board or with colors on paper.
- We can look for a sound that has similarity with something.

The individual should develop joy in connection with sounds and drawing sounds. Then we can move on to a second step that is introducing the new sound.

B) Introducing a new sound

When introducing a new sound, the following three senses should be used:

- Listening. Say a sound to the individual, and then ask the individual to repeat the sound. We do this a few times, so that the individual has the possibility to get to know the sound by hearing and by trying to say the sound and checking if it sounds correct.

- Seeing. We take a mirror, and together with the individual we look into the mirror. We show the individual how to move our mouth when making the sound. Thus the individual has visual feedback.

- The touching-feeling sense. We use our hands to move the mouth of the child in a certain way for specific sounds. The individual gets a feedback through his touch senses.

C) Consolidate practicing the sound

When an individual can make a new sound, it is important to practice it in different games. This helps him to be very familiar with the sound.

D) Up to now a sound was practiced individually. The next step is to combine the sound with other sounds, to integrate it into normal speech.

- We combine the sound with other sounds in meaningless words.
- Level of syllables. We create different syllables using the sound.
- Level of words. We look for words that have the sound in the beginning, end or middle of the word.
- Finally the sound is used in poems, songs, games, so that it becomes really familiar.

The second major speech disorder observed among individuals with Down's syndrome is stuttering. This is a speech problem that can happen with mentally and non-mentally handicapped human beings. Stutter can have very different causes, and therefore, it calls for different therapy forms.

However, although there are several therapeutic methods that could lessen problems in stuttering, the major remedy is balancing the scales on expectations and resources.

As indicated in (http://www.proinfimis.ch) every individual has different expectations. These include the expectations that he/she has of him/herself, expectations of his/her family and environment, expectations in relation to what he/she should do, how he/she should behave, how he/she should be adopted and so on. Thus, if expectations and resources are equal then the individual will not probably stutter. Contrarily, if the scale is unbalanced and the expectations are grater than the individual's resources, then the person is more likely to stutter.

Thus, to lessen problems of stuttering among individuals with Down's syndrome, it is important to help them increase their possibilities and resources, e.g. to support their speech skill. At the same time awareness work in the environment of the Down's syndrome individuals is important. The expectations have to be equal to the resources of the Down's syndrome individuals. As suggested in (http://www.proinfimis.ch) in an atmosphere of love and friendly relationship, Down's syndrome individuals are assumed to stutter less.

Appendix - A

This attached check-list has been used during the interview to assess if the Down's syndrome individuals can properly articulate all the consonant and vowel phonemes of Amharic.

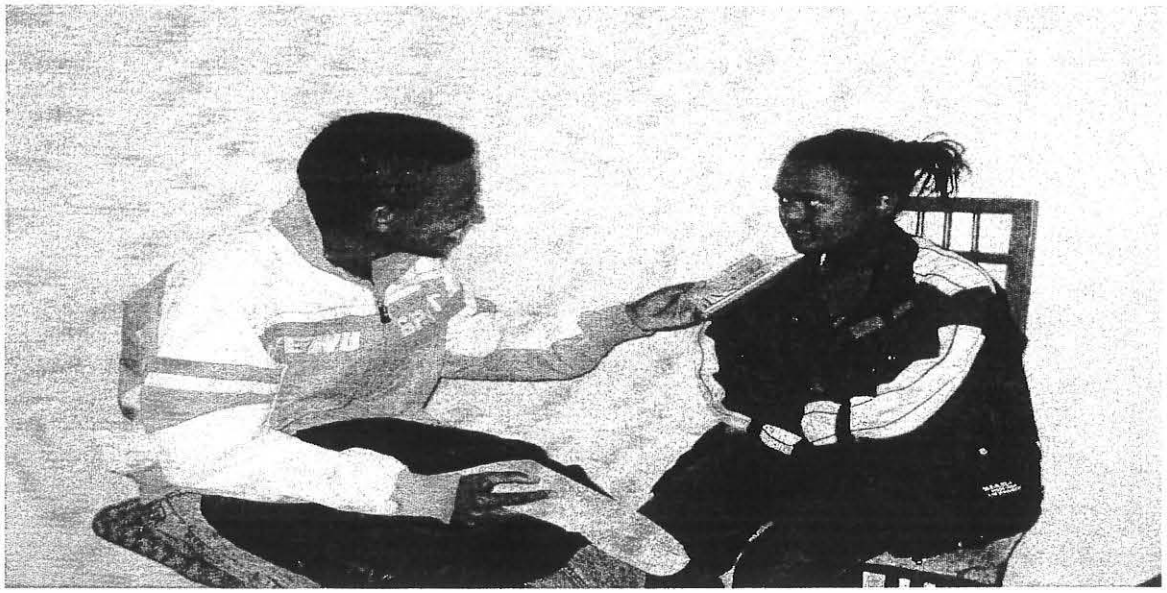
For this purpose, table 1 contains several words that incorporate all the consonant phonemes of Amharic and table 2 incorporates some words incorporating the vowel phonemes of the language. Almost all phonemes are represented by a minimum of two words.

Table 1: Words that have been used to asses the proper articulation of consonant phonemes of Amharic

Words in normal speech	**The phoneme to be checked**	**Gloss**
/polis/	/p/	'policeman'
/posta/	/p/	'envelop'
/bäre/	/b/	'ox'
/bet/	/b/	'house'
/t'äräp'eza/	/p'/	'table'
/lap'is/	/p'/	'eraser'
/käffätä/	/t/	'he has opened'
/tɔ̀gɔ̀l/	/t/	'struggle'

/na /	/a/	'come'
/rot'ä/	/o/	'he run'
/dəro/	/o/	'formerly'
/hullu/	/u/	'all'
/t'ut/	/u/	'breast'
/əssu/	/ə/	'he'
/səənt/	/ə/	'how much'

Appendix-B



The researcher interviewing Dorka Nigusse

The researcher making a conversation with Abenezer Kalekirstos and Dorka Niguse

Declaration

I, the undersigned, declare that this thesis is my original work, has not been presented for degree in any university and that all sources of materials used for this thesis have been duly acknowledged.

Name Amanuel Kebede

Signature

Place A.A.U

Date of Submission 29-12-2006

This thesis has been submitted with my approval as a thesis advisor.

Name _____

Signature _____