OSMANIA PAPERS IN LINGUISTICS

Volume 9, 10 1983 - 1984

NIRMALA MEMORIAL VOLUME

Edited by
B. Lakshmi Bai

DEPARTMENT OF LINGUISTICS
OSMANIA UNIVERSITY
HYDERABAD 500 007
INDIA

OSMANIA PAPERS
IN
LINGUISTICS

Volume 9, 10 1983 - 1984

NIRMALA MEMORIAL
Volume

Edited by : B. Lakshmi Bai

DEPARTMENT OF LINGUISTICS
OSMANIA UNIVERSITY
HYDERABAD 500 007
INDIA

Printed at : VECON PRINTERS Pvt. Ltd., Lalaguda, Secunderabad-17
Phone : 71384

IN

FOND MEMORY

OF

CHERVELA NIRMALA

FOREWORD

We have combined Volumes 9 and 10 of *Osmania Papers in Linguistics* into a special volume consisting of ten papers in language acquisition and allied areas, dedicated to the memory of Dr. Chervela Nirmala, who was a student in the Department of Linguistics from 1971 to 1981, and later joined the faculty as a Lecturer in February 1982.

Nirmala was born in Munduru, West Godavari District in Andhra Pradesh, on the 21st of September, 1951. After completing her Bachelor's degree in Science from Osmania University, she became a student in the Department of Linguistics in 1971 and received her Master's Degree in 1973 with a first class. She was awarded the Master of Philosophy Degree for her dissertation on *Syntax and Semantics of Auxiliary Verbs in Telugu* by Osmania University in 1976. She also carried out her doctoral research in the same department on *First Language (Telugu) Development in Children – A Short Descriptive Study*, under the guidance of Professor Bh. Krishnamurti and was awarded the Degree of Doctor of Philosophy in 1982.

Her dissertation is the first serious attempt at the study of language acquisition by Telugu children. Thus it breaks new ground in psycholinguistic research involving major Indian languages. This view is shared by Professor Charles Ferguson, one of the external examiners of her thesis, who remarks about her work as follows :

'...The combined longitudinal/cross-sectional study gives an excellent view of the acquisition of Telugu and forms a solid foundation on which further detailed investigations by the author or others can be based. The quality of the thesis is especially remarkable considering the relatively little work previously done on the acquisition of South Asian languages. ... The chapter on (lexical) semantic development gives beautiful evidence on overextensions that would be welcomed by all psycholinguists working in this field, not only for the additional evidence as such, but also for the carefully noted criteria other than perceptual and functional. The chapter is especially valuable, however, for the treatment of verb overextensions which are rarely mentioned in the literature...'

Nirmala's promising career as a psycholinguist was cut short by her untimely death on 16th June, 1982, ironically, after the birth of a child whose language acquisition she was very much looking forward to studying.

Nirmala's publications include 'Auxiliary verbs in Telugu' (*OPiL* 4.49-61), 'Medial consonant cluster acquisition by Telugu children' (*Journal of Child Language* 8:1.63-73), 'Assimilatory processes in child language' (co-author, *OPiL* 4.9-22). Two of her papers 'Relativization in children's speech' and 'Interference of second language with the first in a coordinate Bilingual child' have been published posthumously in *Osmania Papers in Linguistics* (6.53-70, and 7,8. 23-36, respectively).

Her colleagues in the Department of Linguistics thought that a fitting gesture to keep her memory alive would be to draw the attention of Indian linguists to an area of research which still lies unexplored in the country and to which Nirmala had made significant contributions within the short span of her academic career. We have included in the volume one paper of Nirmala on the development of plural in Telugu children. Of the remaining papers, seven are written by teachers and students (past and present) of the Department of Linguistics. Two of the papers are invited ones from outstanding Psycholinguists, Charles A. Ferguson and Jean Aitchison, both of whom have been associated with our department as Visiting Professors at different periods. We are grateful to these two scholars for enhancing the value of our academic tribute to Dr. Chervela Nirmala by their contributions.

B.L.

CONTENTS

OPiL 9,10. 1-20 (1983, 1984)

DEVELOPMENT OF PLURAL IN TELUGU CHILDREN

CHERVELA NIRMALA

Osmania University

Acquisition of inflectional categories by children is extremely interesting and valuable for the general linguistic theory. Telugu, a Dravidian language, spoken mainly in Andhra Pradesh, has both noun and verb inflections. Nouns are inflected for number and case and verbs for tense-mode-aspect and they also carry gender-number-person agreement.The development of plural inflection on nouns is studied with the help of longitudinal and cross-sectional data from four Telugu children. Several devices like phonetic imitation, alternation, back formation, analogy, and blending, etc. were used by the children during the acquisition of plurals. The use of plurals across the NP boundary was also studied. The results of this study are compared with those of other studies based on English and other Indo-European languages and the similarities and differences are pointed out. The major conclusion of the study is that children do not learn plurals by rote as Park (1978 : 237) has argued ; instead, they proceed in a systematic way forming their own grammatical rules at each level of acquisition and making necessary modifications to cope up with the language they are exposed to.*

Although there are several studies available on language acquisition by children speaking English and other Indo-European languages, Indian languages, especially the Dravidian languages have so far remained unexplored. The present work, as far as I know, is the first and so far the only work done on the language development of Telugu children.

Four children, three girls and one boy, were chosen for a longitudinal and cross-sectional study in the age group of 1;6-3;0, one each at the ages of 1;6, 2;0, 2;6, and 3;0. All the children belonged to the same socioeconomic group and were exposed to the

* I wish to thank Prof. Bh Krishnamurti for reading the manuscript of this paper and for many helpful suggestions.

standard dialect of Telugu. The data were collected in naturalistic situations for a period of six months with a month's duration between sessions. A Sony cassette tape recorder with a built-in-microphone was used for the recording. Two methods, (a) controlled elicitation and (b) free conversation, were used to collect the data. Broad transcription was used to write down the recorded data.

PLURAL FORMATION IN ADULT TELUGU

Noun. Telugu has two numbers, singular and plural.[1] Plurality is expressed by noun inflection. Telugu nouns can be divided into three categories: (i) proper and common nouns, (ii) pronouns, and (iii) special types of nouns like numerals, adverbial nouns, verbal nouns, pronominalized adjectives and nouns. All nouns except some special types, have number and gender categories. Common nouns can be divided into count and non-count. Non-count nouns are either mass or abstract nouns. Mass nouns can be either singular or plural but not both. e.g. sg. *uppu* 'salt', *raagi* 'copper', pl. *waDLu* 'paddy', *pesalu* 'green gram'. The word *biyyam* 'rice', although singular in form, requires plural agreement in the verb. *niiLLu* 'water' and *paalu* 'milk', on the other hand, are always plural. Count nouns are distinguished for singular and plural. They form their plural by adding the plural suffix *-lu/—Lu*

Every Telugu noun has a basic stem which is identical with the nominative singular. The regular way of forming the nominative plural of a common noun is to add the plural suffix to the basic stem, e.g. *aawu* 'cow': *aawulu* 'cows', *peTTe* 'box': *peTTelu* 'boxes'. The addition of the plural suffix to the nominative singular results in a number of sandhi changes, e.g. *banDi* 'cart': *baLLu/banDlu* 'carts', *pensilu* 'pencil': *pensiLLu* 'pencils'. Proper nouns are generally not used in the plural, but when they are, the plural is formed in just the same way as in the case of common nouns, e.g. *iddaru jaanakilu* 'two Janakis'.

[1]The plural formation in adult Telugu is taken from Krishnamurti and Gwynn's *A Garmmar of Modern Telugu.*

When two proper nouns are conjoined one is placed immediately after the other and the latter takes the plural suffix, e.g. *siitaaraamulu* 'Sita and Rama'.

Demonstrative pronouns. There is a wide variety of demonstrative pronouns in Telugu. When referring to a third person it is important to choose the right pronoun because the choice indicates the speaker's social relationship with, and attitude toward, the person referred to, viz. informal/formal, impolite/polite, etc. The demonstrative pronouns can be classified as shown in Table 1 (see overleaf). The singular pronouns in Table 1 are listed according to politeness-hierarchy. The first entry is used in very informal, intimate and impolite situations. The second entry is used for informal, third degree respect. The third entry is used for formal, second degree respect, and the fourth entry is used for very polite, first degree respect. Glosses for the entries are given at the bottom of the table. The choice of the pronoun conditions the Gender-Nember-Person agreement (GNP) of the inflected verb. GNP endings come after the tense – mode suffixes and can be classified as follows:

	sg.	pl.
1st person	*nu*	*m(u)*
2nd person	*wu*	*ru*
3rd person masc.	*Du*	
non- masculine	*di/du*	*yi/wi* (non-human)

As mentioned earlier. the choice of the pronoun conditions the GNP inflection of the verb. For example, the choice of a demonstrative pronoun like *wiiDu* 'this fellow', which is male close, and singular involves the selection of the suffix *Du* in the verb form:

wiiDu roojuu kaaleejiiki wastaaDu
he daily college to comes
'This fellow comes to the college daily'.

As distinct from this, the polite sg. demonstrative pronouns (male or female), *waaru, wiiru,* and plural forms, *waaLLu* and *wiiLLu,* take the suffix *ru,* e.g.,

MALE–HUMAN				FEMALE–HUMAN				NON-HUMAN			
Distant		Close		Distant		Close		Distant		Close	
sg.	pl.	sg.	pl.	sg.	pl.	sg.	pl.	sg.	pl.	sg.	pl.
waaDu		wiiDu		adi		idi		adi	awi	idi	iwi
atanu	waaLLu/	itanu	wiiLLu/	aame	waaLLu/	iime	wiiLLu/				
aayana	waaru	iiyana	wiiru	aawiDa	waaru	iiwiDa	wiiru				
waaru		wiiru		waaru		wiiru					
'he(that) man)'	'they (these men)'	'he(this man)'	'they (these men)'	'she (that woman)'	'they (those women)'	'she (this woman)'	'they (those women)'	'it (that thing)'	'they (those things)'	'it (this thing)'	'they (those things)'

Table 1. DEMONSTRATIVE PRONOUNS (2nd and 3rd person).

waaru
wiiru
waaLLu
wiiLLu } *roojuu kaaleejiki wastaaru*

'He/she/they come to college daily.'

Children of this study failed to use the right agreement between the noun/pronoun and the verb in a sentence till late in the acquisitional stage as will be shown later.

SUBJECTS

At the commencement of the present study, the four children Swati (1;6-2;0), Kalyani (2;0-2;6), Pawan (2;6-3;0), and Madhavi (3;0-3;6) were at different stages of development. The phonological development of each child during the period of six months that he/she was studied is cited briefly in Table 2 for the following reasons: (i) to give a general idea about each child's phonological ability and development during the six months period and, (ii) the phonological ability of the children often interferes with their morphological ability. For instance, some of the deletions found during the development of plural category are not due to the phonological constraints faced by the children but are motivated by morphological needs (see pp.6-7).

RESULTS

To start with, plural formation is illustrated from each child's speech. Then, based on the data of the four children, certain generalizations are made regarding the development of plurality in child language.

Swati. Swati had very limited vocabulary at 1;6 which included a few singular nouns, e.g. *puu* 'flower' and a few plural nouns, e.g. *aakulu* 'leaves'. But she had no singular/plural counterparts of these nouns in her speech and used them in both the contexts as can be observed in the following examples given both in the adult form (AF) and the child's form (CF) with glosses:

Swati (F) (1;6–2;0)	Kalyani (F) (2;0–2;6)	Pawan (M) (2;6–3;0)	Madhavi (F) (3;0–3;6)
1. Swati had all the vowels of adult Telugu except /EE/. She used /a/ in place of /EE/ throughout the data collection period.	1. Kalyani also had all the vowels except /EE/ and used /a/ in the place of /EE/ throughout the data collection period.	1. Pawan had all the vowels including /EE/	1. Madhavi had mastered all the vowels at 3;0.
2. At 1;6 she had mastered all the voiceless stops, the nasals, /m/ and /n/, lateral /l/ and the semivowel /y/. Voicing was just emerging in her speech.	2. At 2;0 Kalyani had mastered both the voiceless and voiced stops, nasals, /m/ /n/, lateral /l/ and semivowel /y/. Affricates /c/,/j/ and fricative /s/ were just emerging.	2. At 2;6 he had vl. and vd. stops, nasals /m/, /n/, lateral /l/ and semi-vowel /y/. Affricates /c/, /j/ and retro flex stop /T/ were just emerging.	2. She had all the vl. and vd. stops, nasals /m/, /n/, affricates /c/, /j/ lateral/l/, retroflex stop /T/, fricatives /f/ and semivowel /y/ stabilized in her speech at 3;0. Aspiration was just emerging and she used it with the stops.
3. At the end of the data collection period vd. stops were stabilized in her speech, the alveo-palatal affricates and semivowel /w/	3. At 2;6 aspiration in the stops was emerging. Retroflex stops /T/,/D/ and trill /r/ also were just emerging.	3. At 3;0 the affricates /c/,/j/, /ts/, /dz/ were stabilized. Retroflex stop /T/ and semivowel /w/ were also stabilized. Fricative	3. At 3;6 aspiration and retroflexion were well stabilized in stops.

Table 2 : PHONEMIC INVENTORIES OF CHILDREN (Contd. on p. 7)

Swati (F) (1;6-2;0)	Kalyani (F) (2;0-2;6)	Pawan (M) (2;6-3;0)	Madhavi (F) (3;0-3;6)
were emerging.		/s/ was alternatively used with /c/ and trill /r/ alternated with lateral /l/.	
4. Swati used deletion, substitution and assimilation extensively to capture unacquired and unestablished sounds.	4. Like Swati she also used deletion, substitution, and assimilation as major tools to cope up with the adult phonological patterns.	4. Pawan also used deletion, substitution, and assimilation but the number of instances in which they were used are comparatively less than Swati and Kalyani's speech.	4. None of the children had /h/ in their speech.
			5, The impact of deletion, substitution and assimilation on single segments had become much reduced in Madhavi's speech.

Table 2. PHONEMIC INVENTORIES OF CHILDREN

	AF	CF	
sg.	*aaku*	*aakulu*	'leaf'
pl.	*aakulu*	*aakulu*	'leaves'
sg.	*puwwu*	*puu*	'flower'
pl.	*puulu*	*puu*	'flowers'

In the above examples the plural noun was not analysable as singular noun + plural morpheme but was a unit word. From 1;9, Swati started alternating between singlar and plural forms of nouns, which she used in a random manner unmindful of the context. This was evident from her responses. During elicitation, for example, she showed/named either one eye or both the eyes irrespective of whether the singular/plural form was used in the eliciting question. Similarly, at 1;6, she used the plural form *aakulu* for one leaf as well as for more than one leaf. At 1;9, however, she had both *aaku* 'leaf' and *aakulu* 'leaves', but she used the two forms to convey singularity as well as plurality:

	AF	CF	
sg.	*aaku*	*aaku/aakulu*	'leaf'
pl.	*aakulu*		'leaves'

This sort of free variation between singular and plural noun continued till the end of the data collection period in Swati's speech.

Kalyani. Kalyani at 2;0, showed a similar tendency as Swati, and alternated between singular and plural forms of nouns as given below:

	AF	CF	
sg.	*paapa*	*paapa/paapalu*	'girl'
pl.	*paapalu*		'girls'
sg.	*kannu*		'eye'
pl.	*kaLLu/kanDlu*		'eyes'

This free variation of singular and plural nouns continued in Kalyani's speech for nearly two months. From 2;2 she started

contracting the singular and plural forms in her speech and used them correctly in a majority of the nouns:

	AF	CF	
sg.	*cEEpa*	*caapa*	'fish'
pl.	*cEEpalu*	*caapalu*	'fish' (pl.)
sg.	*pappu*	*pappu*	'nut'
pl.	*pappulu*	*pappulu*	'nuts'

Thus, she could sort out singulars from plurals which were used randomly earlier. This resulted in the correct use of several nouns at the morphological level. She seems to have formulated at this stage a rule according to which the addition of *-la/-lu* to a stem in the singular yields the corresponding plural form:

(1) Nsg. + la/lu ⟶ Npl.

At this point Kalayani was confronted with some of the singular nouns ending in *-la/-lu*. These were mistaken by her as the plural forms whose singular counterparts were backformed as shown below:

	AF	CF	
sg.	**tuwwaala*	*tuwwaa*	'towel'
pl.	*tuwwaaLLu*	*tuwwaala*	'towels'
sg.	**kaalu*	*kaa*	'leg'
pl.	*kaaLLu*	*kaalu*	'legs'

In the case of mass nouns ending in *-la/-lu*, Kalyani deleted the final *-la/-lu*, and used the derived singular alternatively with the following mass nouns which are always plural in adult speech:

	AF	CF		
pl.	*niiLLu*	*nii/niilu*	sg./pl.	'water'
pl.	*paalu*	*paa/paalu*	sg./pl.	'milk'

The child's effort to derive singular nouns out of adult singulars

of certain stems gives us a clue that the child has become aware of the fact that the suffix *-la-/-lu* is used as a plural marker in Telugu. The presence of /l/ in the final syllable seems to be more crucial for the child than the following vowel in plural formation. Therefore, Kalyani considered *la* also as the plural morpheme though it is not used in the adult speech. With this knowledge, she tried to generalize the process. This can be written in the form of a rule as follows:

$$(2)\ l(V) \rightarrow \phi / \text{ Noun} \_\_ \#$$

This explains the presence of words like *tuwwaa* and *kaa* as well as borrowed nouns like Eng. *sayki* in place of 'cycle' in her speech. Deletion of the final syllable in such adult words as *tuwwaala, kaalu, sykilu*, etc. by Kalyani is, clearly, due to morphological reanalysis.

Kalyani's speech also showed analogical creations whereby she added the plural morpheme *-lu* to some abstract nouns which are not generally pluralised in adult speech. E.g.,

AF	CF	
kampu	*kampulu*	'bad smell'

Kalyani also created double plurals by adding the plural morpheme *-lu* to both the attribute and the head noun, a tendency not found in the adult speech. E.g.,

	AF		CF	
sg.	*wanTa gadi*	'kitchen room'	*wanTa gadi*	'kitchen room'
pl.	*wanTa gadulu*	'kitchen rooms'	*wanTala gadilu*	'kitchens rooms'
sg.	*senaga pappu*	'horse gram'	*senaga pappu*	'horse gram'
pl.	*senaga pappulu*	'horse gram'(pl).	*senagala pappulu*	'horsesgram' (pl.)

All these examples of back formation, analogical creations, and addition of double plurals show the child's effort to internalize the rule of plural formation in her grammar.

At 2;6, Kalyani was able to distinguish singulars from plural at the morphological level, but she could not yet use the correct concord between the noun in question and the other parts of the sentence. For example,

	AF		CF	
(*a*)	*oka puwwu*	'one flower'	*oka puulu*	*'one flowers'
(*b*)	*anni gurraale*	'all are hores'	**anni gullame*	'all are horses'

In example (a) above Kalyani used a numeral attribute *oka* denoting 'one' followed by a plural noun, and in (b) she used a plural numerical attribute with a singular noun.

Pawan. The development of plural in Pawan's speech from 2;6-3;0 was similar to that of Kalyani's. The pluralization rule (2), found in Kalyani's speech, was actively used by Pawan also. With the help of this rule he could distinguish between several singular and plural nouns and used them correctly at the morphological level. Some of the forms used by him are given below :

	AF	CF	
sg.	*kommu*	*kommu*	'horn'
pl.	*kommulu*	*kommulu*	'horns'
sg.	*cewi*	*cewu*	'ear'
pl.	*cewulu*	*cewulu*	'ears'

The only difference between Kalyani and Pawan was that KalyanI tried to derive a singular stem out of a singular stem ending in *-la/lu*, mistaking the final syllable to be the plural suffix. But Pawan tried to delete the plural suffix *-la/lu* from the plural noun, and used the form so derived as singular. This process can be written in the form of rule (3) as follows:

$$(3)\text{-la/-lu} \rightarrow \phi / \left[\begin{matrix} \text{Noun} \\ +\text{Pl.} \end{matrix} \right] ——$$

This resulted sometimes in the correct singulars but sometimes in the use of the oblique stem as the nominative, e.g. *cewu* 'ear' as singular instead of the normal adult form *cewi* 'ear'. Similar is the case in the following example:

	AF	CF	
sg.	*puvwu*	*puu*	'flower'
pl.	*puulu/puwwulu*	*puulu*	'flowers'

Pawan extended this practice of plural formation to borrowed nouns also creating thus loan-blends of the following type:

	AF	CF	
sg.	*haars*	*aars*	'horse'
pl.	*haarses*	*aarsulu*	'horses'
sg.	*SarT*	*SaTTu*	'shirt'[2]
pl.	*SarTu*	*SaTTulu*	'shirts'

Like Kalyani, Pawan also added the plural morpheme to both the attribute and the head noun and thus created double plurals of the following type:

	AF	CF	
sg.	*kooDi pilla*	*kooli pilla*	'chick'
pl.	*kooDi pillalu*	*koolilu pillalu*	'chicks'

Unlike Kalyani, Pawan used mass nouns correctly in most of the instances, but he also could not master the rule of agreement between the noun and the verb. For instance, he used singular noun as a predicate with a subject noun in plural:

[2]This blend of borrowed English noun 'shirt' and native plural morpheme *-lu* is found in adult speech also.

AF	CF
ii puulu niiwi	**ii puulu niidi*
these flowers yours	this flowers yours
'these flowers are yours'	*'this flowers yours (sg·)'
kootulu occi baa annaay	**kootulu occi baa andi*
monkeys having ba said come	monkeys having ba said come
'monkeys came and said ba'	*'monkeys came and (it) said ba'

Madhavi. Madhavi had internalized the plural formation rule at 3;0, thus distinguishing singular nouns from the plural. She had several nouns in her speech with correct singular and plural forms. For example:

	AF	CF	
sg.	*ceppu*	*ceppu*	'slipper'
pl.	*ceppulu*	*ceppulu*	'slippers'
sg.	*langaa*	*langaa*	'skirt'
pl.	*langaalu*	*langaalu*	'skirts'

Madhavi's efforts to use the rule of plural formation sometimes resulted in over-generalization. She added, for instance, the Telugu plural morpheme *-lu* to English nouns which already carried a plural marker as shown below:

	AF	CF	
sg.	*frenD*	*fenDs*	'friend'
pl.	*frenDs*	*fenDsulu*	'friends'

This could be the result of the application of rule (1) without fully knowing the structure and meaning of the words in question. The child might have acquired the plural noun from the adult speech as a unit word and treated it as a singular noun.

Like Pawan, Madhavi also used the oblique nouns *ceetu* 'hand' and *cewu* 'ear', which are morphophonemically modified stems with the plural suffix deleted, as singular nouns alternating with

the adult forms *ceyyi* 'hand' and *cewi* 'ear'. Mass nouns were used correctly from 3;0 onwards by Madhavi. The addition of plural suffix to words other than nouns was not fonud in her speech. Furthermore, though she was the oldest of the children, she too could not use the concord between subject and predicate correctly as can be seen in the following examples:

AF	CF
wiiLLu enduku uuDustunnaaru	*wiillu enduku uDuttondi*
these why are sweeping people	these why sweeping people (sg.)
'why are these people sweeping?'	'why are these people sweeping (sg.)?'
iwi *guuDa ceTlee*	*iwi guuda ceTTe*
these also trees	these also tree
'These are also trees.'	'These also a tree'

But unlike the other children, Madhavi had several sentences with correct concord right from 3;0. For example,

AF	CF
goolilu eewi naanna	*goolilu eewi naanna*
marbles where daddy?	
'Where are the marbles daddy?'	

This clearly shows the progress Madhavi had made in the acquisition of plural formation as against the other children.

The alternant–*Lu* of the plural morpheme was not present in any of the children including Madhavi. This could be attributed to the general delay in acquiring retroflex consonants.

Morphophonemic changes. The addition of the plural morpheme to the noun stem results in several changes in the noun stem in adult speech. But in the speech of the four children of this study, majorty of the noun stems remained unaltered even after the addition of the

plural morpheme. This could be due to the following reasons: (i) Their failure to apply the morphophonemic rules, and (ii) A general tendency noticed in children to regularize irregular forms found in the adult speech. A few examples are given below to illustrate this point:

(a) An /r/ in the last syllable changes to /L/ in adult forms in plural nouns:

	AF	CF	
sg.	*gooru*	*gooru*	'nail'
pl.	*gooLLu*	*goorulu*	'nails'
sg.	*weeru*	*weeru*	'root'
pl.	*weeLLu*	*weerulu*	'roots'

But as can be seen from the above examples Kalyani and Pawan added the plural morpheme *-lu* to the singlar noun to form the plural noun.

(b) In adult speech the final *nu*, *wu* and *yi* of certain nouns get dropped when the plural suffix is added:

	AF	CF	
sg.	*peenu*	*peenu*	'louse'
pl.	*peelu*	*peenulu*	'lice'
sg.	*puwwu/puuwu*	*puwwu*	'flower'
pl.	*puulu*	*puwwulu/puulu*	'flowers'
sg.	*weeyi*	*weyyi*	'thousand'
pl.	*weelu*	*weyyilu*	'thousands'

Among the several morphophonemic rules found in adult speech the only one acquired by Pawan and Madhavi is the changing of the final /i/ of the noun stem to /u/ when the plural suffix is added. Eg.,

	AF	CF	
sg.	*kaaki*	*kaaki*	'crow'

pl.	*kaakulu*	*kaakulu*	'crows'
sg.	*gadi*	*gadi*	'room'
pl.	*gadulu*	*gadulu*	'rooms'

But Kalyani's speech was not affected by this rule. She had *kaakilu* and *gadilu.*

STAGES IN THE DEVELOPMENT OF PLURALS

Based on the data of the four children of this study the development of plural in child language can be broadly divided into four stages.

Stage one is marked by the absence of the plural morpheme. This was followed by the emergence of plural suffix in a few months, but the child was unaware of the dinstinction between the singular and the plural at this stage. This was reflected in the youngest child, Swati's speech, and also in Kalyani's speech at 2;0.

Stage two is marked by an alternation between the singular and the plural form either in the singular meaning or that of plural. This was reflected in both Swati and Kalyani's speech. This stage of confusion, however, was short lived compared to the other stages.

Stage three was marked by an increased production of plural nouns with the help of the pluralization rule, found in the speech of Kalyani, Pawan and Madhavi. Over-generalization, blends and back formations were characteristic of this stage. Except the youngest child, Swati, all ather children had entered into this stage during the period of this study.

Stage four is marked by the use of correct concord between the plural noun and the other parts of the sentence. This stage was not found in Swati, Kalyani and Pawan. Only Madhavi, the eldest child of the group, entered into this stage. But even she had not yet mastered it at the time of the completion of this study.

DISCUSSION

Park (1978:237) made the following four important observations regarding the development of plurals in children speaking High German: (1) Plurals were supplied in 90% of the obligatory contexts somewhere between stage IV and V. (2) They were not functionally distinguished from singulars and occured in singular contexts also. (3) The predominant morphological deviations were of the type in which an additional plural marker was attached to an already correct plural. (4) To refer to a single jobect or event formally correct plural utterances were often used partly due to the unestablished verb conjugation rules.

These observations hold good for the children of the present study with slight deviations. Park has applied the stages characterized by Brown (1973) to account for language development. Though these were not applied to the present study, development of plural in the children of this study is also divided into four stages and children in stages II and III could use plural nouns correctly in a majority of nouns at the morphological level. The notion of obligatory context is limited in this study to those utterances which contained nouns that have two distinct forms for the singular and the plural nouns as is done in Park's study.

Plurals in adult speech are used when the relevant linguistic and/or situational context refers to more than one object or event. But this basic rule did not always hold in the use of plurals by the children of this study. They used a singular or plural noun in both the contexts in stage I and II. Similar observation was made by Park (1978:541) regarding the devolopment of plurals in two High German children. Park's data also revealed that some types of plurals occured only in plural contexts and some only in singular contexts while some occurred both in singular and plural.

The use of plural in both singular and plural contexts was also found in the data of the children of the study. Swati and Kalyani had one noun, either singular or plural, at stage I and they used it in both singular and plural contexts and later started alternating between the sg. and pl. nouns. (At this stage children were un-

aware of the distinction between the singular and plural nouns. But the tendency to use some types of plurals in only plural contexts and some in only singular coutext and some in both singular and plural contexts was not found in any of the children's data. This could be because in Telugu there is mainly one plural marker *lu* with an alternant unlike High German which has several plural markers. As Park has pointed out the use of plural in both singular and plural functions indicates that plurals were not learned as the functional counterparts of the singulars but simply as nouns referring to the same things or events as the corresponding singulars.

The addition of a plural marker to an already plural noun was found in Madhavi's speech which agrees with Park's observation. But the difference between the children of this study and Park's children is that the Telugu children added plural marker to an already pluralized English noun, being unaware of the meaning of the borrowed English noun, whereas children of Park's study added the plural morpheme to an already pluralized native noun.

Addition of the plural marker to mass nouns like 'water' and 'sugar' was noted by Park (1978) and Cazden (1973). Pawan and Madhavi also added plural marker to mass nouns which are always singular, e.g. *uppu* 'salt'. An intresting point to note here is the fact that the children had the tendency to use the uninflected form of a mass noun for less quantity of the object referred to and the pluralized form for more quantity. For instance, while eating the curry Madhavi suddenly said:

kuuranta	*uppulee*
curry all	salts only

'The curry is full of salt'.

The tendency to derive singulars out of mass nouns ending in *-la/ -lu* and addition of the plural marker to some of the mass nouns used in singular could be due to the child's effort to generalize the plural formation without distinguishing between mass nouns that occur as singulars from those that occur always as plurals in adult speech.

Park noted that children find it diffcult to differentiate between singular and plural nouns having the same endings. He suggests that in order to perceive the difference the sufllxes must have some distinctive phonological features. This observation holds good for the children of this study also. Kalyani, for instance, deleted the endings of such nouns as *tuwwaala* and *kaalu* and derived singulars out of them, thinking *la/lu* in them to be plural markers. As mentioned earlier, children of this study failed to acquire the concord between the noun/pronoun and the verb until quite late. They mastered the agreement within the noun phrase before they learnt it accross the phrases, e. g. *konni puulu* 'some flowers' and *naalugu kootulu* 'four monkeys'. Park (1978:244) and Cazden (1973:230) have also observed a similar tendency in the children of their study. They observed that children supplie d correct plural within the noun phrase boundary before they did so across the noun phrase boundary.

There are diverse views on Telugu plural formation in adult language. Ramarao (1970) opines that among the two plural morpheme alternants *-lu* and *-Lu*, *-lu* is the basic one and *-Lu* could be derived with the help of certain rules. On the other hand, Krishnamurti and Gwynn (forthcoming), and Ramachandrarao (1976) consider *-Lu* as the basic one. The present study lends support to the former position. Children identified and added the morpheme *-la/-lu* to the singular nouns to form plurals. They failed to apply the morphonemic changes resulting from the addition of the plural marker. The alternant-*Lu* was not acquired even long after the children obtained mastery over the plural formation with the morpheme *-lu* at the word level.

On the basis of the data and discussion presented so far it can be argued that children master pluralization in a systematic way by forming their own rules and modifying them when necessary and not by rote learning as Park has suggested. Such devices as generalization and over-generalization, regularization of the irregular plurals of adult speech, back formation, anology and use of double plurals used by the children during the process of mastering the plurals indicate clearly that it is not memory alone that helps children in learning plurals. Children proceed in a systematic way

by thinking and rethinking and analysing their grammar at each step and making the necessary modifications to cope up with the adult model they are exposed to.

REFERENCES

BROWN, ROGER. 1973. *A First Language : The Early Stages.* Cambridge, Mass. : Harvard University Press.

CAZDEN, C. B. 1973. 'The acquisition of noun and verb inflections'. In C. A. Ferguson and D. I. Slobin (eds.), *Studies of Child Language Development* 227–240. New York: Holt, Rinehart and Winston.

KRISHNAMURTI, BH. and J.P.L. GWYNN. *A Grammar of Modern Telugu.* London: Oxford University Press (forthcoming).

PARK, T. *Z.* 1973. 'Plurals in child speech'. *Journal of Child Language* 5. 237–250.

RAMARAO, C. 1970. 'Teluguloo bahuwacana ruupa niSpatti' (Derivation of the plural forms in Telugu). *Bhaarati* 47:6.

RAMACHANDRARAO, C. 1976. 'telugu bahuwacanam : telugu bahuwacana pratyayaalu' (Telugu plural : plural suffixes in Telugu). *Telugu* 5.44–50.

OPiL 9, 10.21-38 (1983, 1984)

MEANING IN CHILD LANGUAGE

H. S. BRAHMANANDA

S. K. University

The intersection phenomenon between the affective and designative uses of language is observed in this paper on the basis of data collected by the author for over six years from children below seven years of age.

INTRODUCTION

Child language has become an interesting field of study for linguists, psychologists, speech pathologists, and philosophers in recent times. In the present paper, linguistic evidence for Piaget's hypothesis that the child's thinking is 'autistic' and 'symbolic' (Piaget 1922) is presented. The rise of 'designative' use of language as a more or less simultaneous development in the child's acquisition of language and its use is also discussed. Following Jakobson (1939) the stage which intersects the designaive use has been termed here 'affectve'.

According to Truby (1971), the child is influenced by its mother's speech during the prenatal period. He argues: 'An unrestricted foetus is certainly listening in utero, and observations of the cry patterns of premies reveal at least token, and in some instances specific, correspondences to the intonations and rhythms and other speech performance features of the mother' (p.67). Being a speech pathologist, Truby was concerned with the neurological responses of the foetus to the linguistic stimuli of the mother. Nevertheless, his research shows that the 'reception' (the 'input' as he calls it), must precede the 'production' (the 'output') stage of language development and its use. Translated in terms of cognition it means that the child has an innate capacity for

acquiring the structural patterns of a language to which he is exposed. This justifies the research on the cognitive aspects of language acquisition (see, for instance, Laurence 1976 and the bibliography therein; for a review of this approach see Kernan 1979).[1]

The term 'autism' refers to the need-satisfying or wish-fulfilling fantasy as a mechanism of escape from reality. On the other hand, Clarpade used this term to indicate the way in which Piaget had tried to characterise the child's thought process. The word 'symbolic' is used almost in the same way as in poetics and rhetorics, i.e. as 'an expression' through a 'sign' which is intuitively structured and experienced, without any logic behind, to make it cognizable through sensory abstraction.

It is not an easy task to penetrate into a child's thinking;[2] but 'language' as it develops in the child, and the uses to which the child learns to put it, could be treated as indicative of the mental processes operating in the child, if we accept that language is an exteriorization of ideas, or that language is used to communicate concepts. The terms 'idea' and 'concept'

[1] "The attempt to relate the emergence of semantic notions to cognitive development in Piaget's sensori-motor period is interesting... However, neither Leonard, nor the authors he surveys make any attempt to account for the fact that the semantic relationships do not appear until the child has passed through the entire sensori-motor period' (Kernan 1979:248).

[2] Piaget devised the 'clinical method' (observing children's linguistic activity indirectly in groups) by which he could propose the following characteristics of child language:

(i) The child's mind is woven on two different looms which are as it were placed one above the other. By far the most important during the first year is the work accomplished on the lower plane. This is the work done by the child himself, which attracts him pell-mell and crystalises round his wants all that is likely to satisfy these wants. It is the plane of subjectivity, of desires, games and whims of the 'Lust Prinzip' as Freud would say.

(ii) The upper plane, on the contrary is built up little by little by social environment, which presses more and more upon the child as time goes on. It is the plane of objective speech and logical ideas, in a word, the plane of reality (see Clarpade's preface to Piaget 1922:14).

are not synonymous. Idea pertains to that psychic aspect of the linguistic 'sign', viz. the thought, which is positively reflected in the 'sign' (Vygotsky 1934). Concept is representative in character, and is 'acquired' as an attribute to the linguistic 'sign'.

Language reflects the individual and his society and is also used to communicate concepts. When we talk about the 'meaning' in child language, we have the immediate problem of identifying the difference between the 'ideas' reflected and the 'concepts' acquired by the child as evidenced in the formation of language and its use. Meaning in this context encompasses a larger area of reference and includes two diametrically opposed semantic aspects of the linguistic sign, viz. 'signification', (of ideas) and 'communication' (of concepts); (for discussion, see Steiner 1981, Brahmananda 1983a). These two aspects interact with each other in making the language 'a process of expression', and at the same time 'a medium of communication'. These two incompatible techniques found in the human being, of which one is 'innate' and the other 'acquired', are precisely responsible for the complex picture that language presents to us.

The very emergence of communication in children has given room for three possible explanations:

(1) Environmental influence
(2) Naturalistic influence
(3) Interaction between naturalistic and environmental influences

(for discussion see Carter 1978: 127–138). Halliday (1973) had earlier expressed that 'there is no obvious source for the great majority of the child's (pre–verbal) expressions' (cf. Carter, op. cit. p. 135). But between 1960's and 80's the problem of child language, particularly, in the area of meaning has been studied from two points of view in the main: 1. child language is sensori–motor in its nature and schematic (cf. Carter 1978) in expression (inspired by the researches of Piaget et al.); 2. child language is not similar to the 'language' that

adults make use of. The child's linguistic system develops out of a prelinguistic system of communication and depends on certain types of interaction with caretakers (Waterson and Snow 1978).

Scope

As against the background outlined above, my wife and I began observing both the expressive and communicative capabilities in our children, Adilakshmi (A. L), a girl born in December, 1976 and Ananda Vardhan (A. V.), a boy born in July, 1978. Our observations began in the second month of each child. Three types of data have been elicited both by indirect and direct method as shown below:

(1) Pre-linguistic systematic articulations: schema and reflexes.

(2) Parental forms and cognitive terms: request, attention to object, request–transfer, disappearance, pleasure, surprise, recognition, etc.

(3) The rise of cognitive differences and recognition of similarities in objects.

We have continuously compared this material with that of other children in the neighbourhood. Systematic comparison was also made between the data observed in the two children. Some of the results of our study have already been published in Telugu (Brahmananda 1978, 1979a, 1980a,1980b, 1982). The present paper summarises the conclusions arrived at in the works mentioned above and also tries to systematise the notion of 'meaning in child language' from the point of view of the 'use' of language. We can talk about two types of uses:

(1) Significative use : the natural, sensori-motor expressive aspects of children's utterances.

(2) Designative use : the environmental, imitative–communicative aspects of children's utterances.

EARLY UTTERANCES

Children make sounds peculiar to themselves which are purely neuro–physiological. Even before *amma* appeared in her speech, Adilakshmi used to produce the following sound sequence between the 1st and 2nd month: /*unga*/ [*uṅgaa*]. This was remarkably absent in AnandaVardhan. *unga* could have originated in A. L. in the process of her trying to cry with a 'toy nipple' in her mouth (she was not fed by her mother). A.V. showed [*u*] repeated at regular intervals while sucking milk from his mother. Thus my wife attributed the meaning 'nipple' to *unga* which we thought was limited to A.L's usage. Later, a mother from a coastal district gave the same explanation regarding the use of *unga*. Even in a film song a lover addresses his lady love who is ignorant of the secrets of 'youth', as *unga*.

Though *unga* in A.L. originated as a psychosomatic cry, it became expressive, symbolic, and autistic later. From our side a designative use was woven into it, viz., the meaning of 'nipple', and also sometimes a 'cry for help and feed'. Thus, A.L. is once again made to learn the word *unga* along with us. Thus, *unga* has been shifted to the area of 'baby talk' from its earlier appearance as a psychosomatic expression. Not only this, it has also become part of the adult's lexicon though never used in the same way as A.L. had started using it, nor the use to which it was attributed by us as a baby cry.[3] We should recall here the observation made by Otto Jespersen (1922:157) that [m] and [n] are predominant in the 'squalling' stage of the child. Jespersen also recognised a stage of 'cooing' which very much resembles that of a cuckoo or a parrot. According to him, the parental forms emerge in the third stage which could properly be called 'child language' (ibid).

[3] The determination of a particular form to a particular meaning is always due to the adults who, however, subsequently teach it to the child Jespersen 1922:157)

The three stages which he has mentioned are not water-tight compartments having a discrete age gap. A boy of 7 years is found to make certain cooing sounds like [kʉ́] at a high pitch with a raising tone, which is not onomatopoeic of the railway engine cry (which most of the children reproduce). The psychosomatic cries are not limited to children alone. Discussing 'the functions of language', Piaget (1922:27) says, 'Love cries, for instance, which lead upto the sexual act are obviously among its most primitive words; henceforward these and all other words alluding to the act retain a definite emotional charge'. He further says, 'The word originally bound up with the act of which it is an element at a latter stage suffices alone to release the act'.[4] It would be worthwhile here to quote Spielrein's comment in detail. 'The baby syllables "mama" uttered in so many tongues to call the mother are formed by labial sounds which indicate nothing more than a prolongation of sucking. "Mama" would therefore be a cry of desire, and then a command given to the only being, capable of satisfying this desire. But on the other hand, the mere cry of "mama" has in it a soothing element; insofar as it is the continuation of the act of sucking, it produces a kind of hallucinatory "satisfaction". Command and immediate satisfaction are in this case therefore almost indistinguishable, and so intermingled are these two factors that one cannot tell when the word is being used as a real command and when it is playing its most magical role' (see Piaget, 1922: 27-28). It is this 'indistinguishability' of the two semantic aspects of 'signification' and 'communication' which I would like to deal with in detail.

Semiotics and semantics of parental forms

It is a recognised fact that 'the very earliest utterances of the child defy analysis into linguistic categories, either semantic or syntactic' (French 1975: 125).

[4] 'In all the child experience, words when seriously uttered mean in so far as they act. The intellectual function of words probably develops as a by-product of the pragmatic function'. (Malinowsky 1975. II:62).

'Mama' is a parental form along with 'papa'. The corresponding Telugu forms are: *amma* and *appa*, the designative use being 'mother' and 'father', respectively. The 'expressive' characteristic of 'mama' as has been shown already, precedes the designative use and is definitely 'a cry for help from the one who can satisfy the desire' (cf. Jakobson 1939, and Bloom 1973).

Before going into the details of the interaction of the two varieties of 'meanings', it is better to recall that the forms *mama* and *papa* have been found over the entire globe with very slight formal modifications like *mummy*, or *mum*, *ammaa*, *mamma* (see for discussion Jakobson 1939: 21-24). [5]

A 'functional stereotypy' is also noticed in these forms (French, op.cit.), which is, of course, our main concern here. The 'stereotypy' is justified on the grounds that (1) The parental forms are treated as 'lower forms'; (2) They are formed (in particular 'mama' and 'papa') in the most natural order of opening of the mouth followed by its closure (cf. Jakobson 1939: 27); (3) They are multi-referent of which 'food' is the central reference (see for discussion Brahmananda 1980b), e.g.,

appam	'bread'
paayi/baayi	'milk'
poopu	'go for a walk'
bajji	'breast/milk'
buuci	'ghost'

[5] Compare the following Telugu sentences :

1. *maa amma naanna vacEEru*
'Our mother and father came.'

2. *maa talli tanDri vacEEru*
'Our mother and father came.'

The second sentence sounds very formal and unnatural (viz., stylised) to a Telugu speaker. The possessive *maa* 'our' is never replaced by *naa* 'my' in Telugu and other Dravidian languages.

Te. *maa amma*
Ka. *anmma taaiy*
Eng. my mummy

buu	'go for a walk'
abbu	'wound'
aamu	'food'

I have elsewhere (Brahmananda 1980a) compared the Telugu *amma* with the English 'mummy' and have shown that the weeping cry *am* is prototypical and is functionally universal for all children, a point to which Jakobson's observation quoted above refers. Metathesis, lengthening of a consonant, and syllable reduplication have been fonnd to be highly productive in children's speech and therefore *am* can be said to give rise to the following forms:

* *am* → *ma* (metathesis)
mama (syllable reduplication)

* *am* → *amma* (lengthening of consonant, i.e. gemination)

In an abstracted form the process can be given as follows:

1. $V_1C \rightarrow CV_1$
   $CV_1 \rightarrow CV_1\ CV_1$
2. $V_1C \rightarrow V_1\ CCV_1$

In most of the parental forms V_1=a; and C=p/b/m (bilabials):

VC	VCCV	CVCV
**ap*	*appa*	*paapa*
**ab*	*abba*	*baaba*
**am*	*amma*	*maama*

PRE-LINGUISTIC SYSTEMATIC ARTICULATIONS

In addition to bilabials, dentals, velars, and semivowels too are found to occur in the position of C, in the forms

given below. These are multi-referent like the food-attention-cum-parent forms:

	VC	VCCV	CVV(CV)	
Dentals	**at*	*atta*	*taata*	'grandfather'
			,,	'good-bye'
	**ad*	—	*daa*	'come'
			dii	'get me down'
	**an*	*anna*	*naana*	'father'
Velars	**ak*	*akka*	*kaaka*	'father's younger brother'
	**ag*	*agga*	*gaa*	'breast'
Semi-vowels	**ay*	*ayya*		
		ayyu		
		ayyo		
	**aw*	*awwa*	*waawa*	'Onom. patting of mouth'

An observation of the above forms would reveal that a phonotactic constraint of the following type needs to be postulated.

$$C \rightarrow [-\text{gem}] / \begin{bmatrix} \text{Vowel} \\ +\text{long} \end{bmatrix} —$$

That is, a consonant is always ungeminated after a long vowel.

[6] Piaget felt that the b-initials indicating disappearance are 'sensorimotor'. But Carter says that 'he has not found any naturalistic basis for the nound-significance'. Our observations too support that they need not be natural in every case.

Our child A.L. had two bilabial forms with [p] and [b] for 'disappearance'[6] namely,

[*poo*] / (*poopu* < baby talk)
[*buu*] / (< baby talk) } 'going for a walk'

The dental/alveolar sounds, of which our children showed only dental [d], have been found to be used as deictics because of their 'outwardly directed character', e.g.

A. L. [*daa*] 'come' (? < baby talk)

[*dii*] 'get me down'
(< Te. *dincu* 'get one down')

[*doo*] 'look there' (baby talk)
(cf. Te. *adigoo* 'look there')

A. L. and A. V. showed t-initial forms to indicate 'disappearance':

[*taataa*] (cf. Eng. tata 'goodbye')

The dislike and rejection schemata are described by Jespersen (1922) as 'turning up one's nose made audible'.

A. L. used to shake her head negatively in displeasure followed by the vocalisation [ʔuuⁿ] repeated at regular intervals with a mixed tone.

The 'pleasure-surprise recognition', as has been recognised by Darwin (1904), is produced by the variants of semi-vowels:

Eng. [*oh*]

Te. [*oh*] (*oho* in adults)

A. L. had [*yuu*] to indicate pleasure and surprise. [*yaa yaa*] is not absent in Telugu children (and also in adults) 'indicating disgust over a nasty thing' (synonymous to [*chaa chaa*]). [*wawa*] is found in children as an onomatopoeic form indicating

the patting of mouth as an 'icon' of displeasure. It is to be remembered that all the above forms have only long vowels in their expressive use (never a short vowel).

Some more expressive features reflected in the above forms are shown below:

sighing:	*ammayya-hammayya* *amma*↑
weeping:	*ammoo* ∞ *ammaa* *abboo* ∞ *abbaa* *ammamma*
wondering:	*yuu* (found in A. L. in the 20th month.)

These are a few of the expressive semiotic aspects associated with the parental forms which enter into the semantics of the adult language and present the following exceptions to their 'designative' use:

1. *amma* and *appa* are considered as lower forms and *talli* and *tanDri* as higher. The latter are purely Dravidian (DED. 2560,2494).[7] The traditional grammarians recognised the fact that *amma* has an emotive element behind it (see Brahmanda 1978). *amma* is added after nouns [+male], e.g *Krishnama naayuDu* (where a man is referred to).

2. *appa* has two dialectal meanings in Telugu. In the Rayalasima variety it refers to 'father', but in coastal districts to 'sister'.

The absence of gender distinction is also found in the address made by some elders, e.g. *eemmaa*; to refer to a boy (also

[7] *amma* and *appa* resist etymological derivation. Bishop Caldwell (1856) claimed that *appa* is a Dravidian form on morphological grounds. But he did not view it as a parental form found in child language.

bymany as a form of endearment). Girls are found to addrss each other as *enTabba* (whereas *abbayi* refers to 'boy'). The expressive characteristic of *amma* is evidenced in three ways in adult usage:

1. *amma dongaa* 'eh thief' (as a mark of love).
2. *ammaDu* (*-Du* is a masculine suffix added to *amma* expressing the masculine behaviour/affection to a woman/girl).
3. *ammi* (*-i*, is a suffix added to indicate endearment; *peddamma* ∞ *peddi*, *ammi* ∞ *ammulu*, etc. are used to address one's own dear daughter).

Lastly, it is instructive to see that even the Sanskrit etymologists accepted that the word *ambaa* is to be taken as a child cry (cf. Brahmananda 1978). This is borne out by the fact that *amba* in Telugu is treated as an onomatopoeic form symbolising the cry of a cow' (see for some more examples G. N. Reddy 1966).

SOUND SYMBOLISM AND CHILD'S CREATIVITY

I would like to present here an interesting case of sound symbolism guiding creativity in a child. My nephew Mahesh (18 months) started creating(from the 10th month)certain forms to which, of course, the surrounding adult folk have attributed some meanings. The forms presented below have been collected at Bangalore very recently (May, 1983).

kattaay	'bicycle'
kuntaay	'tomato'
cittaay	'umbrella'
kaccittaa	'the tilak'
baacittaa	'comb'
jittaa	'glucose'

The [t] sound attracts our eye here. Mahesh used to reproduce his mother's name *śaanta*, as [taantaa] It is likely that the sound [t] has become settled as the model sound unit (MSU) in him. Probably it is this MSU, which has guided him to create forms in which [t] predominates. This process can be called 'sound symbolism'. The predominance of sound over sense is precisely what characterises the fantasy .of the child's autistic thinking.

Carter (1978) reports a different case from a Hindi speaking mother who said that her child produced d-intial forms like *dada* while reaching for an object. He says. 'The sounds of words frequently produced by his mother in specific early situations such as nursing might have determined the outlines of sounds a child would associate with gestures of want' (ibid).

My observation on Mahesh also indicates that [t] was the most repeated sound in his prelinguistic activity. This may be so because *śaanta*, his mother's name, is rendered by him as [taanta]. Moreover, *śaanta* is a form most frequently used in the house.

COLLECTIVE MONOLOGUE IN CHILDREN

Language is essentially a form of dialogue implying the presence of a speaker and a hearer. But children's prelinguistic activity attests such cases where they speak to themselves even while in the company of other children. This peculiar characteristic by which the child takes little notice of the presence of others and expects reply from the hearer has been characterised by Piaget as 'collective monologue'.

The following is a case collected from our children when A. L was 4;3 and A. V. was 2;9. The interesting point is that A. L. shows a thematic continuity between her utterances 1 and 3 whereas A.V's utterance 2 has no connection to 1, nor does he have any response to 3:

A.L.1 *nuvvu skuuluku poo neenu vaNTa ceesta*
you to school go I cooking will do
'You go to school. I will cook.'

A.V.2 *ey!* *enta* *baagundi*
Oh how beautiful it is
'Oh! how beautiful it is' (pointing to a doll).

A.L.3. *ayoo!* *vaNTa* *paaDaypoyndi*
alas! cooking spoiled
'Alas! the dish has been spoiled.'

THE RISE OF DESIGNATIVE USE IN THE CHILD

We observed three stages in simultaneous progress in A.L. and A.V's speech between the 2nd and 3rd year through the 7th year.

Stage 1. Perception of similarities (=) among objects (having partial similarity):

elephant = monkey
boy 'x' = any boy
serpent = rope

Stage 2. Cognition of differences (x):

(a) Clear distinction: (X)

pen X pencil
pencil X slate pencil
iDLi X dosay

b) unclear distinction ($\bar{\bar{X}}$):

chapati $\bar{\bar{X}}$ puuri
coffee $\bar{\bar{X}}$ tea

c) no distinction (—)
radio — taperecorder

A.V was found to refer to me as *amma* and my wife as *naanna* (2nd year). He was confused between tree and leaf, and hair and louse (3rd year). But A.L. never confused the forms. She has been consistent in using them. A.L. used to have *jiivu* for 'water' which she replaced by *iillu* (*niiLLu*) in her third year. *jiivu* was never used by her again.

Hence it is clear that the designative use is connected with the congnition of differences, the main feature of the adult language and use.

Stage 3: Perception of similarities in dissimilars :

Along with the process of cognising differences among objects, children are found to perceive similarities in dissimilars, which is evidenced in the following three examples (see for discussion, Brahmananda 1982).

1. A.L. (between 6 and 20 months) used to add her adjectival form *tiyya* 'sweet' to edibles which are not sweet. Once (in the 3rd year) she looked at a picture of the famous Shahanai player, Bismillah Khan and exclaimed:

adi	*tiyyaga*	*undi*
that	sweet	is

'That is sweet (fine).'

The above example could be interpreted both as a case of lack of cognition between *baagu* 'fine' and *tiyya* 'sweet': or a case of the perception of similarity between 'fine' and 'sweet'.

2. A.V (between 18 and 32 months) when he found his mother and me at a distance would address me as *amma* and his mother as *naanna*, but he would correct himself immediately. Here the case seems to be that the forms *amma* and *naanna* have not yet settled in him as designations with a marked gender.

3. A.V. (between 24 and 48 months) was repeatedly referring to 'hair' as louse, and 'leaf' as tree. The former usage is still found in him (in his 5th year) but the latter forms have been neatly set apart. The probable explanation is that the boy found a point of similarity in the location relationship of the 'louse' with the 'hair'. In the case of 'leaf' the size of the object seems to be the demarcating instrument of cognition.

REFERENCES

BLOOM, LOIS. 1973. *One Word at a Time : The Use of Single Word Utterances Before Syntax.*Mouton : The Hague.

BRAHMANANDA, H. S. 1978. 'draaviDa bhaaSallo maatru pitru vaacakaalu'. *Bhaarati* Vol. 55:10, 27–29.

_____. 1979 a. *'amma < maa'?* Review of S.D. Tirumala Rao. *Bhaarati* Vol. 56:1, 68–70.

_____. 1979 b. *vyanjana suutramu.* Unpublished Ph. D. dissertation. S. V. University, Anantapur.

_____. 1980 a. 'śiśubhaaSa: maatru pitru vaacakaalu'. *Bhaarati* Vol. 57:3, 48–55.

_____. 1980 b. 'śiśusamboodhanacakram'. *Bhaarati* Vol. 59:7, 51–55.

_____. 1982. 'śiśuvaakku: lakSaNavrutti'. *Bhaarati* Vol. 60:3, 10–16.

_____. 1983 a. 'Sergej Karcev skysankeetadrSTi'. *Bhaarati* Vol. 61:4, 22–28.

BURROW, T. and M. B. EMENEAU (eds.). 1961. *The Dravidian Etymological Dictionary.* Oxford : The Clarendon Press.

CALDWELL, ROBERT BISHOP. 1856. *A Comparative Grammar of*

the Dravidian or the South Indian Family of Languages. Repr. Madras University (1961).

CARTER, A. L. 1978. 'The development of systematic vocalisaitons prior to words : A case study'. In Waterson and Snow 1978.

CLARPADE, E. 1922. Preface to Piaget 1922.

DARWIN, C. 1904. *The Expression of Emotions in Man and Animals.* London : John Murray (First Pub. 1872).

FRENCH, PATRICE L. 1975. 'Perception and semantic learning'. In Macris 1975.

HALLIDAY, M. A. K. 1973. 'Early language learning : a Sociolinguistic approach'. Paper presented for to the IX International Congress of Anthropological and Ethnological Sciences, Chicago.

JAKOBSON, ROMAN. 1939. 'Why "mama" and "papa"?' In *Selected Writings*. Repr. In *Studies in Child Language and Aphasia.* Mouton : The Hague (1971).

JESPERSEN, OTTO. 1922. 'Mama and papa: some fundamental problems'. In *Language, its Nature, Development and Origin.* London : George Allen and Unwin Ltd. (1964).

KERNAN, KEITH, T. 1979. Review of LAURENCE (1976). *Language* 55. 245–247.

LAURENCE, LEONARD B. 1976. *Meaning in Child Language : Issues in the Study of Early Semantic Development.* New York: Grune and Stratton.

MACRIS, JAMES (ed.). 1975. *Child Language. Word* Spl. Vol. London: International Linguistic Association.

MALINOWSKY, B. 1935. *Coral Gardens and their Magic. A Study*

of Tilling the Soil and of Agricultural Rites in the Trobriand Islands. London : Allen and Unwin.

PIAGET, JEAN. 1922. *The Language and Thought of the Child.* (Eleventh Printing 1960). New York : The World Publishing Company.

_____. 1954. *The Construction of Reality in the Child.* New York : Ballantine.

REDDY, G. N. 1966. *A Study of Telugu Semantics.* Ph. D. Dissertation, S. V. University, Tirupati.

STEINER, PETER. 1981. 'A defense of semiotics: the dual asymmetry of cultural signs'. In *New Literary History.* Vol. 12–3, 415–436. University of Virginia.

TRUBY, H. M. 1971. 'Prenatal and neonatal speech, pre-speech and an infantile lexicon'. In Macris (ed.) 1971.

VYGOTSKY, L. S. 1934. 'Thought and speech'. Translated and included in Sol Saporta and J. R. Bastain (eds.) *Psycholinguistics.* New York: Holt, Rinehart and Winston (1966).

WATERSON, NATALIE and CATHERINE SNOW, 1978. *The Development of Communication.* New York : John Wiley and Sons.

OPiL 9, 10.39-60 (1983, 1984)

'Auf deutsch, duck' : LANGUAGE SEPARATION IN YOUNG BILINGUALS

CHARLES A. FERGUSON
Stanford University

Separation of two languages in a German-English bilingual child between 2½ and 3 years of age is studied in terms of vocabulary, code-mixing, and metalinguistic awareness. Vocabulary showed a large receptive lexicon from both languages, much situational variability in productive use, and a few paired items. Code-mixing showed incomplete establishment of two codes. Metalinguistic awareness progressed from 'register awareness' to 'bilingual awareness' to 'code selection awareness'. Language separation is interpreted as a function of situational variation in input and the child's natural tendency to construct systems ; it is a special case of register separation.*

In a number of studies of childhood bilingualism in which both languages are acquired simultaneously from the beginning, investigators have hypothesized (1) that such bilingual children have a single linguistic system in the early stages and only gradually separate out the two languages (e.g. Leopold 1954, Imedadze 1967, Swain 1972, Major 1977, Vogel 1975, Volterra and Taeschner 1978, Grosjean 1982: 183-188). Further hypotheses supported by some investigators include: (2) that the children's language progresses through stages in which first there is a single lexicon and single (rudimentary) syntax, then two lexicons and a single syntax, then two separate lexicons and syntaxes (cf. Volterra and Taeschner 1978), and (3) that language separation is earlier and more complete (i.e. less mixing and interference) if the language inputs are balanced in quantity and clearly defined functionally (cf. McLaughlin 1978). Other investigators have maintained that young bilingual children

*Although I was able to spend only a few hours in coversation with Chervela Nirmala in January 1980 and later to serve as a reader of her thesis, I was much impressed with her professional potential and her personal qualities. This paper is a small but heartfelt tribute to her memory.

(simultaneous acquisition) do not exhibit a single, mixed system but show language separation from the beginning or at least very early (Ronjat 1913, Fantini 1974, Bergman 1977).

These hypotheses are interesting and important, and they merit detailed empirical investigation under various conditions. Because of the nature of the questions and the present state of research, the most important single research strategy in the near future is probably the accumulation of longitudinal naturalistic studies of individual children. The purpose of the present paper is to contribute a little additional evidence from one German-English bilingual child and to call attention to some aspects of the language separation process that are often neglected.**

SUBJECT AND DATA

The child studied was Zachary K., known to everyone as 'Zak'. He was born in Berlin on 25 April, 1980 and has spent his entire life there except for a $2\frac{1}{2}$ week visit to the United States at Christmas time in 1981. His mother and father are American citizens working in (West) Berlin; they are native speakers of American English who have acquired German as adults and use it in their daily professional life as university-level instructors. They also have a 16-year-old daughter born in Berlin and bilingual in German and English; she attends a bilingual school. Zak's parents and sister speak English with him most of the time; they estimate 95%, but this figure should probably be lower, especially for the mother. Zak hears his parents and sister speak German from time to time outside the home, and his mother regularly speaks German to him in German-speaking contexts such as droping him off or picking him up at

**The author owes a debt of gratitude to students in a course on language learning (Stanford in Berlin 1982-83) for comments on drafts of the paper and to Zak's mother, Karen Ruoff Kramer, for her willingness to take time from a busy schedule to record and report on Zak's speech. Even greater gratitude is owed to Zak himself for tolerating the investigator's activities as a rather odd playmate and for producing so much fascinating data. Also, Marilyn Vihman, who had just completed a substantial paper on the same topic (Vihman in press), read a version of the paper and offered valuable comments. A lecture version was given at the Research center on Plurilingualism in Brussels in February 1983. Needless to say, the author accepts full responsibility for the data and interpretations presented in the paper.

the kindergarten and playschool he attends. Zak has attended a German-speaking daycare facility five days a week since he was nine months old. Up until he was one he went for three hours a day; from age 1; 0 to 2;5 he went seven hours a day, and at the time of the study he was going to a structured pre-school facility (called locally a 'Kindergarten') from 9 to 12:30 and to a less structured daycare facility ('playschool') from 12:30 to 5:30. In all of these Zak has been the only child exposed to English at home, and the language he hears from the other children, supervisors, and television is consistently German.

Zak's speech was tape-recorded at irregular intervals over the period October 1982-March 1983, ranging from once or twice a week at the beginning to once a month at the end, and he was observed on a number of occasions when no recordings were made. The family members, especially his mother, also reported examples of his speech which seemed particularly interesting. The data cited in this article are taken from these three sources: transcribed recordings, investigator observations, and family reports.

ONE SYSTEM OR TWO?

Discussion of the question of whether the bilingual child at early stages has one linguistic system or two is rooted in the assumption of the structuralist (and generative) lingustic tradition that each language is a self-contained, tightly structured stystem and that two different languages constitute two such systems. The argumentation is based on the linguistic and commonsense point of view that there are two languages in the child's environment and that the imperfect nature of the young child's apparent communicative competence in both may be in part due to the fact that the child has somehow combined the two systems into one. For those theorists who hold that the child's language cannot usefully be analyzed as an independent linguistic system but only in terms of a set of rules connecting the input language and the child's output language (e.g. for phonology, Smith 1973), it is still possible to capture the sense of the single-system possibility by positing a single set of rules applicable to both input languages. For those theorists who emphasize the individual creativity of the child's language development (e.g. for phonology, Macken and Ferguson 1983), it might be especially appealing to find that the

bilingual child creates a new system different from that of either input language.

From whatever theoretical perspective it has been approched, however, the question of 'one system or two' has inevitably been adult-centric and overly concerned with languages as formal systems. Those who hypothesize a highly specified, elaborated innate capacity for language acquisition (or grammar construction or grammar evaluation) on the part of the child must attribute to the child in this connection (a) some kind of foreknowledge that the surrounding verbal symbolic behavior must manifest either a single, self-contained, coherent system or several such systems and (b) the means to distinguish correctly between these alternatives. Those who hypothesize a more generalized cognitive/linguistic capacity to account for the child's acquisition of language must at least assume that this capacity includes the ability to learn to distinguish between two or more language systems in the course of the acquisition process.

The infant is surrounded by a host of communicative behaviors, non-verbal and verbal, which impinge on his or her sensory systems with various kinds and degrees of saliency. In relation to the processes of language separation in the child's acquisition of communicative competence, two factors deserve emphasis; SITUATIONAL VARIATION as a fundamental characteristic of human language and SYSTEM CONSTRUCTION as a fundamental characteristic of the child's linguistic/cognitive activity.

In listing fundamental 'design features' of human language, situational variation is often omitted or mentioned only in passing (e.g. Hockett 1960), but occasionally its importance is noted (e.g. Ferguson 1982). The structural characteristics of language (lexicon, phonology, grammar, discourse) in any speech community vary depending on who is communicating with whom under what circumstances to what purpose. This dimension of variation often called REGISTER VARIATION as distinct from regional and social dialect variation (Hudson 1980, Ellis and Ure 1982), is not limited to language in the narrow sense or even to verbal communication, but is a characteristic of human communication in general and, to a lesser extent, of non-human communication systems (Ferguson 1978:217). The range of register variation in adult-to-adult communication in a monolingual speeah community

may be very great and the ability of members of the community to judge register appropriateness is impressive. Even in the extreme case of an infant who has language input from only a single monolingual caregiver, e.g. the mother, the range of variation is considerable. The mother may, for example, carry on a running 'dialogue' with the child, engage in play routines (peek-a-boo, bye-bye), sing a lullaby, or produce 'self-talk' (for a discussion of such mother-child interactions and related phenomena in several different communities, see now Heath 1983). The lexicon, phonology and grammar will vary systematically in the different forms of discourse uttered by the monolingual mother. In the case of multilingual surroundings and multiple caregivers, the different forms of discourse or the same forms of discourse from different speakers may be in what linguists or laymen would call separate languages. The child, however, has no way of knowing that the register variation in the surrounding verbal behavior will turn out to be all in one language or in two or more languages. From the child's point of view the variation is part of the communicative behavior which is to be perceived, understood in some sense, and acquired for (passive and active) use. From the time of their 'first words' and even before that children not only perceive and respond to register variation but exhibit it themselves in their own use of verbal communication, i.e. they show more or less systematic differences in their speech depending on who their interlocutor is, the occasion of the communication, and the nature of their communicative intent.

An important part of children's language development is the use of their SYSTEM CONSTRUCTING abilities. Although other aspects are also important (e.g. direct imitation, memory of discrete items, articulatory practicing), this problem-solving, hypothesis-testing cognitive component is a crucial one. The child communicator, in the course of development, seems often to be scanning the input for regularities and patterns, constructing 'rules' to be applied under given conditions, and joining these rules together into larger systems. These rules and systems may be modified or sometimes dismantled completely as the child's communicative competence develops and comes to match more clearly the communicative systems of the community and selected reference groups within it.

The interaction of these two characteristics, register variation and system construction can be expected to eventuate in the child's construction of structures of register variation, and the point of these paragraphs is to note that language separation is only a special, extreme case of register separation. Language separation in the ideal case might involve complete matching of all possible utterances in one language with appropriate utterances in the other language, but in most instances bilingual individuals and bilingual communities have ways of speaking one language that are not matched in the other one.

VOCABULARY

A number of authors have used the bilingual child's lexicon as evidence for a single linguistic system, or at least a single lexical system. These authors assume two independent source lexicons (languages A and B) and note that the child draws on them in such a way as to give evidence for a single combined lexicon. Three kinds of evidence have been discussed: complementation, free variation, and blending.

In the case of complementation, the child's lexicon contains words taken from both A and B but with little or no overlap, so that the child's lexicon consists of a set of words and their meanings such that any meaning has only one word and there is no semantically corresponding word from the other source. Thus, according to Volterra and Taeschner (1978), Giulia, an Italian-German bilingual, at age 1;6 had one lexical system that included words from both languages but almost no overlap: the child's word for 'water' was her version of Italian *acqua* and her word for 'milk' was her version of German *Milch*.

In the case of free variation, the child has words from both A and B and uses them interchangeably. The relevant paragraph from Vogel (1975), may be quoted in full (p. 45): 'At 2;0 Eileen's speech seemed to have an undifferentiated system at the lexical level. There appeared to be no patterns for her choice of Romanian or English vocabulary items. Words were used regardless of addressee, preceding utterance, or topic of conversation, unless Eileen had a particular word only in one language and her choice was limited in that way. For example, she used both *sus* 'up' and *jos* 'down' interchangeably with *down*,

and Romanian *ciine* interchangeably with English ***dog***. Many of her utterances of more than one word were composed of Romanian and English. For example, *apa* ('water') *there*, and *go to nam* ('sleep')'.

In the case of blending, the child's lexicon includes items that blend or compound corresponding words from the two source languages. Grosjean (1982) cites examples from French-English bilingual children: *shot* < F. *chaud*, E. *hot*: ***pinichon*** < F. *cornichon*, E. *pickle*: *lune-moon*: ***papa-daddy***.

In none of the three cases is it clear what is meant by saying that the child has a single lexical system. Apparently the various authors mean nothing more than that the child has not clearly separated out two systems ; no evidence is offered to show that the lexicon is in some sense a single, coherent system as opposed to an unstructured repertoire of different items. Perhaps they mean only to say that these children have the same type of lexicon as monolinguals.

These analyses are, however, based almost exclusively on the child's productions, giving little or no attention to the child's word-recognition repertoire. If it can be shown that a bilingual child who exhibits lexical complementation in his speech is also able to recognize and understand many of the corresponding words in the opposite language, this would be evidence against the single-system hypothesis. Thus if Giulia at 1;6, when addressed in German, recognized and responded appropriately to German *Wasser* as well as she did to Italian *acqua* and similarly recognized and responded to Italian *latte* as well as she did to German *Milch*, the very fact of her use of only one word out of each Italian–German pair suggests her recognition of two different source systems and a simplifying output strategy that chooses one for every two. If there were no recognition of two systems at some level, presumably Giulia would have randomly sometimes a word from one source, sometimes from the other, and sometimes both words. On the other hand, if the complementation in lexical production is accidental in the sense that each word has been acquired only in one language because it has occurred often enough or saliently enough only in that context, then the complementation is not evidence of a double system at some level but it is neutral on the one-system–or–two question. A similar argument can be made about the blends, but in any case these

constitute only a small fraction of the lexicon and can hardly be decisive in characterizing the whole lexicon as one system or two.

An attempt was made to list Zak's total active lexicon at the end of September 1982, at age 2:5. The list is undoubtedly incomplete; he probably used many words that the family did not observe during the days the list was being compiled or did not recall from earlier observations and that did not appear during times the investigator was with him. In the opinion of his mother and the investigator, however, the list is roughly representative of his total vocabulary; it is attached as an Appendix, given in terms of ordinary orthography and presumed adult sources. The data suggest that at 2;5 Zak had near complementation in his productive lexicon, with predominantly German-source items (about 5 to 3), but recognition knowledge of the opposite-language words for items of either source that were in his production repertoire. In a few instances it was not possible to determine the source of a word because the possible English and German models closely resemble each other in phonetic shape and semantic value (e.g. *Boot:boat*), and in at least one case the origin is totally unclear: *fattafan*, Zak's regular word for a van (closed-in car without side windows). Only a few words, roughly 5% of the total, are paired in active use (e.g. both *noch eins* and *other one*, both *Hubschrauber* and *helicopter*).

Testing the subject by using English equivalents to his German-origin words in a normal communicative exchange, the investigator found that Zak almost always understood the words, i.e. would react appropriately to them. In only a very few cases did he obviously not have the English equivalent in his repertoire, e.g. *Bagger* 'bulldozer', *Kran* 'crane', *Stadt* 'city'. In these three examples the word referred to a toy he played with often in German contexts and rarely heard referred to in English. The similarity of *Kran* and *crane* was not sufficient for Zak to guess at the meaning of the latter even when he was asked to fetch his toy crane; he was cooperative and brought several different toys in response to the request, but he clearly did not know which one was wanted. Going from active English to passive German was in general the same as active German to passive English: he understood *Kleider* although he normally said *clothes*.

Although exact statistics are not available, the overall impression was that Zak understood adequately for his age the English addressed to him but replied in what sounded German, reminiscent of the many American children of immigrant parents who reply in English when their parents speak to them in the other language. This imperssion was not fully accurate since he regularly used a number of English-origin words in his speech, and after a period of interaction with English speakers, he sometimes seemed to shift in the direction of more English vocabulary. On one surprising occasion at 2;6, when the investigator had been playing with him for nearly an hour, using English, Zak came up with the expression *my papers* to refer to sheets of paper he had been marking on. In this collocation he used *my* instead of his normal *mein/meine* and used the English noun plural, one of the rare items during the period of the study. Since the investigator had not referred to the objects as papers, this isolated incident suggests that Zak was able to activate, under special conditions, details of language knowledge normally utilized only in recognition/comprehension.

In short, Zak's lexicon could not be characterized as either one system or two. He had a large receptive vocabulary and apparently recognized to a considerable extent the situational variability in its use, as evidenced by tendencies in his productive use of the lexicon. His lexical competence reflected quite faithfully the general pattern of input: 'German' daycare vocobulary predominated in his active lexicon since he heard more of it and everyone understood it, 'English' home vocabulary was well developed in his passive lexicon but less used actively since it was not needed for comprehension by his family. His few commonly used paired items indicated an incipient control of register synonyms.

CODE MIXING

Code switching, the changing from one language or variety to another in the course of speaking or writing, has been much studied in bilingual individuals and communities, and many generalizations have been made about constraints on the occurrence of code-switching and the social functions of its use. Some investigators distinguish 'code mixing' as the use of elements of two languages or varieties in the same discourse without clear

switching from one to the other over identifiable stretches. The term 'code mixing' will be used here to refer to utterances of Zak that contain elements of both source languages; the term is intentionally vague as to whether Zak is switching from one language to another or is blending systems.

While most of Zak's utterances are apparently German throughout and a few are apparently English throughout, many contain elements of both source languages. The mixing of elements is not random, and some aspects of the pattern of the mixing can be discussed here in relation to his separation of languages.

The most obvious case is that of using a word of one language (typically a content word: noun or verb) in the appropriate place in a sentence of the other. The apparently inserted word is either Zak's more common or only word for the referent or echoes the language being spoken to him. For example, his *fix-it* has no German equivalent and occurs frequently in such sentences as the following:

Autobahn kaputt. *Fixit* Autobahn. 'The car is broken. [Someone should] fix the car. [Said to the investigator. The use of *Autobahn* instead of *Auto* was a passing phase; he had been using *Auto* and apparently heard the word *Autobahn* and treated it as an alternative to *Auto*. 2;6]

Similarly with *belly button*:
Ich hab kein *belly button* mehr.
Belly button ist weggegangen.
'I don't have a belly button anymore. Belly button has gone away'. [Said to his sister, who wasn't saying anything, as she dressed him. 2;6]

An example of the less common use of a German-source word in an English framework:

Mama, my *Hose* falling' down. 'Mom, my pants are

falling down.' [Said to mother. 2;7]

As Zak's sentences become longer and more complex this pattern becomes somewhat more difficult to specify. The commonest kind of 'mix' is for the basic grammatical machinery of the sentence to be in German-source items while one or more pieces of the sentence (e.g. subject, main verb, complement) are in English-source items. The English 'insertions' may be either single words or appropriate chunks. By 'grammatical machinery' is meant personal pronouns, verbal auxiliaries and modals, basic quantifiers such as *auch* 'too', *kein – mehr* 'no more—' and connectives such as *und* 'and', *aber* 'but', (cf. Vihman in press).

Typical examples:

Mother: You can't sit on me; you must sit in the chair.

Zak: Nein, ich kann nicht *sit in my chair*. [2;7]
'No, I can not'

Zak [to investigator]: Ich kann dies hier *open*. [2;7]
'I can this here'

[After Zak spilled something on the floor, his mother told him to be careful because Ihnes, the cleaning woman, has to work hard to clean the floor. Zak's reply:]

Ihnes *cleans* die Haus und putz' die Hausschuh, aber *later*
'Ihnes cleans the house and shines the shoes, but later.'

The most striking characteristic of this pattern of mixing is Zak's regular use of German modals/auxiliaries with English verbs. Zak clearly has the modals *kann, muss* and the auxiliaries *hat, ist* in his active repertoire, but the corresponding English *can, must, have to, has* are primarily in his passive repertoire. German word order requires that the infinitive/past participle come at the end of the sentence whereas English has the corresponding verb form immediately after the modal/auxiliary. In many short sentences the difference in word order is not apparent, but in longer sentences where there is a direct object or adverbial expression the difference is clear. Whether he is using German or English main verb, Zak most often puts the verb at the end, in the German order, although examples of the other order occur. The examples given below were all in January 1983 (2;8):

[Zak had broken the leg of a plastic cow and showed it to his mother. She said she would fix it. Several hours later he came to her and said:]

Zak: Du hast fixit mein cow?
'You have' 'my'

[She had done so and gave it to him.]

Zak: Toll!
'Great'!

[Sometime later his mother noticed that the leg had broken off again.]

Mother: Look, Zak, it broke again.

Zak; Muss put it trash.
'(I) must'

Zak: Ich kann ja nicht see.
'I can indeed not'
Ich muss the light on.
'I must'

Mother: Zak, I have to work.

Zak: Ja, Ich muss auch work.
'Yes, I have to work too'

Mother: Zak, Ich muss arbeiten.
'Zak, I have to work'.

Zak: Ich muss arbeiten.
'I have to work'

Mother: Gut. What are you doing?
'Good'

Zak- Ich muss malen
'I have to paint'
Ich habe nicht mein so was.
'I don't have mine like that'
Das ist nicht malen
'That isn't painting'
Ich habe mal so uns.
'I have painted like that'

An example of unmistakably German order:

[Mother asking for second kiss at bedtime:]
Mother: What do mamas get?
Zak (laughingly): Ich hab du kiss. 'I've already kissed you.'
'I have you'

The code mixing examples cited here cannot be interpreted unambiguously as switching between two distinct codes in the same sense that code switching occurs in bilingual speech communities, where it may be attributed to a variety of factors, ranging from gaps in the speaker's knowledge of lexical items in one code to community norms of metaphorical code switching (cf. Blom and Gumperz 1972). In Zak's case, the two codes are not yet fully established, although presumably more so in his speech recognition than in his speech production. His behavior does not yet reflect to any great extent the patterns of code switching conventionalized in the speech of German-English bilinguals with whom he comes in contact. A more plausible hypothesis is that Zak has in his active repertoire some items that he associates with certain settings (occasions of usual German or usual English speech), some items that he does not associate clearly with particular settings, and some items that he prefers to use regardless of settings (and regardless of their degree of association with particular settings). The items of these various types may consist of simple lexical items or longer expressions that constitute syntactic units, such as noun phrase complements; in either case items that can be 'plugged in' as needed in sentences. His basic grammatical armature in production is of German source, although in many instances he not only recognizes and understands the English equivalents but can even produce them under special circumstances. A similar hypothesis can be made about his syntax. Insofar as he has acquired syntactic patterns, apart from habitual collocations and unanalyzed sequences, they are partly separated out and partly confused, the variable position of the main verb with a modal/auxiliary being an excellent example.

The linguistic development of a bilingual child will be determined in large part by the language situation in which he grows up, since any bilingual community--whether just a nuclear family or a population of millions--will have its characteristic degree of separation of the two languages, its patterns of situational appro-

priateness of use of the languages, and often its patterns of code switching in ongoing discourse. To these determinants must be added the circumstances of acquisition and the child's own strategies and motivation. Given the early point in Zak's linguistic development, the short period of time covered, and the narrow range of settings observed, it is not possible to go much beyond these hypotheses of a competence which is neither a unified system nor two completely separate systems.

METALINGUISTIC AWARENESS

Recently, increased attention has been paid to the development of language awareness in children as an important component in their total language development (Sinclair, Jarvella and Levelt 1978, Pratt and Grieve 1980). Most of this attention has been devoted to awareness of phonological structure, syntactic grammaticality, and the like on the part of monolingual children, and relatively little is said about the development of children's awareness of different registers or different languages.[1] Most of the classic diary studies of bilingual children, however, at least mention the question of awareness, though sometimes without clearly distinguishing it from separation of the two languages in speaking. If we assume that the fully competent adult bilingual has not only full separation but also full awareness of which language is which and the ablity to assign any utterance to its proper language, then it is plausible to assume a course of development that begins with little or no awareness and progresses to this endpoint.

One of the problems in charting this course is that the endpoint is not as clear as it might seem. If we define bilinguals roughly as people who are fluent and 'at home' in two languages, then some bilinguals have overlapping or confused names for their languages or may not even be aware that they use two languages (Khubchandani 1972). Many bilinguals, even children,

[1] Studies of the metalinguistic awareness of bilingual children have generally been focused on a comparison of monolingual and bilingual children's awareness of phonological, syntactic, or lexico-semantic structure in either language in order to determine whether bilinguals are cognitively superior to monolinguals in these respects (cf. Aronsson 1981 for a recent experiment and literature review); no attempt has been made to measure the degree of bilingual awareness as such, i.e. awareness of the two languages and association of the correct language names with the respective languages.

have 'transfer rules' to convert a word or construction from one language to the other and some can even verbalize such rules to a considerable extent (cf. Leopold 1954). Bilinguals differ in their ability to codeswitch and to translate from one language to the other, and in their degree of awareness of these processes. Some of these differences depend on the norms of the speech community and the structures of the languages involved, and some are individual differences within the community. All in all, it is wise to be cautious in making generalizations about bilingual awareness and its development in children (cf. Elliot 1981:173-175). The data from Zak seem to show a definite development in his metalinguistic awareness, but the apparent course of Zak's development can not at this point be generalized to other bilingual situations or other children without further investigation.

The evidence for Zak's development in metalinguistic awareness of his two lauguages comes primarily from his comments about language use. He proceeded through a stage of becoming aware of the situational conditioning of variation in language ('register awareness') to a stage of becoming increasingly able to attach the right language label to utterances ('bilingual awareness'), and finally to a stage of being able to talk about the appropriateness of the choice of language ('code selection awareness').

Within a two–week period in October 1982 (age 2;5) three incidents were recorded in which Zak showed concern about the situational appropriateness of particular expressions, evidence of his growing register awareness:

(1) *Ja–uh–huh.* Zak frequently adds a tag interrogative *ja?* to his statements. When his mother once replied with *ja*, he responded with a scolding *nicht ja, besser uh-huh*, thus indicating that the common *uh–huh* of English speakers was more appropriate from his mother than the *ja* used by his German–speaking associates. This clear pairing of *ja* : *uh–huh* and preference for his mother to use *uh–huh* continued for a long time, in fact to the end of the period of the study. Although he did not invariably correct his mother's *ja*, he often did so.

(2) *Besserbetter.* On one occasion when Zak got his foot caught between a front seat and the gear box in their car, his mother helped him to extricate his foot and asked him, *Ist*

das besser?' He retorted, '*nicht besser, better*'. Apparently Zak had now paired the similar *besser* and *better*, and expressed a preference for his mother to use the right one for her. This explicit pairing of *besser* and *better* continued to be a concern of Zak's and several similar incidents occurred later.

(3) *Tschüss - bye-bye.* For over a year one of Zak's German-speaking playmates had been saying *bye-bye* to Zak's mother when she came to pick him up. No one remembers exactly how this got started but most likely after an occasion when Zak's mother once said *bye-bye* and it was imitated by the friend. The October incident of register awareness took place when Zak's father came one day to pick him up and the other boy said *bye-bye* to him. Zak corrected his friend by saying, '*Nicht bye-bye, besser tschüss*'. Apparently Zak had accepted the boy's ritual use of (English) *bye-bye* with his mother, but felt that on this more unusual occasion, when his father was the interloctor, the boy should have stuck to the ordinary (German) *tschüss*. This incident is a good illustration of how hard a job it muste for a child to discover appropriate occasions of use of synonyms, in this case synonyms across languages.

The next month, November 1982, two incidents showed Zak's beginning use of the labels *deutsch* and *englisch/English*, evidence of his growing bilingual awareness.

(1) *Circle-Mann.* On November 6 Zak and his mother were playing, drawing pictures on a blackboard. His mother said, '*That's a circle*'. Zak replied with '*Dis a circle; auf deutsch Mann*'. Zak's identification of English *circle* with German *Mann* was quite reasonable, given that drawing was a frequent activity at his kindergarten and the common way to draw a man was to begin with a circle and add lines. This was his first clear indication that he was attaching language labels to paired expressions. His mother followed up the exchange by asking '*Do you know the difference between Deutsch and English?*' Zak's reply was simple and to the point: *Kinder auf deutsch* 'Children in German'. He had learned names for the two languages and was able to make explicit generalizations about the occasions of appropriate use of each language, e.g. that German was the language used with the children at kindergarten and playschool.

(2) *Auf deutsch, duck.* One day Zak's mother was showing him a profusely illustrated Mother Goose book, and she pointed to a picture, saying '*That's a goose*'. Zak's response was, '*Goose Auf deutsch, duck*'. The interpretation seems obvious. Zak had been familiar with the word *duck* and its referent for a long time, and when his mother gave him a new name for what seemed to be the same creature he could only conclude that it must be a language–paired synonym—a reasonable, though erroneous, conclusion. The response certainly suggests alertness to the possibility of word pairings, readiness to acquire the missing item of pairs, and awareness of the classification into two languages.

Late in December 1982 an incident occurred in which Zak was introduced to the notion of translation games. An American university student who spoke a considerable amount of German interacted with Zak at a party when Zak had come with his parents. The student asked Zak the names for various items in a small case of decorative objects. Zak responded readily but then after each answer, the student asked again for the name in English. At first Zak did not get the idea, but as the student kept supplying the English equivalents he finally seemed to 'catch on' and gave one or two appropriate responses. This translation game (cf. Burling 1959) apparently made quite an impression on Zak, and when he saw the student again later in the evening, he tugged at his sleeve for attention and produced an English word he had failed to be able to provide in the translation game earlier in the evening.

In February 1983 Zak could respond with understanding and definite opinions to his mother's questions about which language he thought she should use. When she asked him one day, in the presence of the investigator, about her use of *uh-huh* or *ja* and English or Deutsch, he was able to assure her that she should use *uh-huh* in preference to *ja* and English rather than Deutsch.

CONCLUDING STATEMENTS

This presentation of data from a child raised in a bilingual environment has focused on the child's separation of the two languages as a function of the situational variation in input and the child's natural tendency to construct systems.

On the basis of Zak's production vocabulary, the paper suggests that it is misleading to ask when the child has one linguistic system and when he has two. Zak had an extensive receptive competence in German and English, but his production vocabulary was more heavily German-based. This kind of split competence reflected the fact that most of his German-speaking interlocutors, including age peers, were monolingual and he spent the greater part of his time speaking with them, whereas his family, although typically speaking to him in English, could understand German and speak to him in that language when they found it appropriate.

On the basis of Zak's 'code mixing', i.e. use of material o different source languages in the same discourse, the paper suggests again that the question 'one system or two?' is not sufficiently nuanced. His association of elements with one lingustic context or another is not complete and he also has preference strategies that can override the language identification.

On the basis of Zak's comments on language, the paper suggests that he developed in metalinguistic awareness from being aware of situational variation ('register awareness') to being able to attach the right language label to utterances ('bilingual awareness') to being able to talk about which language to use ('code selection awareness').

Evidence of children's system construction in morpho-syntax and phonology is often found in 'errors' of overgeneralization, idiosyncratic formations, resistance to attempts at correction, and the child's attempts to correct others. Evidence for system construction in register variation (including the extreme case of language separation) may correspondingly be found in overgeneralization, idiosyncracy, resistance to correction, and correction of others, but in this case in the choice of appropriate varieties on different occasions. A frequently cited illustration is the objection made by a child when a parent speaks in the 'wrong' language, in a household where there is a clear division of which parent speaks which language. The child wants to correct the language use in terms of the 'grammar' of variation that he has constructed.

In the case of Zak, one recurrent illustration of this phenomenon finally became clear to the investigator. Zak's system

of allocation of English and German failed to match the system of the environment in respect to his mother's code selection. Zak's comments on language reported here show that he felt his mother should speak English in more situations than she did. Zak accepted the fact that his mother spoke both ways depending on the situation, and he probably often depended on her ability to understand and speak German, but he clearly felt that she sometimes used German when his system called for her to speak English. As his analysis of the situational variation developed, including the labeling of the two languages, Zak's system was presumably coming to match the surrounding patterns more exactly and the resistance Zak manifested to his mother's use of German, on some occasions is evidence of remaining areas of mismatch. Whatever the precise details of the non-matching systems, which could only be discovered by meticulous analysis of many speech events, this mismatch gives evidence of the child's system constructing efforts in the acquisition of register variation/language separation, evidence just as convincing in its way as Zak's impressive hypothesis 'Auf deutsch, duck'.

APPENDIX

ZAK'S OBSERVED VOCABULARY AT 2;5

A. German source

auch	Eisenbahn	papa
aussteigen	Elefant	rein
Auto	geht nicht	runter
Autobahn	guck mal	Sonne
Bagger	hupla	Stuhl
Bahn	ich	Stadt
Blumen	kaputt	Tee
bums	kran	Traktor
da	machen	vier
das	Mama	was
die	muss mal	Windmühle
Doktor	nee	wo denn
drei	nicht	zumachen
du	noch mehr	zwei

B. English source

airplane	news

all done	piano
baby	play
carry me	play song (=play with tambourine)
clean up	potty
clothes	push button
do it	running
don't touch it	tired
eating	umbrella
empty	watch T.V.
fix it	wiping
flush it	

C. Source uncertain because of English-German similarity and Zak's pronunciation.

Bär, bear
Boot, boat
Buch, book
dies, this
hallo, hello
hier, here
mein, my (mine)
Schuhe, shoe (s)

D. Source unknown
fattafan 'van'

E. Pairs in active use

Ah-ah (machen)	(go) potty
auch	too
Auto	car
Fahrrad	bicycle
Hubsschrauber	helicopter
ja	uh-huh
noch eins	other one
tschüss	bye-bye

REFERENCES

AARONSSON, K. 1981. 'The bilingual preschooler as grammarian. Children's paraphrases of ungrammatical sentences'. *Psychological Research Bulletin* 21.10/11 .1-26.

BERGMAN, C. R. 1977. *Problems in the Developmental Psycholinguistics of Bilingualism: Language Acquisition and Language Use.* Unpubl. Ph.D. diss. University of California: San Diego.

BLOM, J.-P. and J.J.GUMPERZ. 1972. 'Social meaning in linguistic structures: code-switching in Norway'. In J. J. Gumperz and D. Hymes (eds.), *Directions in Sociolinguistics.* New York: Holt, Rinehart and Winston.

ELLIOT, A. J. 1981. *Child Language.* Cambridge: University Press.

ELLIS, J. and J. Ure. (eds.). 1982. *Register Range and Change.* (=*International Journal of the Sociology of Language* 35). Berlin: Mouton.

FANTINI, A. E. 1974. *Language Acquisition of a Bilingual Child: a Sociolinguistic Perspective.* Brattleboro, VT: The Experiment Press.

FERGUSON, C. A. 1978. 'Talking to children: A search for universals'. In J. H. Greenberg et al. (eds.), *Universals of Human Language.* Vol. 1. Stanford, CA: Stanford University Press.

FERGUSON, C. A. 1982. 'Simplified registers and linguistic theory'. In L. Obler and L. Menn (eds.), *Exceptional Language and Linguistics.* New York: Academic Press.

GROSJEAN, F. 1982. *Life with two Languages: an Introduction to Bilingualism.* Cambridge, MA: Harvard University Press.

HEATH, S. B. 1982. *Ways with Words: Language, Life, and Work in Communities and Classrooms.* Cambridge: University Press.

HOCKETT, C. F. 1960. 'The origin of speech'. *Scientific American* 203.88-96.

HUDSON, R. A. 1980. *Sociolinguistics.* Cambridge: University Press.

IMEDADZE, N. V. 1967. 'On the psychological nature of child speech formation under conditions of exposure to two languages'. *International Journal of Psychology* 2.129-132.

KHUBCHANDANI, L. M. 1972. 'Mother tongue in multilingula societies'. In A. Chandra Sekher (ed.), *Economic and Socio-Cultural Dimensions of Regionalisation* (=Census Centenary Monograph 7). New Delhi: Registrar General of India.

LEOPOLD, W. F. 1954. 'A child's learning of two languages'. *Georgetown University Round Table on Languages and Linguisiics* 7.19-30.

MACKEN, M. A. and C. A. FERGUSON. 1983. 'Cognitive aspects of phonological development: model, evidence, and issues'. In K. E. Nelson (ed.), *Children's Language*. Vol. 4. Hillsdale, NJ: Erlbaum Associates.

MAJOR, R. C. 1977. 'Phonological differentiation of a bilingual child'. *Ohio State University Working Papers in Linguistics* 22.88-122.

MCLAUGHLIN, B. 1978. *Second Language Acquisition in Childhood.* Hillsdale, NJ: Laurence Erlbaum Associates.

PRATT, C. and R. GRIEVE. (eds.). 1980. 'Language awareness in children'. Special issue, *Education Research and Perspectives* 7.1-112.

RONJAT, J. 1913. *Le Development du Language Observe chez un Enfant Bilingue.* Paris: Champion.

SINCLAIR, A., R. JARVELLA. and W. J. M. LEVELT. 1978. *The Child's Conception of Language.* Vienna: Springer.

SMITH, N. V. 1973. *The Acquisition of Phonology: A Case Study.* Cambridge: University Press.

SWAIN, M. 1972. *Bilingualism as a First Language.* Unpubl. Ph. D. diss., Universtty of California, Irvine.

VIHMAN, M. M. 'Language differentiation by the bilingual infant'. To appear in *Journal of Child Language.*

VOGEL, I. 1975. 'One system or two: an analysis of a two-year-old Romanian-English bilingual's phonology'. *Papers and Reports on Child Language Development* 10.43-62.

VOLTERRA, V. and T. TAESCHNER. 1978. 'The acquisition and development of language by bilingual children'. *Journal of Child Language* 5.311-326.

OPiL 9,10.61-72 (1983, 84)

THE MENTAL REPRESENTATION OF PREFIXES

JEAN AITCHISON

London School of Economics

According to a number of psychologists, prefixed words such as *conception, perception, reception* are stored in the mental lexicon basically as stems, with the various prefixes added as subentries. This paper presents psycholinguistic evidence against this decompositional view, arguing that prefixed words are stored in the mental lexicon as wholes. It shows that, in a collection of approximately 750 word selection errors, those involving prefixed words are no different in nature from those found in unprefixed ones. Moreover the prefix errors were found not to constitute a homogeneous group. A variety of explanations, and in particular blending, were put forward to account for the prefix errors found.*

Derivational morphology is a fascinating topic which has recently become very popular. Those of us interested in derivational morphology who are also psycholinguists are faced with the following crucial problem: when we do derivational morphology, are we describing a process which happened in the past? Or are we dealing with an analysis into morphemes which actually occurs in the minds of speakers? In other words, does derivational morphology have 'psychological reality'?

In this paper, I will discuss the mental representation of English prefixes. That is, if a word has a prefix, as in *conception, deception, inception, perception, reception,* does this affect the way it is stored in the mental lexicon, and also the way in which it is accessed in comprehension and production?

The topic of prefixes was first raised by Taft and Forster (1975). They argued that a word such as *rejuvenate* was stored in the lexicon primarily as the stem *-juvenate,* with a subentry for the prefix *re-*. This conclusion was based on a lexical decision task, that is, a task in which subjects were asked to decide whether a particular sound sequence was a word of English or not. They claimed that it took longer for subjects to reject stems of

* I am grateful to Anjani Kumar Sinha for his comments on an earlier draft of this paper.

prefixed words such as **juvenate* (from *rejuvenate*) than forms such as **pertoire* (from *repertoire*) where the initial sequence *re-* cannot be regarded as a prefix. They assumed that when presented with **juvenate*, a subject found the lexical entry *-juvenate*, then discovered that it needed a prefix. This accounted for the delay in rejecting it. For **pertoire*, on the other hand, there was no lexical entry, so the decision to reject it was immediate.

There are a number of problems with Taft and Forster's paper. For example, they did not check to see whether the stems they dealt with resembled other words: so **juvenate* might have been rejected slowly because of its likeness to *juvenile*, rather than because its prefix had been detached. In addition, they paid no attention to stress: they stripped off the main stress with the initial sequence *re-* in **pertoire*, but retained it in **juvenate* Furthermore, their task was a visual one, so their results might reflect reading strategies rather than lexical storage.

However, Taft and Forster received unexpected support from Fay (1977), who analysed a number of slips of the tongue. He argued that among word substitution errors in which one prefixed word is substituted for another, the largest single subtype involved words having the same stem, but different prefixes, as in *constraint* for *restraint*, *advice* for *device*. In order to account for these errors, he suggested that these words are listed in the mental lexicon primarily by their stems, with the various prefixes dangling off as subentries. He hypothesizes that the subentries are arranged by frequency, so that prefixed words belonging to the same stem would tend to get confused if they were of similar frequency.

More recently, Taft and Forster's paper has been re-examined by Stanners, Neiser and Painton (1979), and Rubin, Becker and Freeman (1979). Both of them dispute Taft and Forster's conclusions. Stanners et al. suggest that prefixed words are represented BOTH as stems AND as whole words in the mental lexicon, while Rubin et al. claim that Taft and Forster's results are due to an artificial strategy adopted by subjects for that particular experimental task.

Taft (1981), however, rejects these criticisms, and has reaffirmed the results of the original Taft and Forster paper with a new set of experiments which complement the earlier ones: he

finds that word recognition of pseudoprefixed words (unprefixed words which look as if they are prefixed, e.g. *precipice*) is slower than word recognition of both prefixed words (e.g. *replica*) and unprefixed words (e.g. *pinnacle*). He suggests that pseudo prefixed words are difficult because they are mistakenly decomposed in a prefix-stripping procedure. He claims, 'In summary, then, from the finding that pseudoprefixed words are indiscriminately treated as prefixed words, it can be concluded that prefix stripping occurs in word recognition, and this, in turn, implies that prefixed words are accessed through a representation of their stem' (1983: 296).

In brief, three different viewpoints are found in the previous literature:

(1) Prefixed words are stored primarily as stems, with their prefixes as subentries.

(2) Prefixed words are stored as whole words.

(3) Prefixed words are stored twice, both as stems with detachable prefixes, and as whole words.

I hope to shed some light on this problem by examining the treatment of prefixed words in a collection of approximately 750 different spontaneous speech errors in which one similar sounding word was selected for another.

Essentially, I shall claim that prefixes are unlikely to be detached from bound stems in the mental lexicon. I will argue that previous analyses have been oversimple, and that a variety of mechanisms are needed to account for the prefix changes found. I will show that prefixed words need to be considered alongside other words beginning with the same initial sequence, and also that, when dealing with speech errors, the full context of the error must be taken into account: failure to do this may have led Fay (1977) to false conclusions.

DATA

The data consisted of approximately 750 similar sound errors collected by myself, my students and friends over the past few years, as well as the adult errors listed in Aitchison and Straf (1981). From these, I extracted all instances of the initial

sequences found in the 13 prefixes examined by Stanners et al. (1979), and discarded those with fewer than 10 examples. This left a total of 208 errors, involving the initial sequences: *con-*, *de-*, *dis-*, *ex-*, *in-*, *re-* as error or target, or both. In order of frequency, the number of times each initial sequence occurred was as follows:

con- 70 ; *in-* 50 ; *de-* 34 ; *re-* 27 ; *ex-* 24 ; *dis-* 16.

Note:

(i) The total of errors listed under each prefix comes to 231, more than the overall number of errors (208). This is because 23 errors were counted twice, as they involved the change of one of these prefixes to another, as in *distinguished* ⟶ *extinguished.*

(ii) The prefixes covered a variety of phonetic representations; *con*: [kom] [kon] [koŋ] [kəm] kən] kəŋ]; *in*: [im] [in] [iŋ]; *de*: [de] [di]; *re*: [re] [ri]; *ex*: [eks]; *dis:* [dis].

(iii) Initial sequences, rather than prefixes, were dealt with at this stage. The criterion for being a prefix is discussed below.

Analysis

Each word involved in an error (i.e. both errors and targets) was assigned to one of six categories in accordance with its morphological make-up.

(a) **Unprefixed words:** *delphinium, Delilah.*

(b) **Uniquely prefixed words:** e.g. *concubine, detergent.*

These are words which seemed to be prefixed on the basis of their historical derivation, but whose stem was not found attached to any other prefix, e.g. we do not find forms such as **decubine, *procubine, *retergent, *pretergent.*

(c) **Interchangeably prefixed words:** *conception, deception, inception, reception.*

These are words whose stem could be attached to several different prefixes.

(d) **Detachably prefixed words:** *(con)sequential, (in)dependent.* These are free forms which could have attachable or detachable prefixes.

(Meaning was ignored.)

(e) **Non-words:** *insultant, conflictory.*

(f) **Different longer prefixes:** *interlude, retrospect.*

These are words which began with the initial sequences under discussion, but which seemed to involve different longer prefixes such as *inter-, retro-.*

The data were then analysed under the following headings:

(1) **Category interchange:** The extent to which errors and targets interchanged within and between the morphological categories listed above was examined.

(2) **Target maintenance:** The percentage of target prefixes which were maintained in the errors was calculated.

(3) **Prefix change:** Errors which seemed to exhibit 'pure' prefix change were examined within their context of use.

Results and Discussion

(1) **Category interchange.** Category maintenance and category interchange within and between categories (a), (b), and (c) were as follows (absolute numbers):

(a) <—> (a) 16, e.g. dilemma → Delilah

(b) <—> (b) 48, e.g. escalator → excavator
conveyance → convenience

(c) <—> (c) 59, e.g. compartment → component
construction → instruction

(a) <—> (b) 15, e.g. concubine → porcupine
columbine → concubine

(a) <—> (c) 2, e.g. corrugated → congregated
deficient → difficult

(b) <—> (c) 50, e.g. combative → competitive
expedition → exhibition
dessicated → desecrated

If prefixed words were regarded by speakers as comprising a special category which were treated differently from other words, one would not expect such a free interchange across categories. In other words, one would expect changes to occur only within categories, e.g. (c) <—> (c), and not between categories, e.g. (a) <—>(b). The large number of (b) <—> (c) interchanges might be explained on the assumption that (b) words as well as (c) words are treated as prefixed, but this would then leave unexplained the 15 examples of (a) <—> (b). (The smaller number is due to the fact that there were fewer (a) words in the data than (b) and (c) words).

(2) **Target maintenance.** 71% of target initial sequences were maintained in the errors as a whole. The figures for target maintenance in categories (b) and (c) were similar to the overall percentage amounting to 72% and 73% respectively, as summarised below:

Target	Initial sequence maintained
Overall	71%
(b) Uniquely prefixed words	72%
(c) Interchangeably prefixed words	73%

In all categories, therefore, there was a strong disposition to maintain the initial sequence. Moreover, words in category (c) (interchangeably prefixed words) behaved no differently from other types of word. If prefixes were stripped, one might expect this category to show a lower level of prefix maintenance, since there would be more potential sources for prefix confusion.

If we had been concerned only with initial consonants, rather than initial sequences, then the proportion maintained in these categories came to over 80% (e.g. *disruptive* → *destructive* preserves the initial consonant, but not the prefix).

This is a slightly higher figure for initial consonant maintenance than in similar sound errors as a whole. Aitchison and Straf (1981) found that, in a collection of 472 adult malapropisms, the percentage of initial consonants identical to their targets was 77%. It therefore seems that the presence of a prefix might actually aid recall, rather than being an unstable feature. This

finding is consistent with the observations made by Brown and McNeill (1970) in their famous 'tip of the tongue' experiment, in which they noted that subjects tended to remember the presence of a chunked prefix or suffix. It is also consistent with the findings of Browman (1976), and with a number of examples of word searching found in my data, for example: 'I met a man at the party who said he'd written an article on the IRA, on its contemplation, no combination, I think I mean its construction, not quite, it's something like consistency or constitution, it's make-up, ah, composition!'

(3) **prefix change.** There were 32 apparent examples of 'pure' prefix change, that is, cases in which the stem appeared to be the same in both target and error, and only the prefix altered. There were 22 in category (c) (interchangeably prefixed words), 4 in category (d) (detachably prefixed words), and 6 in category (e) (non-words). These are listed below:

(c)	aspersions	→	dispersions	Blend
	conception	→	contraception	[s]
	congestion	→	digestion	Blend
	constitutional	→	prostitutional	[s]
	delegation	→	relegation	Re
	department	→	impartment	Blend
	distinguish	→	extinguish	[s]
	distinguished	→	extinguished	[s]
	ejection	→	injection	Mal.
	establish	→	distablish	Blend
	extinguisher	→	distinguisher	[s]
	impact	→	compact	Blend
	induce	→	seduce	Mal.
	intended	→	attended	Blend
	intensive	→	extensive	Mal.
	precision	→	concision	Blend
	reception	→	conception	[s]
	referred	→	deferred	Re
	respiration	→	perspiration	[s]

succeeded	→	exceeeded	[s]
suppose	→	expose	Blend
transpires	→	expires	[s]
(d) capitation	→	decapitation	Mal.
dependent	→	independent	Op.
livery	→	delivery	Mal.
sequential	→	consequential	Blend
(e) consultant	→	insultant	Blend
delayed	→	dislayed	Blend
expendable	→	dispendable	Blend
important	→	exportant	Blend
replace	→	deplace	Blend
strictly	→	extrictly	Blend

When these words were examined within their context of use, it became clear that they did not form a homogeneous group, and that there were likely to be several different mechansms underlying the prefix changes. They can be usefully discussed under the following headings:

(i) Blends
(ii) *s-* disruption
(iii) Classical malapropisms
(iv) Opposites
(v) Residue

(i) **Blends.** Blends, the combination of two words into one, formed the largest single subgroup. They accounted for 14 out of the 32 errors listed above, and are marked 'Blend' [(c) 7; (d) 1; (e) 6;].

E.g. expect + suppose → expose (c)
'I don't expose anybody will eat that.'
consecutive + sequential → consequential (d)
'The numbers aren't consequential.'
disposable + expendable → dispendable (e)
'Plastic bags are expendable, er... I mean dispendable, ..dispensable, ..ah, disposable.'

(It is possible that the number of blends was even higher: some may have gone undetected, due to inadequate context).

(ii) ***S*-Disruption.** In child language, it has been noted that the presence of *s* or a cluster containing *s* can lead to disruption of the word as a whole (e.g. Waterson, 1971; Aitchison, 1972). This could be due to the complex neuromuscular coordination required for executing clusters such as *skl*, *spr* etc., or to the likelihood that sibilants produce a strong auditory image which can partially mask surrounding sounds.

It is interesting to note that nine of the remaining prefix-change words involve *s* at the junction of prefix and stem. This suggests that *s*-disruption may be a factor which needs to be taken into consideration in adult speech also. The words involved are all in category (c), and have been marked [s]:

e.g. construction → instruction
extinguisher → distinguisher

(iii) Classical malapropisms. Classical malapropisms are errors of ignorance (as perpetrated by Mrs Malaprop in Sheridan's play, *The Rivals*) in which a word is misidentified with another similar one. Such malapropisms are a confusing factor in collections of selection errors, and can be identified only if they are particularly strange (e.g. bubonic plague → blue bonnet plague), or found repeatedly in speakers of low education. Typically, unstressed syllables tend to be distorted, due to mishearing. It is probable (judging from the context) that several of the prefix-change errors listed above are classical malapropisms. The five probable examples have been marked 'Mal.(apropism)':

e.g. livery → delivery (d)
'The footman was dressed in delivery'.
ejection → injection (c)
'The pilot escaped in his injection seat'.

(iv) Opposites. The error *independent* → *dependent* could be interpreted as a prefix-change, particularly as its stem is a free form. It seems plausible that a word such as *independent* should be treated differently from one such as *inception* where the stem is bound. (Unfortunately there were insufficient detachably prefixed words in the data to comment usefully on this point: most words

had bound stems .) Note, however, that there is nothing to distinguish this word from the common semantic error-type in which opposites are confused, as in *left* <--> *right*, *up* <--> *down*, *open* <--> *closed*, *early* <--> *late*. It cannot therefore be regarded as a firm example of a detached prefix, and has been marked 'Op(posite)'.

(v) **Residue.** If the explanations above are plausible, then we are left with only two examples of prefix change, marked 'Re(sidue)' :

delegation → relegation
referred → deferred

In both cases, the interchanged words begin with consonants that have a similar place of articulation, followed by an identical vowel, and the words show a strong metrical similarity. If, as many linguists now believe, speakers store words as either metrical trees or grids (e.g. Liberman and Prince, 1977), then an explanation based on weak syllable masking seems more likely than one based on the assumption of a detached morphological prefix.

In brief, for all 32 examples of prefix change, it is possible to suggest alternative, and arguably more plausible explanations than one which involves the notion of a mental lexicon with detached prefixes.

CONCLUSION

An analysis of 208 slips of the tongue involving the initial sequences *con-, in-, de-, ex-, re-, dis-* does not support the suggestion that morphologically complex words which involve bound stems are stored in the mental lexicon as stems with detached prefixes. (It is possible, but unlikely, that such a viewpoint could be maintained for written material, and would involve the assumption that storage of visually accessed words is quite different from storage of spoken ones .) Note that the claim made in this paper refers only to prefixes attached to bound stems, e.g. (*conception, reception*). It is possible that prefixes attached to free forms (e.g. *unhappy,* and *regain*) are treated somewhat differently: there was insufficient evidence in my data to make any useful comment on this point.

Note also that this paper makes no claims about a speaker's metalinguistic ability (or lack of it). It is probable that speakers can, on reflection, separate words such as *conception, reception,* into *con + ception, re + ception.* However, such metalinguistic abilities should not be confused with normal use (as is clear from several studies, e.g. Gleitman, Gleitman and Shipley, 1972). In other words, no assemblage of prefix and stem is required when a word is used: it is stored in its assembled state. But this does not imply that speakers are unable to disassemble a word on reflection.

The prefixes considered here, then, indicate that prefixes and bound stems are stored together as a unit. This was shown by :

(1) **Category interchange.** The frequent interchange of interchangeably prefixed words with uniquely prefixed words, and also the interchange of uniquely prefixed words with unprefixed words suggest that prefixed words are not treated any differently from unprefixed words.

(2) **Target maintenance.** There was a strong overall preference for maintaining the initial sequence, and prefixed words were treated no differently from unprefixed words: 71% of initial sequences were preserved in the data as a whole, 72% of initial sequences were preserved in uniquely prefixed words, and 73% of initial sequences were preserved in interchangeably prefixed words.

(3) **Prefix change.** All possible examples of prefix changes were examined and were found not to constitute a homogeneous group. A variety of explanations (e.g. blending) was proposed to account for the errors, none of which involved the notion of a detachable prefix.

Note, incidentally that the conclusion reached here from psycholinguistic evidence supports that reached by Aranoff (1976), by means of linguistic argumentation. However, the fact that prefixes are stored alongside their stems does not imply that words are stored as linear strings. Instead, it seems likely that their mental representation is in terms of metrical trees or grids (Liberman and Prince, 1977). The details of such a representation are still unclear. Further specification is a task for the future.

REFERENCES

AITCHISON, J. 1972. 'Mini-malapropisms'. *British Journal of Disorders of Communication* 7. 38-43.

AITCHISON, J. and M. STRAF. 1981. 'Lexical storage and retrieval : a developing skill?' *Linguistics* 19. 751-795.

ARANOFF, M. 1976. *Word Formation in Generative Grammar*. Cambridge, MA : MIT Press.

BROWMAN, C. 1976. 'The natural mnemopath : Or, what you know about words you forget'. *UCLA Working Papers in Phonetics* 31. 62-67.

BROWN, R. and D. MCNEILL, 1966. 'The "tip of the tongue" phenomenon'. *Journal of Verbal Learning and Verbal Behaviour* 5. 325-337.

FAY, D. 1977. 'Prefix errors'. Paper presented at the *Fourth Salzburg International Linguistics Meeting*.

GLEITMAN, L.R., H. GLEITMAN, and E.F. SHIPLEY. 1972. 'The emergence of the child as grammarian'. *Cognition* 1. 137-164.

LIBERMAN, M. and A. PRINCE. 1977. 'On stress and linguistic rhythm'. *Linguistic Inquiry* 8. 249-336.

RUBIN, G.S., C.A. BECKER, and R.H. FREEMAN. 1979. 'Morphological structure and its effect on visual word recognition'. *Journal of Verbal Learning and Verbal Behaviour* 18. 757-767.

STANNERS, R.F., J.J. NEISER, and S. PAINTON. 1979. 'Memory representation for prefixed words'. *Journal of Verbal Learning and Verbal Behaviour* 18. 733-743.

TAFT, M. 1981. 'Prefix stripping revisited'. *Journal of Verbal Learning and Verbal Behaviour* 20. 289-297.

TAFT, M. and K.I. FORSTER. 1975. 'Lexical storage and retrieval of prefixed words'. *Journal of Verbal Learning and Verbal Behaviour* 14. 638-647.

WATERSON, N. 1971. 'Child phonology : a prosodic view'. *Journal of Linguistics* 7. 179-211.

OPiL 9,10. 73-101 (1983, 1984)

CASE RELATIONS AND CASE FORMS IN CHILD LANGUAGE

B. LAKSHMI BAI

Osmania University

Based on a longitudinal research, the study presents the development of case relations and their surface manifestation in the speech of two bilingual children, Chetan and Deepa. Using cross linguistic evidence, the validity of conglomerating such diverse semantic roles as 'recipient', 'beneficiary' 'possessor' and 'experiencer' under the old term 'Dative' or the more recent 'Experiencer' is questioned. The early acquisition of dative forms by Tamil-Telugu children as distinct from the common preference for accusative by children speaking English and other Indo-European languages is explained in terms of cognitive and linguistic factors. Finally, it is claimed that the instrumental case like 'source', is cognitively less salient than the other case relations and therefore Ruke-Dravina's explanation of its late acquisition due to its being marked with a preposition is untenable.*

There has been a considerable amount of interest in the development of case roles and case forms in children's speech (Slobin 1970, Brown 1973, Bowerman 1973, 1978, Greenfield and Smith 1976). Such studies can shed light on the complex interaction between cognitive, linguistic, and pragmatic factors in the speech development of young children. In particular, such studies are valuable when they provide data which enable cross-linguistic comparisons to be made. The present paper, therefore, has the following aims:

(1) It outlines the development of case-roles and case-forms in two bilingual children-Chetan, a boy, and Deepa, his younger sister.

(2) It compares this development with that of other children discussed in the literature.

(3) It attempts to account for the findings in terms of the interaction between cognitive development, linguistic development and communicative needs of young children.

*I would like to thank Jean Aitchison for her useful comments and help

CASE RELATIONS

Fillmore (1968, 1971, 1977) distinguishes between case relations or deep structure cases and their surface realizations. According to him 'The propositional core of a simple sentence consists of a "predicator" (verb, adjective, or noun) in construction with one or more entities, each of these related to the predicator in one of the semantic functions known as (deep structure) cases' (1971:37). The case-relations or roles proposed by Fillmore in 'The Case for case' (1968) are as follows:

Agentive	The typically animate perceived instigator of an action identified by the verb.
Instrumental:	The animate force or object causally involved in the state or action named by the verb.
Dative	Animate being affected by the state or action.
Factitive	Object or being resulting from the state or action identified by the verb.
Locative	Location or spatial orientation of the state or action.
Objective	Things affected by the state or action identified by the verb.

Besides these six roles, Fillmore also proposed 'benefactive', 'comitative' and 'temporal' as possible candidates to be reckoned with. Since its original formulation in 1968, his 'case-theory' has undergone many changes including the number and content of the case-roles. In 'Some problems for case grammar' (1971), Fillmore introduced the cases 'experiencer', 'source', and 'goal', and reassigned the earlier 'dative' to the 'experiencer' role in the case of a 'genuine psychological event or mental state verb', to 'object' in the case of verbs indicating change of state , and to 'goal' in verbs indicating transfer or movement of something to a person. His earlier 'factitive' was now reassigned to 'goal'. In 'The case for case reopened' (1977), he talks about 'patient' for the 'thing which gets manipulated' and considers instrument a 'derived notion'.

As far as characterization of children's speech in terms of case like notions is concerned, Brown (1973:169) points out that all the six case concepts posited as universal by Fillmore were found in 'Adam I though the instances of the factitive are a little doubtful'. Bowerman (1973, 1978) characterizing the early semantic relations in children's speech, talks about the notions 'agent', 'person-affected' (Fillmore (1968)dative case with verbs like *want, see, receive, be afraid.* etc.) 'object-involved' (Fillmore's objective case with verbs like *fall, break*, etc.), 'object-created' (factitive case), 'object acted upon', 'object located' and 'possessor and possessed'. Greenfield and Smith (1976), in their study of two English speaking children, talk about the case roles, agent, object, instrumental, dative and locative.

In the present study, 'agent' is used to include both 'movers' and 'agents', that is, entities which can move on their own as well as those which move other objects as in Clark (1977). The term 'object' is used for both affected object as well as the resultative or factitive of Fillmore (1968). Instead of the more recent term experiencer which normally subsumes such varied semantic roles as 'experiencer of a psychological event', 'recipient' and 'possessor' (Clark 1977), I have used the term dative, in its traditional sense, to include 'experiencer', 'recipient', 'benefactive' and also 'directional', as has been done by Brown (1973) and Greenfield and Smith (1976). The semantic relationship between possessor and possessed is assigned to a separate case namely possessive. Comitative or associative is treated as a seprate role. This differs from the general treatment of it as an instance of conjunction (see, for example, Fillmore 1968, Greenfield and Smith 1976). Both Annamalai (1976), and Agesthialingom (1976) have argued convincingly that in Tamil the conjunctive case or comitative cannot be derived solely from phrasal conjunction. Furthermore, as will be seen later, the two bilingual children of this study kept the associative role distinct from instrumental following the Tamil pattern, where the two are marked differently, rather than the Telugu situation where they are realized by the same postposition. The source relation is expressed by the term ablative in this study. Instrumental and locative are used in the general sense of the terms.

To summarise, I shall consider the emergence of the following case-roles in my children: agentive (mover and agent), objective (affected object and resultative), dative (experiencer, recipient, benefactive and directional), possessive, comitative and instrumental and their surface realization.

SURFACE REALIZATION OF CASE IN TAMIL AND TELUGU

In Tamil and Telugu the underlying case-relations, when marked on the surface, are indicated by postpositions or by stem alternation or by a combination of both.

The agentive case has no marker or postposition in the two languages in question:

(1) Ta. *kamalaa saapTaaL*
Kamala ate
'Kamla ate.'

(2) Te. *kamala ceppindi*
Kamala said
'Kamala said it.'

Possession is expressed by the juxtaposition of the possessor and possessed nominals in that order:

(3) Ta. *ammaa poTavai*
Mother sari
'Mother's sari.'

(4) Te. *amma ciira*
Mtoher sari
'Mother's sari.'

In the predicative position, however, a possessive NP takes *-tu* in Tamil and *-di* and *-vi* for singular and plural respectively in Telugu as shown below:

(5) Ta. *inta poTavai ammaatu*
this sari mother's
'This sari is mother's.'

(6) Te. *ii pen ammadi*
this pen mother's
'This pen is mother's.'

(7) Te. *erra gaajulu ammavi*
red bangles mother's
'Red bangles are mother's.'

The postpositions used in the realization of the rest of the cases are given below:

	Ta.	Te.
Dative	*-kku*	*-ku/ -ki*
Object	*-ϕ, -a*	*-ϕ, -nu, -ni*
Instrumental	*-aala*	*-too, -tooTi*
Locative	*-la*	*-loo*
Ablative	*-(l)eentu*	*-(loo)nunci*
Associative/ Comitative	*-ooTa, kuuTa*	*-too, -tooTi*

For example,

(8) Ta. *ammaakku kuTu*
mother to give

(9) Te. *ammaku ivvu*
mother to give
'Give it to mother.'

(10) Ta. *anta penna konTu vaa*
that pen bring

(11) Te. *aa pennu tiisukoraa*
that pen bring
'Bring that pen.'

(12) Ta. *kamala naaya kaTTayaala aTiccaaL*
Kamala dog stick with beat

(13) Te. *kamala kukkani karratoo koTTindi*
Kamala dog stick with beat

'Kamala beat the dog with a stick.'

(14) Ta. *ammaa viiT*la *irukkaaL*
mother house in is

(15) Te. *amma inT*Loo *undi*
mother house in is
'Mother is at home.'

(16) Ta. *raamu viiTTul*eentu *vantaan*
Ramu house from came

(17) Te. *raamu inT*inunci *occEEDu*
'Ramu came from home.'

(18) Ta. *liilaa*vooTa *veLayaaTu*
Liila with play

(19) Te. *liila*too *aaDukoo*
Lila with play
'Play with Lila.'

A majority of nouns in Tamil and Telugu have an invariant form to which are added the different postpositions. But certain nouns in both languages show stem alternants which can be identified as (i) nominative and (ii) genitive, of which the former is used for expressing agentive relation, and the latter, possessive. In all other cases the postpositions are generally added to the genitive stem. An example from Telugu will make this point clear:

(20) Te. illu *baaga undi*
house good is
'The house is good.'

(21) Te. *andaru* inTi *pani ceyyaali*
everyone house work should do
'Everyone should do the household work.'

(22) Te. inTiki *poo*
house to go
'Go to the house.'

All neuter nouns ending in *-m* in Tamil have their genitive stem formed by dropping the *-m*. A third stem is formed by replacing *-m* by *-tt* which is what is used in dative, instrumental

ablative, etc. For example, *maram* 'tree', *mara katavu* 'wooden door', *marattu kaLai* 'branch of the tree', *marattukku* 'to the tree', *marattaala* 'with the tree', *marattula* 'in the tree', etc.

As far as the pronominal forms are concerned, except the third person pronouns of Tamil, other pronominal forms of the two languages in question show nominative and genitive stem alternants which have similar distribution as the corresponding variants of noun forms. Table 1 below shows the personal pronouns of Tamil and Telugu with their variants

	TAMIL		TELUGU	
	Sg.	Pl.	Sg.	Pl.
Nom.	*naan*	*naankaL* (Excl.) *nampa(L)* (Incl.)	*neenu*	*meemu* (Excl.) *manamu* (Incl.)
Gen.	*en*	*enka(L)* (Excl.) *nampa(L)* (Incl.)	*naa*	*maa* (Excl.) *mana* (Incl.)
Nom.	*nii*	*niinka(L)*	*nuu/nuvvu*	*miiru*
Gen.	*on*	*onka(L)*	*nii*	*mii*
Nom.	*avan, avar*	*avaa(L)*	*vaaDu, atanu* *aayana*	*vaaLLu*
Gen.	*avan, avar*	*avaa(L)*	*vaaDi, atani* *aayana*	*vaaLLa*
Nom.	*ava(L), avar*	*avaa(L)*	*aame, aaviDa*	*vaaLLu*
Gen.	*ava(L), avar*	*avaa(L)*	*aame, aaviDa*	*vaaLLa*
Nom.	*itu, atu*	*itukaL, atukaL*	*idi, adi*	*ivi, avi*
Gen.	*itu, atu*	*itukaL, atukaL*	*diini, daani*	*viiTi, vaaTi*

Besides the postpositions mentioned above, there are a few words of location like Ta. *meela*, Te. *miida* 'above', Ta. *kiTTa*, Te. *daggara* 'near', etc. which behave like postpositions in the sense that they call for the same form of the noun or pronoun as the postpositions do, e.g. Te. *ceyyi* 'hand', *ceetiloo* 'in the hand' *ceeti miida* 'on the hand'.

Except for the object marker, all other postpositions occur obligatorily. The selection of the object marker is guided by a number of grammatico-semantic considerations. The object marker is compulsory with human nouns. For instance,

(23) Te. baabuni *manci DaakTarki cuupincaNDi*
boy acc. good doctor show polite marker
'Show the boy to a good doctor.'

(24) Te. *ikkaDa raa niiku pedda* paamu *cuupistaa*
here come to you big snake I will show
'Come here I will show you a big snake.'

(25) Te. *nii kotta* bomma *naaku cuupincavaa*
your new doll to me won't you show
'Won't you show me your new doll.'

As has been pointed out by C.Ramarao (personal communication), verbs of 'impinging' or 'inflicting' like *tannu* 'kick', *koTTu* 'beat', *gillu, giccu* 'pinch', and *weLLagoTTu* 'drive out', etc. also call for obligatory marking of the object. For example,

(26) Te. kootulni *raayitoo koTTa kuuDadu*
monkeys obj. marker stone with hit should not
'One should not hit the monkeys with a stone.'

(27) Te. *pooyinappuDallaa* kooDini *koosi bhoojanam peDataaru*
whenever went chicken having cut meals serve
'Whenever we go they serve us food with chicken, having cut it.'

DATA AND METHODOLOGY

The present research is based on the speech of my son, Chetan, and my daughter, Deepa, both of whom are bilingual speakers of Tamil and Telugu. It is the result of a longitudinal study of Chetan's speech from 1;0 to 5;0, and of Deepa from 1;0 to 3;9, her present age. Chetan is 4 years 2 months elder to Deepa.

The Children's father is a Telugu speaker and speaks to them in Telugu, while I use Tamil to communicate with them. In addition, the children quite often met Tamil and Telugu speaking relatives and friends and thus had a good exposure to both

languages right from the start. As English is also used extensively by the adults while interacting with educated friends and relatives, the children had an early acquaintance with it also.

Regular tape recordings of the spontaneous speech of both Chetan and Deepa were made from the time they were one year old. These recordings were done at intervals of 10 to 15 days and consisted of an average duration of ten minutes. Besides spontaneous speech, relevant data relating to specific phonological and grammatical points were elicited from age 2;0. Over and above the regular recordings, extensive diaries of the speech development of the children were also maintained, in which the details of the situations in which the utterances were spoken were noted.

MAJOR FINDINGS

It was noticed that even at the one-word stage the children could comprehend many case relations and express them verbally or non-verbally. This will be evident from the consideration of the following facts. Chetan started combining words into sentences at 1;7 and Deepa did so at 1;3.2. but Chetan at 1;4 and Deepa at 1;1 could comprehend and correctly express agent, dative (recipient), object, locative, and possessive roles. They could, for instance, comprehend and answer appropriately questions (Q.), like the following:

(28) Ta. Q. *yaar vantrikkaamaa*
who has come dear
'Who has come dear?'

(28a) C. *appaa*
father
'Father.' (Q. 28 was addressed to Chetan at the arrival of his father.)

(29) Te. Q. *nuvvu eemi teccEEvu*
you what brought
'What have you brought?'

(29a) C. *puu*
flower
'Flower.' (Chetan had gone and brought some

flowers from the garden and had given them to his mother.)

(30) Ta. Q. *nii yaarukku puu kuTutta*
you to whom flower gave
'Whom did you give the flower?'

(30a) C. *ammaa*
mother
'Mother.'

(31) Ta. Q. *itu yaartumaa*
this whose
'Whose is this?' (The question was addressed to Deepa pointing out Chetan's shoe.)

(31a) D. *annaa*
brother
'Brother's.'

(32) Ta. Q. *nampa etula vantoom ippo*
we (incl.) in what came now
'By which vehicle did we just arrive?' (The question was asked Chetan after he had returned home with his mother in an auto.)

(32a) C. *aato*
auto
'Auto.'

(33) Te. Q. *nuu ekkaDa kuurcunTaavu?*
you where sit down
'Where will you sit down?'

(33a) D. *kucci*
chair
'In the chair.'

Though both the children expressed agentive, objective, locative, possessive and recipient roles at the one-word stage, source or ablative and instrumental roles were typically absent during this period. For instance, Chetan at 1;4 could not comprehend a question like (34) below, which involves a source relation, though he readily comprehended questions involving many other case relations as was shown earlier:

(34) Ta. Q. *nii puu enkeentu konTu vanta*
you flower from where brought come
'From where did you bring the flower?'

Source and instrumentals were not expressed in Deepa's speech until 1;9 and in Chetan's until he was 2;1.

Furthermore, though both the children of the study were able to comprehend and express many of the case relations, the case postpositions were missing in their early speech. Even when the appropriate postpositions were supplied in the questions addressed to the children, they omitted them in their replies. For instance;

(35) Ta. Q. *itu ontaa tammutaa*
this yours Tammu's
'Is it yours or Tammu's?'

(35a) C. *nammu*
Tammu
'Tammu's.'

The first case relation to be overtly marked by both Deepa and Chetan was the dative. Sporadic use of the dative marker was noted in thier speech even at the one-word stage. But it was used productively only when they started making two - and three word sentences.

Deepa kept a clear cut distinction between the following uses of the dative: (1) recipient, (2) benefactive, (3) possessive, and (4) directional. The first function of the dative to appear in her speech was the recipient which found expression both in her one-word utterances as well as her early two-word utterances. For instance, at 1;5 when her mother was feeding her rice she wanted some to be given to her doll also which she was holding in her hand and said:

(36) Ta. *mamma paapaa*
food baby
'Give food to the doll.'

The next function of dative in Deepa's speech was benefactive, which emerged when she was 1;6. Her father brought some sweets and gave them to her. But she wanted to

take some for her brother and mother who were not on the scene. She stretched out her hand and said sentences (37) and (38) in a sequence with a rising intonation:

(37) *annaaku*
to brother
'For brother?'

(38) *ammaaku*
to mother
'For mother?'

The fact that Deepa made a clear-cut distinction between the different semantic roles of dative is borne out by her selective use of the dative marker for certain roles and leaving out others at the same time. For instance, note that in sentences (39-45) which were all spoken by Deepa at the same age, (39-41) involving recipient and benefactive roles carry the dative marker while (42-45) involving possessive, (animate) object, and directional typically lack the dative marker.

(39) *naaki toocaa*
to me dosa
'Give me dosa.' (Mother is feeding dosa to Chetan and Deepa also wants some to be given.)

(40) *naaki tii*
to me tea
'Give me tea.'

(A visitor was offered some tea. Deepa goes and brings a cup and utters 40.)

(41) Ta. *annaaku naanaa*
to elder brother water
'The water is for elder brother.'

(Chetan is playing outside and asks Deepa to bring some water. Deepa is carrying the water in a glass for him and utters sentence (41) in the presence of her mother.)

(42) Ta. *tallaa baal illa*
Sarla baal does not have
'Sarla does not have a ball.'

(43) Ta. *paapaa mayir illa*
baby hair does not have
'Deepa has no hair.'
(Said by Deepa while looking at her own image in the mirror after her hair was shaved off.)

(44) Te. *paapaa tappal peTTu*
baby sandals put on
'Put the sandals on the baby.'
(Deepa wanted shoes to be put on her baby doll.)

(45) Te. *neene aatal poota*
I hostel will go
'I will go to the hostel.'

Notice further that *sarlaa* in (42) and *paapaa* in (43) and (44) need a dative suffix obligatorily in adult speech.

As distinct from this, Chetan's early dative forms typically expressed the experiencer role. It is interesting to note here that the set of verbs with which Chetan used a dative were at first all 'mental state' verbs. At this period of development he avoided expressing the recipient role even in those sentences which would call for it in adult equivalents. This will be obvious from a comparision of sentences (46) and (47) with (48-50), which were all produced by him between 2;0 and 2;1:

(46) Ta. *adi kaaTumaa*
that show mommy
'Show (me) that mommy.'

(47) Ta. *adi taa maa*
that give mommy
'Mommy give (me) that.'

(48) Ta. *naaku pikkatu*
to me like it
'I like it.'

(49) Ta. *idi veenũũ naaku*
this want to me
'I want this.'

(50) Te. *naaku telusu*
to me known
'I know it.'

Dative expressions were next extended by Chetan to possessive relations as can be seen in the following sentences from his speech at 2;1.11:

(51) Ta. *naaku pencil ikkaa*
to me pencil is
'I have a pencil.'

(52) Ta. *nooku pencil ikkaamaa*
to you pencil is it there mommy
'Mommy, do you have a pencil?'

After about a week, Chetan used datives for directionals also. For example,

(53) Ta. *danni viiTukku poolaam*
Dhanni house to let us go
'Let us go to Dhanni's house.'

(54) Ta. *adi viiTukku veeNDaa*
Hari house to not
'Let us not go to Hari's house.'

The use of dative for expressing a recipient role was noticed in Chetan's speech at 2;3 as in the following examples:

(55) Ta. *naaku tara maaTayaa*
to me give won't you
'Won't you give it to me?'

(56) Ta. *naaku aytiim kuDu*
to me ice-cream give
'Give me ice-cream.'

The contrast between the nominative and dative forms first appeared in Chetan's pronominal forms. For instance, at 2;0, his speech included the nominative forms of the first and second person pronouns *naa* 'I' and *nii* 'you' as shown below:

(57) Ta. *naa eedarẽẽ* (required *naa(n) eZutarẽẽ*)
I write
'I will write.'

(58) Ta. *nii toccuTa* (required *nii taTaccuTTa*)
you wiped
'You wiped it.'

At 2;0.10, he started distinguishing the dative form *naaku* 'to me' from the nominative *naa* 'I'. This distinction was later made in the second person pronominal form also. Deepa, on the other hand, used the dative marker first with nouns, thus making a contrast between nominative and dative in nominal forms but not in pronominal ones. Of the pronouns, at 1;5.8, she used *neene* 'I', the nominative form of the first person singular pronoun of Te. marked with the emphatic particle *-e*, to express the agent relation. Later she extended the same form to dative and possessive relations also as shown in the following examples:

(59) Te. / Ta. *neene naanaa*
to me water
'Give me water.'

(60) Te. *neene buk*
my book
'Where is my book?'
(uttered with rising intonation as she was looking for her book.)

After a month she separated *naaki* from *neene* using the former for dative relation. For example,

(61) Te. *naaki toocaa*
to me dosa
'Give me dosa.'

But at this point *neene* still served the purpose of both agentive and possessive relation for her. Similarly, the nominative form of the second person singular pronoun was *nuu* 'you' in Deepa's speech which emerged on 1;8.9, and was used by her while interacting with both Tamil and Telugu speaking persons. For instance,

(62) Te. *taataa nuu ottaawaa*
grandfather you will come
'Grandfather! will you come?'
(The verb form is from Telugu *ostaawaa* and the sentence was addressed to her paternal grandfather who speaks only Telugu.)

(63)Ta. / Te. *ammaa nuu naandko*
mommy you move
'Mommy you move.'

(The verb is from Tamil *nakantukko* 'move', and as is obvious, she was communicating with her mother who spoke Tamil alone to her.)

After 16 days, i.e. on 1;8.17, she started using the dative form of the second person singular pronoun *niiku* 'to you' as in the following sentences:

(64) Ta. / Te. *neene niiku pootudẽẽ*
I to you will put it
'I will fix it for you.'

(trying to fix red mark on mother's forehead.)

(65) Te. *niiku eemayindi*
to you what happened
'What happened to you?'

(looking at a cut on her father's finger.)

Locative was the next case relation to be overtly marked in both Chetan and Deepa's speech. In Deepa's speech the emergence of locative postposition clearly preceded that of locative words which compares well with Dromi's (1973:561) finding that in Hebrew-speaking children 'en-clitic prefixed prepositions are acquired before full word prepositions that express the same locative notions'. But in contrast to this, in Chetan's speech locative words like *uLLa* 'inside', *miida* 'on, on top of,' and *meela* 'up, on', etc. emerged before the locative postpositions. Deepa used the Telugu locative marker *-loo* when she was 1;5.7. But productive use of locative marking was noticed in her speech only a month later when she used both Telugu *-loo* and Tamil *-la* with different nouns. This was soon followed by her use of Telugu *miida* and Tamil *uLLa*, the latter being wrongly identified by her as *kuLLa*. A few examples of sentences involving locative relation from Deepa's speech are given below:

(66) Ta. *kaalla tappal pooTuko*
on feet sandles put on
'Put your sandals on your feet.'

(67) Te. *neene kuuloo pooyi aayi aayi*
I in school havinng gone aaii aaii
'I will go to school and write *aaii, aaii.*'

(68) Te. *kuutal miida oddu*
scooter on no
'Let us not go on the scooter.'

(69) Te. / Ta. *adi kulla pootaa*
that inside I will go
'I will go into thal.' (pointing to a pit).

Chetan used locative words productively from 2;0.15. A few examples follow:

(70) Ta. *idu kulla ikkaa paar*
this inside it is see
'See if it is inside that.'

(71) Ta. *Tebul meela aayi ikku*
table on dirt is
'There is dirt on the table.'

After a week's time his speech started showing the Tamil locative marker *-la* as in sentence (72):

(72) Ta. *ammaa danni viiTula poollãã*
mommy Dhanni house in let us go
'Mommy let us go to Dhanni's house.'

As is obvious from sentences (67) and (72), both the children wrongly extended locative marking to the dative also. Chetan also overgeneralized dative for locative as in sentence (73):

(73) Ta. *bablu viiTuku aanTi illa*
Bablu house to aunt not there
'Auntie is not in Bablu's house.'
(After coming back from his playmate Bablu's house whose mother was not home at that time.)

The use of dative for locative and vice-versa has also been reported by Nirmala (1982).

The concept of possession showed in Deepa's speech at almost the same time as that of location. Even in her one-word utter-

ances, after a few days of using such expressions as *annaaku* 'to brother', *appaaku* 'to father', we also find the occurrence of possessive and locative nouns like *annaadi* 'brother's', and *gaadanlo* 'in the garden'. Furthermore, her early two-word utterances consisted mostly of a possessor followed by the possessed object. The following are a few examples from her speech at 1;4.20:

(74) Ta. *appaa mukku*
father nose
'Father's nose.'

(75) Ta./Te. *annaa bukku*
elder brother's book
'Elder brother's book.'

(76) Ta./Te. *neene bæg*
my bag
'My bag.'

A month later, possessive phrases in predicate position emerged in her two-word utterances. For example,

(77) Te. *idi annaadi*
this brother's
'This is brother's.'

(78) Te. *buk ammaadi*
book mother's
'The book is mother's.'

Once Deepa learnt the construction involving a possessive phrase in predicate position, she started extending nominal and pronominal forms like *naadi* 'mine', *niidi* 'yours', and *ammaadi* 'mother's, etc. which occur with a predicate phrase alone in adult speech, to the possessor NP of the possessor + possessed construction also, as can be witnessed in the following examples:

(79) Te. *naadi pensil eedimaa*
my pencil where mommy
'Where is my pencil mommy?'

(80) Ta./Te. *kooti naadi bæg kinna pootutu*
monkey my bag down dropped
'The monkey threw my bag down.'

Deepa's preference for marking the possessor NP with the marker *di* even in those situations where zero-marking is called for, might be explained by a general operating principle proposed by Slobin (1973) according to which children prefer not to mark a semantic category with a zero morpheme. He points out, 'If a category is sometimes marked by ϕ and sometimes by some overt phonological form, the latter will, at the same stage, also replace the ϕ' (202).

Though Deepa could cope with the notion of possession from quite an early age, she did not differentiate the genitive and nominative forms of the pronouns for a long time. For instance, even after she contrasted *naaku* 'to me' with *neene* 'I' (which, had been used by her hitherto for 'agent', 'recipient' and 'possessive' relations), she continued to use the latter for possession alongside the agentive. For instance,

(81) Te. *neene kuul baagundi*
my school good is
'My school is good.'

The contrast between the genitive and nominative forms first emerged in her speech at 1;7.6 in the first person pronoun followed immediately by the second person.

In Chetan's speech, possessive forms emerged only aftee dative and locative forms. Unlike Deepa, Chetan did not have utterances consisting of possessor NP + possessed NP in thd early two-word stage. Possessive relationship was first expresser in predicate position when he was 2;1.12 in sentences such as (82):

(82) Te. *idi naadi*
this mine
'This is mine.'

It was a month before he started using utterances involving a possessor followed by the possessed NP as in sentences (83) and (84) :

(83) Ta./Te. *naa peer ceetan*
my name Chetan
'My name is Chetan.'

(84) Ta. *on peer enna*
your name what
'What is your name?'

Like Deepa, Chetan also distinguished the dative form of the pronouns from the nominative and then the genitive from the other two. For instance, only after he had distinguished *nii* 'you' as second person nominative and *nooku* 'to you' as the corresponding dative did he start to use the genitive form *on* 'your'.

Objective case was the next one to be overtly distinguished in the children's speech. Chetan contrasted the object form of the first person pronoun from the other forms at 2;2.11 as shown in (85):

(85) Te./Ta. *appaa enna dimpu*
father me put down
'Father put me down.'
(Chetan wanted to get down from the table on which he was sitting.)

But he still failed to use the objective marker with nouns. Thus at the same time as he uttered (85), he left out the object postposition in (86) :

(86) Ta. *kiiya pooyi ari paatuTu varlãã*
down having gone hari having seen let us come
'Let us go down and see Hari and come.'

Deepa started marking the object overtly with Telugu *ni*-at 1;9 as in (87) below :

(87) Te. *annaani koTTupaa*
elder brother beat father
'Father! beat elder brother.'

Within a few days, her speech also showed the occurrence of Tamil *-a* as in sentence (88) :

(88) Ta./Te. *annaava baaga aDikanõõ*
elder brother nicely we should beat
'We should give elder brother a good thrashing.'

But she still failed to distinguish the objective form of pronouns from the others and tended instead to use dative forms for the object case too as will be evident from sentence (89) :

(89) Te. *ammaa naaku akkala peTTu*
mommy to me there put
'Mommy put me there.'

When she did pick up the objective forms of the first and second person pronouns at 2;0 they were rendered as *naani* 'me' and *niini* 'you' instead of the adult *nannu* and *ninnu* of Telugu.

As far as the other case-relations are concerned, there is a slight difference in their order of emergence in the two children's speech as can be seen from the following table :

Chetan		Deepa	
AGE	CASE RELATION	AGE	CASE RELATION
2;1.13	Ablative (Source)	1;10,14	Associative (Comitative)
2;2.3	Instrumental	1;10.21	Instrumental
2;2.20	Associative (Comitative)	1;11	Ablative (Source)

Chetan first learnt the Telugu ablative marker *nunci* 'from' and after a month's time tried its Tamil counterpart -(l)*eentu* as will be clear from sentences (90) and (91) uttered by him on 2;1.13 and 2;2.15 respectively :

(90) Ta./Te. *ikanunci ika jamp ceecaa uwwaa paTTuDũũ*
from here here jump if done wound will get hurt
'One will get hurt if one jumps from here to there.'

(91) Ta. *nii kaalejleendu vandu enakku suup kukkala edukku*
you college from having come to me soup did not give why
'Why did you not give me soup after coming from college?'

Deepa, on the other hand, learned the Tamil ablative marker first and after about 10 days started using its Telugu counterpart in the following sentences :

(92) Ta. *daajayyaa engeendu vandukaa*
Rajaiah from where has come
'From where has Rajaiah come?'

(93) Te. *ikanunci daali pooyindi*
here from lorry went
'The lorry went from here.'

As far as the instrumental suffix is concerned, both Chetan and Deepa tried the Tamil *-aala* first and not the Telugu *-too* or *-tooTi*. In Chetan's speech *-aala* occurred at 2;2 as in the following examples,

(94) Ta. *appaa poodadaala aDikaraa*
father powder with is beating
'Father is beating me with the powder box.'

(95) Ta. *adaala avaa aDipaa*
that with they will beat
'They will beat with that (referring to a stick).'

Chetan used Telugu instrumental marker *-too* after a month. For instance, sentence (96) was uttered by him on 2;3.2 :

(96) Ta. *ammaa kaalto ippi panninaa onju peyDũũ*
mother with leg like if one does break will go
'Mother if one kicks it with the foot, it will break.'

Until the emergence of the instrumental marker *-aala* in her speech, Deepa used the unmarked nominative form for the instrumental case as can be seen from sentence (97) uttered by her when she was 1;9.24:

(97) Te. *nuu* adi *daaymaa neenu* idi *daataa*
you that write I this will write
'You write with that I will write with this.'

(Handing over one pen to mother and keeping one in her hand.) Recordings of Deepa's speech showed no examples of Telugu *-too/ -tooTi* used as an instrumental until she was 3 years old.

The explanation for the children's relatively late acquisition of the Telugu instrumental marker when compared with its Tamil counterpart seems to lie in the fact that in Telugu the instrumental marker is homonymous with the associative marker. According to Slobin, 'If there are homonymous forms in an inflectional system, those forms will tend not to be the earliest inflections acquired by the child; i.e. the child tends to select phonologically unique forms, when available, as the first realization of inflections' (1973:203).

As has been mentioned earlier, the associative marker was the last one to emerge in Chetan's speech. In Deepa's speech, however, the associative marker *-too* emerged before the instrumental and ablative.

COMPARISON AND DISCUSSION

We have noticed that Chetan and Deepa were capable of comprehending and expressing case relations even prior to the beginning of syntactic formation in their speech. This is in consonance with the findings of others such as Ruķe-Dravina (1973), Greenfield and Smith (1976), and Clark (1977).

Of the different case- roles, agentive, objective, locative, possessive and recipient were observed to be present at the one-word stage in the speech of the children of this study. In their longitudinal study of the speech of two English speaking children, Greenfield and Smith (1976) also have reported the presence of agent, object, recipient and locative relations at the one - word stage. Bowerman's study (1973) of the two-word utterances of Kendall, a two-year-old girl, showed the following case-roles: agent, object, locative and dative. Braine's (1976) study of the two-word combinations of ten children acquiring English, Samoan, Finnish, Hebrew and Swedish showed that all the children talked about agent, object and locative case-roles. Evaluating the evidence from research in the area of language acquisition and comprehension as well as from the non-verbal domain, viz. infants' responses to films designed to explore semantic concepts that may be implicit in their cognition, Golinkoff (1981) comes to the conclusion that 'the concept of agent is available to infants perhaps as early as at the end of the first year of life' (431).

Though Deepa and Chetan could comprehend and express many of the case relations, these were not formally marked in their early speech. According to Ruķe-Dravina, 'The child actually understands the meaning of the various cases of verbal forms long before he is able to use the particular endings actively in his own speech' (1973:254). In addition, Nirmala (1982:118), who studied the speech development of four Telugu speaking children, observed that the early speech of children 'was marked by the absence of case inflection'.

It was pointed out earlier that in Deepa's speech, recipient, benefactive, possessive and directional functions of the dative emerged in that order, and that the typical function of Chetan's early datives was to express the experiencer role. It is interesting to note here that in the case of the two boys, Nicky and Mathew, studied by Greenfield and Smith (1976), the first function of the dative to emerge is also the 'recipient' followed by the 'benefactive' and 'animate object'. As they point out, 'The first exemples of Datives for both boys involve handing something to a parent. Later developments involve expressing a benefactive goal and expressing animate objects' (1976:12). They further report that 'Dative as experiencer of a perception arose only once in our corpus, in the two-word sentence *I see*' (57). On the basis of this step-by-step emergence of distinct functions of 'dative', Greenfield and Smith doubt that there is 'cognitive unity' in what has been characterized as the dative case. A stage by stage marking of the datives of recipient, benefactive, possessive and directional by Deepa and the conspicuous avoidance of recipient nouns by Chetan at a time he could express an experiencer noun with proper marking, coupled with a clear-cut gap in the emergence of experiencer, possessive, directional and recipient roles in his speech, add strong support to Greenfield and Smith's claim. The cross-linguistic evidence provided by these children thus calls into question the validity of lumping together such diverse semantic roles as 'recipient', 'beneficiary', 'possessor' and 'experiencer' either under the old term 'dative' or the more recent 'experiencer'.

In the speech of both children of this study, the first formal contrast to emerge was between the nominative and dative. That is, the dative postposition was used by the children earlier than the others. In the pronouns also, the nominative form was contrasted with the dative before it was contrasted with other forms. Nirmala (1982), also has shown in her study of four Telugu speaking children that dative marking precedes locative, accusative, instrumental and ablative. As distinct from this, study carried out on the speech development of a Latvian child (Ruķe-Draviņa 1973) shows that he began by distinguishing the accusative case form from the nominative. Both Nirmala's children and the children of the present study learnt to distinguish

accusative or objective forms relatively late. This calls into question the validity of the assumption that unmarked cases are acquired earlier than the marked one (Tiersma 1982). According to Greenberg, the direct cases namely nominative, accusative and vocative are unmarked in relation to oblique cases like dative, locative, instrumental, and genitive. Ramarao (1976) has shown that the accusative is less marked than dative and locative (in Telugu and therefore presumably in other Dravidian languages). But we have just seen that the Tamil and Telugu speaking children of this study as well as Nirmala's study, learned to contrast the more marked dative, genitive and locative before the less marked accusative.

The explanation for the early acquistion of dative forms seems to be in children's cognitive need to express what they 'want' and what they 'do not want' at a very early age. Rodgon (reported in Macrae 1979), on the basis of her analysis of the one-word utterances of ten children, claims that one of the two largest categories of utterances of her subjects were in the 'I want group.' The verbs for 'want' and 'do not want' in Tamil and Telugu (and other Dravidian languages), typically call for a dative construction. Besides this, the early acquisition of dative postpositions by our children may be due to the high functional load of the dative construction in these languages. The dative is used not only for the experiencer or recipient roles but also for time, direction, purpose and possession (Ramarao 1976), as is illustrated in the following examples from adult speech :

Time :

(81) Ta. *avan naaLekki varuvaan*
he tomorrow will come
'He will come tomorrow.'

Place :

(82) Ta. *avaL bambaayikku pookiraaL*
she to Bombay is going
'She is going to Bombay.'

Direction :

(83) Te. *munduku jarugu*
forward move
'Move forward.'

Purpose :

(84) Te. *n'iLLu teewaDaaniki veLLindi*
water to bring she has gone
'She has gone to get water.'

Possession :

(85) Te. *meDraaslo maaku illu undi*
in Madras we -to house is
'We have a house in Madras.'

It is interesting to note here that the early use of datives by children speaking Dravidian languages is in marked contrast to the situation found in English speaking children. As has been pointed out by Greenfield and Smith (1976:139), in the two children studied by them, 'Although the first example of the dative case occurs relatively early, productivity is not arrived at until much later.' They also point out that this characteristic of the dative case continues into the two-word speech of Brown's child.

As distinct from the dative, object marking or accusative forms developed relatively late in Deepa and Chetan as well as in Nirmala's children. This seems to be due to the formal complexity involved in this area. As was indicated earlier, appropriate selection of the object marker in Tamil and Telugu requires not only a knowledge of the basis of classification of nouns into different groups, but also information regarding the specificity or otherwise of the referent in question. Furthermore, the type of activity expressed by the verb also plays a role in the choice of the postposition. We have noticed already that verbs of 'impinging' or 'inflicting' call for compulsory marking of the object. The late emergence of accusative forms in our children is in sharp contrast with Ruķe-Draviņa's (1973) observation of a Latvian child. The first contrast to be established in his speech was between the nominative and the accusative followed by locative, genitive and dative. The instrumental forms were lacking in her subject even at the beginning of the third year. The late appearance of instrumental in her subject's speech is ascribed by Ruķe - Draviņa to the fact that instrumental, unlike other case relations is marked with a preposition and 'prepositions', she

points out, 'belong to those word-classes which a child acquires very late' (1973:257). We have noticed, however, that though all case-relations are marked with postpositions in Tamil and Telugu, instrumental postpositions emerged much later than the others in the speech of our children as well as those studied by Nirmala. This suggests that the instrumental case, like source, may be cognitively less salient for a child than the others. Supporting evidence in this regard comes from Bogoyavlenskiy's (1957) observation that the instrumental case endings were more difficult for Russian children to acquire than accusative. Note further that in the case of English also Greenfield and Smith noticed that the instrumental relationship was rare in the early speech of the two boys studied by them.

The relatively late development of accusative forms in Tamil and Telugu speaking children, when compared with children from other language backgrounds, supports Slobin's (1973) dichotomy between 'conceptual complexity' and 'linguistic difficulty'. The non-appearance of instrumental and source relations in the early speech of our children may be due to the former. But the relatively late development of object marking may be attributable to the linguistic system that the children had to cope with.

CONCLUSION

To sum up, both the children of this study talked about entities in different case-roles even before the emergence of formal syntax in their speech. Of the case-roles, agentive, dative, objective, locative and possessive seem to be cognitively more salient than roles like instrumental and source. The fact that the children kept a clear distinction between the different functions of datives questions the validity of treating together diverse semantic roles such as recipient, benefactive, possessive, etc. as 'dative' or 'experiencer'. Unlike children speaking European languages, who learned to contrast nominative from accusative forms first, the children of this study distinguished the dative form from the nominative first. This may be due to the high functional load of the dative construction in Dravidian languages. Finally, while the late acquisition of instrumentals could be ascribed

to its beieng cognitively less salient as borne out by cross linguistic evidence from English, Russian and Latvian, the relative delay the children showed in learning the accusative forms of Tamil and Telugu nouns and pronouns could be due to their formal complexity.

REFERENCES

AGESTHIALINGOM, S. 1976. 'The so-called sociative case in Tamil'. In S. Agesthialingom and K. Gowda(eds.), *Dravidian Case System*. Annamalainagar: Annamalai University.

ANNAMALAI, E. 1976. 'Conjunction and the conjunctive case'. In *Dravidian Case System*.

BOGOYAVLENSKIY, D. N. 1957. 'Psikhologia usvoyeniya orfografii' (The psychology of acquisition of orthography), English translation by Greta Slobin. In Charles J. Ferguson, and Dan I. Slobin (eds.), *Studies of Child Language Development*. New York: Holt, Rinehart and Winston.

BOWERMAN, MELISSA. 1973. *Early Syntactic Development: A Crosslinguistic Study with Special Reference to Finnish*. Cambridge: University Press.

———. 1978. 'Structural relationships in children's utterances: syntactic or semantic?' In T. Moore (ed.), *Cognitive Development and the Acquisition of Language*. New York: Academic Press.

BRAINE, M. D. S. 1976. *Children's First Word Combinations. Monograph of the Society for Research in Child Development* 41.

BROWN, ROGER. 1973. *A First Language*. Cambridge, Mass.: Harvard University Press.

CLARK HERBERT H, and CLARK, EVE V. 1977. *Psychology and Language*. New York: Harcourt, Brace, Jovanovich.

DROMI, ESTHER. 1979. 'More on the acquisition of locative prepositions: an analysis of Hebrew data.' *Journal of Child Language* 6. 547-562.

FILLMORE, CHARLES J. 1968. 'The case for case'. In Robert T. Harms (ed.), *Universals in Linguistic Theory*. New York: Holt, Rinehart and Winston.

————. 1971. 'Some problems for case grammar'. In R. J. O Brien (ed.), *Linguistcs: Developments of the Sixties — Viewpoints for the Seventies. Monograph Series on Languages and Linguistics* 24. 35-56.

————. 1977. 'The case for case reopened'. In Peter Cole and Jerrold M. Saddock (eds.), *Syntax and Semantics*, Vol. 8. New York: Academic Press.

GOLINKOFF, ROBERTA M. 1981. 'The case for semantic relations: evidence from the verbal and non-verbal domains'. *Journal of Child Language* 8. 413-437.

GREENFIELD, PATRICIA M. and SMITH, JOSHUA H. 1976. *The Structure of Communication in Early Langage Development*. New York: Academic Press.

MACRAE, ALISON. 1979. 'Combining meanings in early language', In Paul Fletcher and Michael Garman (eds.), *Language Acquisition*. Cambridge: University Press.

NIRMALA, CHERVELA, 1982. *First Language (Telugu) Development in Children: a Short Descriptive Study*. Unpublished doctoral dissertation. Hyderabad: Osmania University.

RAMARAO, CHEKURI. 1976. 'Markedness in cases'. In *Dravidian Case System*.

RODGON, N. M. 1976. *Single-word Usage, Cognitive Development and the Beginning of Combinatorial Speech :a Study of Ten English Speaking Children*. Cambridge: University Press.

RUKE—DRAVINA, V. 1973. 'On the emergence of inflection in child lauguage: a contribution based on Latvian speech data'. *Studies of Child Language Development*.

SLOBIN, DAN I. 1973. 'Cognitive Pre-requisite for the acquisition of grammar'. In *Studies of Child Language Development*.

TIERSMA, PETER M. 1982. 'Local and general markedenss'. *Language* 58. 832-849.

OPiL 9, 10.102-115 (1983, 1984)

PHONOLOGICAL DIFFERENCES BETWEEN TELUGU ADULT SPEECH AND BABY TALK

V. RAMACHANDRA RAO
Osmania University

Generally adults employ various speech modifications when they speak to little children. This paper is an attempt to study this kind of variation at the phonological level. The different phonological processes involved in the adult speech variation in Telugu language are discussed in detail.

In every speech community, generally adult speakers make certain modifications and adjustments in their speech with young children at various levels of linguistic organization. As the mother is the most important person regularly interacting with a young child, this veriety of speech is popularly known as the 'motherese'. Many studies (Ferguson 1977, New Port et. al 1977, Snow 1977 and 1977a) have shown that the motherese contains a special design of features to facilitate the child's language acquisition. The mothers generally speak at a slower rate with simple well-formed sentences and confine themselves to topics limited to the 'here-and-now'. But it has also been observed that others like fathers, care-takers, and older children also make these speech modifications. This child-dictated adult speech known as 'baby talk', will be refered to as BT as opposed to the adult-dictated speech which will be abbreviated as AS.

METHODOLOGY

Subjects. The subjects of this study are three mothers in the age group of 28-35 years, two fathers in the age group of 35-38 years, and three children between 7 and 7;3. Besides this, I have also drawn on my own exeperiences while communicating with young children. They all speak the 'standard' dialect of Telugu and belong to the upper middle class. They are all migrants from central Andhra and are living at present in Hyderabad city.

Data. The data for the present study come from the speech samples recorded during the subjects' conversations with young

children who are below three years. The recordings were done mostly without the knowledge of the subjects.

BACKGROUND

The systematic studies on BT (Brown 1977, Ferguson 1977, New Port et al. 1977, Snow 1977 and 1977a) have shown that the basic factors necessitating the use of baby talk are : (1) the need to express one's affection to the young children, and (2) an effort to make the input i.e AS easy and simple to facilitate the child's language acquisition. Ferguson's (1977) discussion of the structure of BT brings out three involving processes clearly :

1. The Simplifying process which consists of the replacement of difficult consonants with easy ones, or elimination of inflections, or replacement of pronouns with proper nouns. 2. The Clarifying process, in which the speech is maintained at a very slow rate along with many repetitions. 3. The Expressive process, where the use of 'hypocoristic' affixes, 'cute' euphemisms, and 'nursery tone' are maintained.

Brown's (1977) analysis groups the above three processes into two principal components, viz. (1) Communication and Clarification (COMM), and (2) Expressive and Affective (AFF). Brown maintains that the BT is created by the conjunction of these two components. The functional aspect of his hypothesis is that the persons, animals, and things (like dolls) whose primary characteristic is cognitive and linguistic incompetence, will be addressed in the COMM register, while persons, animals, and things whose primary characteristic is inspiration of affection, will be addressed in the AFF register. As distinct from this, persons and animals, (e.g. a dog) combining cognitive and linguistic incompetence with the inspiration of affection and intimacy will be addressed in the two–dimensional COMM-AFF register which constitutes the BT.

The structure of BT registers of a language can be represented by a formal 'grammar' which makes explicit the processes relating the grammar of AS to all possible BT utterances.

Ferguson points out, 'Since a simplified register is largely a reduced and otherwise modified version of normal adult speech, a promising way of describing it is to specify the relations

between adult speech, viewed as the source or norm, and the register, viewed as a derivative or derivation. Such specification can be done by identifying processes of the form X→ Y(X becomes Y) or X→Y/Z (X becomes Y under conditions Z) in which the input is some part of the AS structure and the output is the corresponding part of the structure of the simplified register' (1977:214). For instance, we can look into the derivational history of a Telugu BT word *oonni* which is derived from AS *eeNTI←eemiTi* 'why', The rules operating in this derivation are as follows :

AS *EENTi* → (by vowel backening rule) → *ooNTi* → (by de-retroflexion rule) → *oonti*→ (by nasal assimilation rule) → *oonni.*

The above derivation makes it clear that the BT can be regarded as derived from AS by some phonological processes which are simplifying or reducing in nature.

PHONOLOGICAL DIFFERENCES

Segmental Phonemes. Telugu has 47 segmental phonemes[1] in standard adult speech of which 11 are vowels and 36 consonants (Kostič, Mitter, and Krishnamurti 1977) as shown in Tables 1 and 2.

	Front		Back
Close	ii i		uu u
Half close	ee e		oo o
Half open	(EE)		
Open		a aa	

Table 1. AS VOWEL SYSTEM

1 Though traditionally aspirated stops are shown along with the unaspirated ones in the phonemic charts, it is rare to find a minimal contrast. The lack of aspiration does not seem to create any difficulty in communication. Aspiration, however, may indicate the speaker's intention to be associated with the elite group. It is not uncommon to find the aspiration missing from the casual speech of the elite group also.

			Bilabial	Labio-dental	Dental	Alveolar	Alveolo-palatal	Palato-alveolar	Retroflex	Velar	Glottal
Stop	VI.	Unasp.	p		t				T	k	
		Asp.	ph		(th)				Th	kh	
	Vd.	Unasp.	b		d				D	g	
		Asp.	bh		dh				Dh	gh	
Affricate	VI.	Unasp.				ts	c				
		Asp.					ch				
	Vd.	Unasp.				dz	j				
		Asp.					jh				
Fricative				f		s	ś		S		h
Nasal			m			n			N		
Lateral						l			L		
Trill						r					
Semi-vowel			w				y				

Table 2. AS CONSONANTAL SYSTEM

(/wⁿ/is not indicated in the chart as its distribution is very rare in BT.)

(Vl. = Voiceless, Vd. = Voiced, Asp. = Aspirated, Unasp. = Unaspirated)

An adult or young child who speaks to a baby reduces the adult phonemic system to a BT phonemic system with 25 phonemes (10 vowels and 15 consonants). The phonemes in Tables

1 and 2 can be considered as the input which passes through a number of phonological processes resulting in the output which constitutes the BT model as represented in Tables 1a and 2a:

Close	ii i		uu u
Half-close	ee e		oo o
Open		a aa	

Table 1a. BT VOWEL SYSTEM

			Bilabial	Labio-dental	Dental	Alveolar	Alveolo-palatal	Palato-alveolar	Retroflex	Velar	Glottal
	VI.	Unasp.	p		t					k	
		Asp.									
Stop	Vd.	Unasp.	b		d					g	
		Asp.									
	VI.	Unasp.					c				
		Asp.									
Affricate	Vd.	Unasp.					j				
		Asp.									
Fricative											
Nssal			m		n						
Lateral					l						
Trill											
Semivowel			w				y				

Table 2a. BT CONSONANTAL SYSTEM

Over and above the phonemes which can be directly related to AS, BT also has two additional phonemes, viz. /B/, a bilabial egressive vibrant and /ŋ/ a velar nasal.

The frequency of distribution of nasals in BT is higher than in AS. Unlike in AS, it is wide enough to cover the vowels in BT. Since lateralisation is the most productive process in BT, its distribution is wider than in AS. The aspirated phonemes are very rare in BT (found only in BT *dhaam* < AS *dhaam* 'the form of a sound'). Affricates in BT have a wider distribution, while retroflex consonants are totally absent. The half open long front vowel /EE/ of AS has no parallel in BT. In BT /ee/, /e/ and /oo/, /o/ are contrastive only in the final position, whereas in AS they contrast also in the initial and medial positions.

PHONOLOGICAL PROCESSES

The important phonological processes[2] involved in the derivation of BT forms from AS are as follows:

(1) **Vowel-backening**. The half close front vowel /er changes to the corresponding back vowel /o/, in positions othe/ than the final :

$$e \rightarrow o / \neq (C) - C$$

en-du-ku	→	*on-nu-ku*	'why'
ce-di	→	*oo-di*	'which one'
ce-ru-ku	→	*co-lu-ku*	'sugar cane'
lee-du	→	*doo-du*	'no'
cee-loo-ki	→	*coo-loo-ki*	'into the field'

(2) **Vowel-lowering**. (a) A half open front vowel /EE/ changes to an open vowel /aa/ :

2 The hyphen indicates the syllable boundary. For further details regarding the syllable division see Hyman (1975), and Bell and Hooper (1978), The three principles of Pulgram (1970) (cited and discussed by Hyman 1975), viz. 1. prineiple of open syliablcity, 2. principle of minimal coda and maximal onset, and 3. principle of the irregular coda are followed in the syllable divison.

EE → aa

mEE-ka	→	*maa-ka*	'goat'
fEE-nu	→	*paa-nu*	'fan'
pEEka	→	*paa-ka*	'playing cards'

(b) A half close back vowel /o/ changes to an open vowel /a/, when the following syllable contains /a/ thus harmonising with it :

o → a/ -C(C)a

koo-pam	→	*kaa-pam*	'anger'
kot-ta-di	→	*kat-ta-di*	'new one'
ko-Da-ta	→	*kat-ta*	'(I) will beat'
poos-taa	→	*paat-ta*	'(I) will pour'

But, *koo-ti* 'monkey' remains unchanged as the vowel in the second syllable is not an open back vowel.

(3) Assimilation.

(a) Total Assimilation: Total assimilation is a very common and widespread phenomenon in BT. The assimilatory process operates both in progressive and regressive directions.

Nasal assimilation is very common in clusters where the nasal totally assimilates the following homo-organic stop and thus simplifies the cluster into a geminate:

NC → NN

/-mb-/

bom-baay	→	*bom-maay*	'genital organ' (BT)
baam-bu	→	*baam-mu*	'bomb'

/-nd-/

pan-di	→	*ban-ni*	'pig'
un-di	→	*un-ni*	'(it) is'

/-ND-/

baN-Di	→	*ban-ni*	'cart'
muN-Da	→	*mun-na*	'widow'
koN-Da	→	*kon-na*	'hill'

/-ŋg-/

doŋ-ga	→	*doŋ-ŋã*	'thief'
maŋ-ga	→	*maŋ-ŋã*	'a name'
koŋ-ga	→	*koŋ-ŋã*	'crane'

In the above items the assimilation is progressive, and hence the first syllable is dominant. The assimilatory affect is regressive in the following items in which the second syllable is dominant:

$$C_1V_2 - C_2V_2 \rightarrow C_2V_1 - C_2V_2$$

naa-ku	→	*kaa-ku*	'for me'
naa-di	→	*daa-di*	'mine'
nii-ku	→	*kii-ku*	'for you'
lee-du	→	*doo-du*	'not'
raa-du	→	*daa-du*	'(it) won't come'

The above forms suggest that this process operates only on liquids and nasals (the evidence for other consonants is not available). It may also be noted that the onsets of the second syllables are stops.

(b) Partial (voicing) assimilation: In partial assimilation the affected consonant is assimilated only in the feature of voicing and not completely. The voiceless onset of the previous syllable gets assimilated to the voiced onset of the following syllable:

kaa-lu	→	*gaa-lu*	'leg'
pan-di	→	*ban-ni*	'pig'
tan-nu	→	*dan-nu*	'kick'
ka-Du-gu	→	*gag-gu*	'wash (you)'
ti-ru-gu	→	*dig-gu*	'rotate (you)'

No examples were found for partial regressive assimilation.

(4) Fricatvie strengthening: The fricatives[3] of AS are paralleled

3. Though three sibilants are shown in this paper, it is extremely rare that any individual speaker maintains a contrast between the three.

by the phonetically nearest stops in BT. The direction of /s,ś, and S/ is towards /c/, and /f/ towards /p/.

s,ś,S → C

/s/:

sii-ta	→	*cii-ta*	'a name'
bas-su	→	*bac-cu*	'bus'
maam-sam	→	*maa-cam*	'meat'
raa-su-koo	→	*laa-cu-koo*	'(you) write'

/ś/:

śe-na-ga-lu	→	*coŋ-ŋa-lu*	'bengal gram'
śer-ma	→	*col-ma*	'a name'

/S/:

ra:k-Sa-si	→	*laa-ca-ci*	'monster'

(*b*)

f → p

fEE-nu	→	*paa-nu*	'fan'
kaa-fi	→	*kaa-pi*	'coffee'
aa-fi-su	→	*aa-pii-cu*	'office'

(5) Lateralisation and lateral reduction. The alveolar trill of AS changes to a lateral in BT unconditionally. For instance:

raa-ju	→	*laa-ju*	'king'
raa-yi	→	*laa-yi*	'stone'
raa-su-koo	→	*laa-cu-koo*	'write (yourself)'
kuu-ra	→	*kuu-la*	'curry'
cii-ra	→	*cii-la*	'saree'
kar-ra	→	*kal-la*	'stick'
gur-ram	→	*gul-lam*	'horse'
tor-ri	→	*tol-li*	'tooth less'

The alveolopalatal /ś/ may be heard with slight palatalisation which could be attributable to the following front vowel. The palato alvolar /S/ has a very low degree of functional load and occurs in a few borrowed items whose frequency is rare. All the three are taken here to indicate that the process is applicable even if a speaker consciously maintains the distinction in AS.

Among the subjects, two mothers and one young child whom we can call group-B speakers as distinct from the rest of the speakers who will be called group-A speakers, the word initial lateral got changed to the homo-organic nasal. For example,

laa-gu	→	*naa-gu*	'knicker'
laa-wu	→	*naa-wu*	'fat' (size)
laD-Du	→	*nad-du*	'a round sweet'

It may be noted here that the change of the word initial nasal to a lateral is a common process even in the As of Godawari and Srikakulam districts.

For the description of the speech of gorup-A subjects, one rule namely 5a. is enough. But, for the description of the speech of the other group we need two rules (5a. and 5b.), which are in the feeding order.

5 a. r → l

5 b. l → n/≠—

Change of /r/ to /l/ is also found in Berber, but in Giluak /r/ changes to /t,d/ intervocalically (Ferguson 1977).

Lateralisation of a voiced retroflex stop in intervocalic position is also a regular process in BT. A retroflex consonant is generally changed to its non-retroflex counterpart in BT. But an intervocalic /D/ which is phonetically a flap in Telugu changes to a lateral.

D → l /V-V

gu-Di	→	*gu-li*	'temple'
ja-Da	→	*ja-la*	'plait'
ba-Di	→	*ba-li*	'school'
koo-Du	→	*koo-lu*	'leg of o cot'

(6.) **Deletion.** Deletion of a syllable and deletion of an initial semi-vowel are very common processes in BT.

(a) **Syllable deletion and compensatory gemination.** In words consisting of three or more syllables, the second syllable is always

deleted. Along with the deletion, the onset of the third syllable gets geminated. Since both the processes seem to be operating on the same material in unison like one proceess, this can be described in the following transformational format:

$(C_1)V\text{-}C_2V\text{-}C_3V(C_4)\text{-}(C_5V) \rightarrow (C_1)\ VC_3\text{-}C_3V(C_4)\text{-}(C_5V)$

ki-Ti-ki	→	*kik-ki*	'window'
ti-ru-gu	→	*dig-gu*	'(you) play'
aa-Du-koo	→	*aak-koo*	'(you) play'
mi-ri-yaa-lu	→	*miy-yaa-lu*	'pepper'
mo-ri-gin-di	→	*mog-gin-di*	'(it) barked'

This syllable deletion is conditioned by the structure of the first two syllables.[4] The second syllable is not deleted if either the first syllable or the second syllable is a closed one. That is, two syllables must be open for the deletion rule to operate. For example,

kob-ba-ri	→	*bob-ba-ri*	'coconut'
kot-ta-di	→	*kat-ta-di*	'new one'
kaa-rin-di	→	*kaa-lin-di*	'(it) leaked'
jaa-rin-di	→	*jaa-lin-di*	'(it) slapped'

(*b*) **Deletion of a semi vowel.** In BT, the initial bilabial semi-vowel is deleted regularly. In adult speech also this process is found though inconsistently, i.e. /e/ is retained in some formal situations. The rule for initial semivowel deletion in BT is:

4 The syllable deletion can be viewed as a simplification process in BT. In order to keep the syllabic balance intact and probably to maintain the rhythm of the speech, the onset consonant is geminated making the first syllable strong, or heavy. In rhythm, a syllable with long peak and a syllable with short peak followed by a coda are equivalents. We also notice here that the deleted syllable should not be a strong one. This process does not operate if the first syllable is a closed one.

This process also conforms to the syllable pattern of the word in Telugu where an initial short syllable is followed by another short syllable rather than a long syllable. For example, in *mi-ri-yaa-lu* 'black pepper' without the compensatory gemination the loss would give a long second syllable which is prevented by making the first syllable long or heavy. It should also be noted that normally the first syllable has primary phonetic stress which would be upset if the second syllable is long. In other words, the gemination helps retain the prominence of the first syllable by strenthening it.

wee-lu	→	*oo-lu*	'finger'
woN-Du	→	*on-nu*	'to cook'
weL-Lu	→	*ol-lu*	'(you) go'
was-taa-nu	→	*at-taa-nu*	'(I) come'

(7). **Epenthesis.** An epenthetic vowel is usually introduced to break a consonantal cluster. If such a vowel occurs in the penultimate syllable, it gets harmonised in certain features with the following vowel. For example,

weL-taa-nu	→	*o-la-taa-nu*	'(I) go'
nid-ra	→	*did-da-ra*	'sleep'
kaNT-loo	→	*kan-tu-loo*	'in the eye'
oNT-loo	→	*on-tu-loo*	'in the body'

8. **Deretroflexion.** Except the voiced retroflex stop occuring in the intervocalic position, all other retroflex consonants change into their non-retroflex counterparts as shown by the following examples:

/T/	*Ta-maTa*	→	*ta-ma-ta*	'tomato'
	maa-Ta	→	*maa-ta*	'word'
/TT/	b*uT-Ta*	→	*but-ta*	'basket'
	koT-Tu	→	*kot-tu*	'shop'
/NT/	*gaN-Ta*	→	*gan-ta*	'bell'
	maN-Ta	→	*man-ta*	'flame'
/N/	*baa-Nam*	→	*baa-nam*	'arrow'
	raa-Ni	→	*laa-ni*	'queen'
/ND/	*diN-Du*	→	*din-nu*	'pillow'
	baN-Di	→	*ban-ni*	'cart'
/L/	*taa-Lam*	→	*taa-lam*	'lock'
	mEE-Lam	→	*maa-lam*	'music band'
/LL/	*biL-La*	→	*bil-la*	'toffee'
	meL-Lo	→	*mel-lo*	'in the neck'

/Lt/	*weL-taam*	→	*ol-taam*	'we go'
/D/	*Dab-bu-lu*	→	*dab-bu-lu*	'money'
	Dab-baa	→	*dab-baa*	'tin'

Conclusion

We have thus noticed that like in other languages adult speakers of Telugu particularly mothers, use a modified variety of speech commonly called BT when they speak to little children.

We consider the AS as the basic or input and some phonological processes derive the BT from AS. At the level of phonology, Telugu BT register involves a good number of phonological processes in its derivation from AS. Of these, the following have been dealt with in the paper in detail: (1) Vowel lowering, (2) Vowel backening, (3) Assimilation, (4) Fricative strengthening, (5) Lateralisation and Lateral reduction, (6) Deletion, (7) Epenthesis, and (8) De-retroflexion.

I have concentrated on the phonological differences between AS and BT in Telugu. A systematic study of such differences at the levels of lexicon, morphology, and syntax would also be worthwhile.

Investigation of the extent and nature of BT register in the context of socio-economic parameters may also prove useful. Yet another area to explore would be the correlation between the BT and its influence on language acquisition at various levels and stages of language acquisition.

In the light of the above mentioned possibilities, the scope of the present paper is very limited. But, the justification of this study can be correctly assessed if we consider Brown's comment that 'Finally there is one sentence in this book which more than any other must be taken to heart by all of us. Snow writes "The role of BT in language acquisition can not be determined until we have the correct description of language." True and terrible. For linguists do not today even have a consensus on the general form of a correct description. No language has been fully described in any form. No serious modes of the psychological process of speaking exists. Are we a century premature? We do not like to think so' (1977:25).

REFERENCES

BELL, ALAN and JOAN, B. HOOPER. 1978. 'Issues and evidences in syllabic phonology'. In Alan, Bell and Joan, B. Hooper (eds.), *Syllables and Segements.* Amsterdam: North Holland Publishing Company.

BROWN, ROGER. 1977. Introduction to Catherine, E. Snow and Charles, A. Ferguson (eds.), *Talking to Children* Cambridge: University Press.

FERGUSON, C.A. 1977. 'Baby talk as a simplified register'. In *Talking to Children.*

HYMAN, LARY M. 1975. *Phonology: Theory and Analysis.* New York: Holt Rinehart. 188-93.

KOSTIĆ, DJ., A. MITTER, and BH. KRISHNAMURTI. 1977. *A Short Outline of Telugu Phonetics.* Calcutta: Indian Statistical Institute.

NEW PORT et al. 1977. 'Mother I'd rather do it myself: some effects and non - effects of maternal speech style'. In *Talking to Children.* 109-50.

PULGRAM, ERNST. 1970. *Syllable, Word, Nexus, Cursus.* The Hague: Mouton.

SNOW, E. CATHERINE. 1977. 'The development of conversation between mothers and babies'. *Journal of Child Language* 4.1-22

————.1977, 'Mothers' speech research : from input to interaction'. In *Talking to Children.*

OpiL 9, 10. 116-123 (1983, 1984)

SOME ASPECTS OF PERCEPTUAL ASSESSMENT OF PATHOLOGICAL VOICE

ROSHAN WEIR

University of Edinburgh

It is clear that the quality of an individual's voice holds clues to the underlying state of that individual's larynx. This fact, coupled with the inadequacies of traditional clinical techniques for assessing laryngeal pathology, suggest the feasibility and desirability of developing aural techniques for identifying pathology, on the basis of voice quality.

In the present paper, the relevance of such an approach is detailed, and one project that seeks to develop such a system of auditory assessment is discussed (Laver, 1980). In particular, in relation to one experimental application of Laver's system, its effectiveness in identifying harshness in deviant voices is considered. It is concluded that Laver's system proves viable as a step toward the aural assessment of laryngeal pathology.

The voice is capable of conveying a great deal of information about the identity of the speaker. It can tell us,for instance, among other things, something about the sex, age and emotional state of the speaker. But most important of all is the fact that the quality of the voice can indicate aspects of the medical state of the speaker (Laver 1968:49). In other words, the presence of abnormalities or pathology in the larynx may be reflected in the voice so that the voice serves as a diagnostic sign of laryngeal diseases. Clearly, it would be of great value if this capacity of the voice for providing information about the medical state of the speaker could be fully exploited for clinical purposes. A recent attempt by Laver (1980), which seeks to develop a system for the perceptual assessment of voice quality, is discussed in this paper.

Any attempt to identify pathology by aural means must ultimately rely on knowledge of the physical cnaracteristics of the vocal apparatus, in particular the larynx, when in a pathological condition. Therefore in order to adequately evaluate the voice, one must go right down to the roots, and examine the vocal folds and the manner in which they vibrate. It is impor-

tant to remember, however, that the larynx is situated in a fairly inaccessible position deep down in the throat where it is in complete darkness and therefore difficult to examine. Numerous methods ranging from high speed photography to ultrasonics exist for studying the vibratory pattern of the vocal folds. Unfortunately, most of these methods are not very practical as they require expensive equipments and a great deal of work has to be done on the data before any sense can be made of the results. The clinician who has to examine the vocal folds in order to determine the presence of pathology cannot afford to rely on such time consuming methods. The traditional methods used for the clinical examination of the vocal folds are direct laryngoscopy, indirect laryngoscopy and radiography. Both direct and indirect laryngoscopy have their disadvantages. They can cause discomfort to the subject and cannot be used if certain anatomical or physiological abnormalities are present. Further, it is impossible, to examine the undersurfaces of the vocal folds by laryngoscopy and thus any pathology present in that area may be overlooked (Takahashi and Koike 1975). Radiography may not cause discomfort to the subject but there is always the risk of radiation even thouh attempts have been made, according to Allen and Hollien (1973), to reduce the dosage of radiation as much as possible. Apart ftom thc above methods it is also possible to obtain information about the state of the larynx by acoustic analysis of the speech wave which will be dealt with later in the paper.

Having identified the physical behaviour of the patholoigcal larynx, the next step is to establish acoustic correlates in order to assess this pathology. aurally. In this cotnext, it is necessary to consider how to characterize voice quality. Traditionally, terms like 'harshness', and 'breathiness' have been used by voice scientists to describe deviant voices which result when pathology is present in the larynx. Of these, the voice quality which is most frequently associated with the presence of laryngeal pathology is hoarseness. Descriptions of hoarseness indicate that it is a complex voice quality consisting of at least two components. It is generally agreed among speech scientists that one of the components of hoarseness is harshness which will be the concern of this paper. 'Breathiness', is most frequently cited as

the other componet present in hoarse voice. The term 'huskiness' is used as a substitute for breathiness by Van Riper and Irwin (1958). Murphy (1964) describes hoarseness as 'breathy, husky harshness'. Laver (1980) defines hoarseness as 'harsh whispery voice' and maintains that it cannot be described as a combination of harshness and breathiness and that the two phonation types are mutually incompatible.

Harshness is characterized by low fundamental frequency, high intensity, pitch perturbation (jitter), amplitude perturbation (shimmer) and extreme tension in the laryngeal and pharyngeal muscles. Of these, pitch perturbation and amplitude perturbation are the main acoustic correlates of harshness. Pitch perturbation is caused by irregular vocal fold vibrations which, in turn, are often due to extreme tension in the laryngeal muscles. The presence of pathology in the form of mass lesions, like nodules, polyps or tumours, also contributes to irregularity of vocal fold vibrations because mass lesions weigh down the vocal folds preventing them from vibrating efficiently. It is fairly well established that the presence of pitch perturbation in a voice causes it to be perceived as rough or harsh. The effects of Pitch perturbation or jitter on perceived roughness was investigated by Coleman and Wendahl (1967), and Coleman (1960) using an electric laryngeal analog LADIC to produce pitch jittered stimuli. Their results showed that not only does the presence of pitch jitter in stimuli cause it to be perceived as rough but that the perceived roughness increases with the amount of pitch jitter. Pitch perturbation, however, does not exist in harsh voices alone. Lieberman (1961) and Hollien, Michel, and Doherty (1973) studied pitch perturbation in the voices of normal adult males and were able to conclude that normal voice does contain a small amount of pitch jitter. Lieberman (1961) discovered that differences in duration between adjacent pitch periods of more than 0.6 msec occur 20% of the time and of more than 1.0 msec 15% of the time; while Hollien, Michel and Doherty (1973) found that jitter factors of 0.5 to 1.0 were characteristic of normal male voices. This means that the amount of pitch perturbation in a voice must exceed these values before that voice can be considered to be harsh.

The effect on the speech wave of irregular vocal fold vibration is loss of periodicity. This results in a reduction of

the harmonic components and consequently in an increase in the level of inhormonic or noise components. A good amount of work has been done in this area (Emanuel and Sansone 1969, Emanuel, Lively, and McCoy 1973, and Emanuel and Whitehead 1979).

The other type of perturbation that is associated with harshness is amplitude perturbation or 'shimmer'. Shimmer is defined by Wendahl (1966:98) as 'amplitude variation among successive glottal impulses. Wendahl used the laryngeal analog computer LADIC to generate both jitter and shimmer stimuli. The purpose of his experiment was to discover the relationship between shimmer and listener judgments of perceived roughness. He also wanted to compare the roughness judgments obtained from shimmer with those obtained for jitter. His results indicated that shimmer can be scaled in terms of degrees of perceived roughness in the same way as jitter so that increases in the amount of shimmer present in a stimulus correspond to increases in perceived roughness. This led him to suggest that in those cases where listeners judged a signal to be rough when no jitter was present, shimmer could account for the perception of roughness.

Finally we come to the auditory evaluation of the voice. It would be ideal if laryngeal pathology could be diagnosed just by listening to the voice of the subject because producing voiced sounds is easy and does not usually cause any discomfort or inconvenience to the subject. The danger of using perceptual techniques for identifying voices, however, lies in the fact that most definitions used for describing voices are subjective and lack clarity. This leads to confusion because different terms are used for describing the same voice quality and vice versa. This is shown by the lack of agreement among speech therapists and other voice scientists when describing voice disorders and rating their severity and has been observed by several researchers, among them Jensen (1965). Jensen conducted an experiment in which trained speech pathologists were asked to assess the voices of cheer-leaders suffering from hoarseness. He found that there was very poor agreement among speech pathologists when identifying voice deviations, so that what some speech pathologists heard as hoarseness was considered to be breathiness by

others. In addition, there was no self-consistency. For instance, when a voice sample was presented to a speech pathologist twice it was judged differently on each occasion. Standardization of the terminology used for identifying and describing voices is, therefore, a very essential requirement.

Several psychometric procedures exist for identifying voices in terms of their components. The most common of these is the Semantic Differential Method in which pairs of adjectives are used as scales and dimensions for classifying the voice (Isshiki et al. 1969, Takahashi and Koike 1975). Although the Semantic Differential Method is a very useful technique, it is heavily dependent on the pairs of adjectives used to define the scales, and this is a disadvantage. Another method used for the psycho-acoustic evaluation of the voice is the GRBAS scale, which has been established by the Japan Society of Logopedics and Phoniatrics, and is mainly used for evaluating pathological voices. A description of the GRBAS scale is given by Hirano (1981:83-4). The five letters GRBAS, according to him, represent the five scales: grade (G), rough (R), breathy (B), asthenic (A) and strained (S). Though definitions are provided for the scales, their interpretation remains rather vague.

We arrive eventually at the phonetic labelling system devised by Laver (1980) in which voices are assessed in terms of phonation types like modal voice, harshness, whisper, breathiness, creak, and falsetto, and the degree to which each phonation type is present. Laver provides very clear and precise definitions for each phonation type. The degree to which a phonation type is present is represented on a standard 6-point scale.

Under a current project in the Phonetics laboratory at the University of Edinburgh, speech therapists have been trained in Laver's phonetic labelling system. An experiment was carried out in order to establish whether speech therapists trained in this system agree among themselves when identifying and describing voices. To do this selected data were obtained from the project and analyzed. Ten speech therapists from Edinburgh were trained for 8 weeks at the rate of one session per week, each session lasting for 1½ hours. Ten speech therapists from Newcastle were also trained. Their training period included one

preliminary day followed by a two day training period plus a one day follow-up. The training for both groups of speech therapists included instruction in recognizing voice qualities and listening to tapes.

Six subjects with deviant voices, 3 male and 3 female, ranging in age from 25 to 65 years, were each asked to read a short passage and their voices were recorded on tape. The two groups of speech therapists were then asked to listen to the tapes and assess the voices. In addition to listing the phonation types present in each voice they were asked to determine the degree to which each phonation type was present. This 'degree' was selected from a standard 6-point scale on which 1 represented a slight degree of the phonation type and 6 an extreme degree. Of the phonation types listed by the speech therapists the amount of their agreement on the identification and scaling of harhness alone was taken into account. A statistical value known as the Kendall Coefficient of Concordance (W) was calculated for the Edinburgh group and the Newcastle group separately, as well as for the two groups taken together. It was found that W in all the three cases was significant at the 0.01 level of significance (Ali 1983). A high or significant value of W is interpreted as meaning that the judges employed essentially the same criterion in ranking the voices. It has to be pointed out, however, that a significant value of W does not necessarily mean that tne criterion used for ranking is correct, nor does it identify the nature of the criterion used.

In order to establish whether harshness was actually present in the voice samples, acoustic analysis of the speech wave was carried out. As far as harshness is concerned, it is possible to use computer programs for detecting pitch and for measuring pitch perturbation. Laver, Hiller and Hanson (1982) compared the Gold and Rabiner (1969) parallel processing technique for estimating pitch periods with inverse filtering and cepstral processing methods, in order to establish which pitch detection system would be most reliable for dealing with deviant voices. They fonnd that the Gold and Rabiner technique was the most suitable of the three methods, both for detecting pitch in normal voices and for detecting pitch in deviant voices.

The Gold and Rabiner method was, therefore, employed in order to obtain jitter percentage (RATEX) values for each of the six voices. It was found that substantial amounts of jitter were present in the voices.

It is, therefore, highly likely that the presence of jitter in the voices was used as a criterion for identifying harshness by the speech therapists. It is also possible that amplitude perturbation or other unknown criteria may have been used by the speech therapists to identify and assess harshness.

The fact that the speech therapists appear to agree with one another to a significant extent suggests that the system used in the training of the speech therapists, namely Laver's phonetic labelling system, is a fairly effective one and can be taken as a viable step towards the aural detection of laryngeal pathology. One point of interest is that a higher value of W was seen in the case of the Edinburgh gronp of speech therapists who were trained for a longer period of time. This implies that longer training periods in which the characterization of voices can be practised frequently would improve the results.

REFERENCES

ALI, R. 1983. *An Acoustic and Perceptual Study of Harshness* in *Pathological Voices*. M. Litt. Thesis, University of Edinburgh.

ALLEN, E.L, and HOLLIEN, H. 1973. 'A laminagraphic study of pulse (vocal fry) register phonation'. *Folia Phoniatrica* 25.241-250.

COLEMAN, R.F. 1969. 'Effect of median frequency levels upon the roughness of jittered stimuli'. *JSHR* 12.330-336.

COLEMAN, R.F. and WENDAHL, R.W. 1967. 'Vocal roughness and stimulus duration'. *Speech Monograph* 34. 85-92.

EMANUEL, F.W., LIVELY, M.A. and MCCOY, J. 1973. 'Spectral noise levels and roughness ratings for vowels produced by males and females'. *Folia Phoniatrica* 25. 110-120.

EMANUEL, F.W. and SANSONE, F. 1969. 'Some spectral features of "normal" and simulated "rough" vowels'. *Folia Phoniatrica* 21. 401-415.

EMANUEL, F.W. and WHITEHEAD, R.L. 1979. 'Harmonic levels and vowel roughness'. *JSHR* 22.829-840.

GOLD, B. and RABINER, L. 1969. Parallel processing techniques for estimating pitch periods of speech in the time domain'. *JASA* 46. 442-448.

HIRANO, M. 1981. *Clinical Examination of Voice*. Vienna, New York:Springer-Verlag.

HOLLIEN, H., MICHEL, J. and DOHERTY, E.T. 1973. 'A method for analyzing vocal jitter in sustained phonation'. *Journal of Phonetics* 1.85-91.

ISSHIKI, N. OKAMURA, H., TANABE, M. and MORIMOTO, M. 1969. 'Differential diagnosis of hoarseness'. *Folia Phoniatrica* 21.9-19.

JENSEN, P.J. 1965. 'Adequacy of terminology for clinical judgment of voice quality deviation'. *The Eye,Ear, Nose* and Throat Monthly 44.77-82.

LAVER, J. 1968. 'Voice quality and indexical information',. *BJDC* 3.43-54.

LAVER, J.1980. *The Phonetic Description of Voice Quality*. Cambridge: University Press.

LAVER, J. HILLER, S. and HANSON, R. 1982.' Comparative performance of pitch detention algorithms on dysphonic voices'. *Transactions in Acoustics, Speech und Singal Processing* 1.192-195.

LIEBERMAN, P. 1961. 'Perturbations in vocal pitch'. *JASA* 33. 597-603.

MURPHY, A.T. 1964. *Functional Voice Disorders*. Englewood Cliffs: Prentice-Hall.

TAKAHASHI, H. and KOIKE, Y. 1975. 'Some perceptual dimensions and acoustical correlates of pathologic voices'. *Acta. Otolaryngologica Suppl.* 338.1-24.

VAN RIPER, C. and IRNIN, J.V. 1958. *Voice and Articulation*. Engiewood Cliffs: prentice-Hall.

Wendahl, R.W. 1966. 'Laryngeal analog synthesis of jitter and shimmer auditory parameters of harshness'. *Folia Phoniatrica* 18.98-108.

OPiL 9,10. 124-39 (1983, 1984)

NEGATION IN IMITATION

A. Usha Devi

M.S. University, Baroda

Elicited Imitation is used as a tool in this study to observe Telugu children's competence in negative sentences. Subject whose age ranged between three years to five and a half were divided into five groups with six months' interval. They were asked to repeat after the investigator a set of negative (Telugu) utterances prepared for the study. Results indicate that children could repeat a sentence correctly if it was short and within the limitation of their memory and recall. It is further observed that sentences with semantic and syntactic complexity were repeated with more errors, than the others.*

SCOPE AND AIM

Much of the work done on language acquisition is based on observation of children in natural settings. However, attempts have also been made to elicit specific types of responses in more or less structured or formal situations. Naturalistic observations require large samples of data in order to be assured of some degree of representation of a child's linguistic competence, limiting thus the number of children whose speech can be studied due to the enormous amount of time involved in collecting and processing the data. Elicited data collection, on the other hand, is a technique for tapping several children's linguistic knowledge in a short period of time. The two kinds of study, viz. naturalistic and experimental are, however, complementary activities in child language research.

In the present study, an attempt is made to study children's imitation of Telugu negative sentences considered to be well-formed by adult norms using the technique of elicited imitation.

* I would like to express my thanks to the Principal of Kotha Yelliah Memorial School for providing me all the facilities required in conducting the experiment. I would like to record my appreciation for all the children who participated in the experiment cheerfully. I am also grateful to C. Ramarao and to B. Lakshmi Bai for their encouragement and suggestions. I am particularly grateful to Jean Aitchison, for her criticism, comments, and help.

As has been pointed out by Smith (1970), the situation in which a child imitates sentences after an experimenter is not a normal speech situation. But, it is a fact that children can attend to particular structures, and perhaps a somewhat artificial situation is the best way to get them to do so.

The term repetition has been used differently by scholars working on child language. Three such main differences are worth mentioning: (1) Spontaneous Imitation or Imitation I —repetition of adult utterances by children in a real-life situation spontaneously (Ervin-Tripp 1964). (2) Elicited imitation or Imitation II where children are asked to repeat the model sentences presented to them (Fraser, Bellugi and Brown 1963, Slobin and Welsh 1973). (3) Repetition or Echolalia as Piaget calls hit, where a child repeats his own utterances or those of others for his pleasure. This has been classified by Piaget (1955) under egocentric speech.

The experiment, on which the study is based, tries to infer a good deal about children's ability to handle different adult negative sentences. Its aim is: (a) To find out the children's linguistic ability in Telugu negative constructions (without any contextual support). (b) To discover what structural properties make the model sentences easy or difficult for the children to repeat. (c) To gain some insight, if possible, from the errors the children make, into the processes involved in their listening and structuring of negative sentences.

NEGATION IN CHILD LANGUAGE

Children begin to produce negative as well as positive sentences in 'real-life' situations at an early point in their linguistic development. Klima and Bellugi (1966) report three stages in the development of the syntactic form of negative sentences in English-speaking children belonging to the age group two to three years. According to them, the first stage of negation consists in attaching the negative word *no* or *not* outside of a simple sentence, e.g. *no sit there.* In the second stage, the negative word appears inside of the sentence, e.g. *he no bite you*; and in the third stage, the negative sentences approximate the 'transformationally' derived negative sentences of the adult model, e.g. *Paul*

can't have one. Russian children show identical development according to Slobin (1966). Bloom (1970) talks about three semantic categories of negation in children's speech: (1) Nonexistence and Disappearance, e.g. *no pocket, no more noise*; (2) Rejection : rejecting some action or object which someone else has proposed, e.g. *no dirty soap*; and (3) Denial: denial of what someone else has said, e.g. *'no truck'*, *'that not scramble'*. These negatives are confined to quite concrete and immediate situations and do not include negations of possibilities. Bloom suggests that the three kinds of negative utterances do not develop together, rather they appear in the order of Nonexistence, Rejection, and Denial. As has been reported by Bloom and Lahey (1978) similar results have also been reported in the development of syntax and semantics of negation in Italian (Volterra 1971), French (de Boysson-Bardies 1972), Russian (Slobin 1966), and Japanese (McNeill and McNeill 1968).

Research on the acquisition and development of language by children of Indian languages has started only recently, and very little information is available on the developmental stages of negation in Indian languages, particularly, in Telugu. Nirmala's study (1981) on four Telugu children does include some data on Telugu negatives. Contrary to the order suggested by Bloom, Nirmala's observations show the appearance of the negative verb for rejection, *oddu* 'don't', first in the developmental sequential order. The same is found in the study conducted by Lakshmi Bai (1984) on two Tamil-Telugu speaking bilingual children.

SUBJECTS AND METHODOLOGY

Subjects. Thirty eight children, 22 girls and 16 boys, between the age of three to five and a half years were selected from a school at Secunderabad in Andhra Pradesh. All the children belonged to more or less the same socio-economic background namely, middle class. Most of them were born and brought up in the twin-cities where their parents are settled in different occupations. Most of the parents had the same type of educational qualifications, that is, the father had a bachelor's degree and the mother educated upto school final. The language used at home was mostly Telugu. The mothers invariably used Telugu,

while the fathers used English also quite frequently, perhaps, to encourage the children to use the language which is generally considered as prestigious, essential for higher education, and also a symbol of social status.

The children belonged to the following five age groups:

Group	Age
I	3;0-3;6
II	3;6-4;0
III	4;0-4;6
IV	4:6-5;0
V	5;0-5;6

The children of group I were in nursary and those in group II and III in Lower Kinder Garten. The other two groups were from Upper Kinder Garten. However, group V also had two children from First Standard.

Each child was tested individually in a room in the school and was asked to repeat after the experimenter. The relevant instructions for the task in question were given to all the groups as a whole and later each child was tape-recorded independently. Most of the time the children imitated the model sentence immediately. Occasionally, a sentence had to be recorded for a second time. There were also a few instances when the child failed to repeat even a part of the model sentence and remained silent. Except in the case of children of group I who could not be tape-recorded as they spoke very softly all other children's repetitions were tape recorded. The imitations of the children of group I were written down in a note book in Telugu script so as not to miss the child's exact repetitions. The rest of the data were also transcribed into Telugu script after the completion of all the recording sessions.

Forty-seven well-formed negative sentences both simple and complex were prepared and presented randomly for the test. The sentences differed in semantic complexity as well as in length, since length has been considered one of the important variables in testing the immediate memory of children. Some of the sentences used are illustrated in the following section.

NEGATION IN TELUGU

There are three verbs of negation in Telugu which occur both with nouns and verbs. These are the negative counterparts of positive verbs which do not have surface manifestation in equational sentences. The three verbs viz. *leedu* 'no', 'not', *oddu* 'don't, and *kaadu* 'not' convey the notions of 'non-existence', 'rejection', and 'denial' of Bloom's study, though there exists a certain amount of overlap in their uses. The following examples are pairs of positive and negative sentences of Telugu given for illustration:

	POSITIVE	NEGATIVE
1.	pustakam *undi* 'there is a book'	pustakam *leedu* 'there is no book'
2.	naana inTLoo unnaaDu 'daddy is at home'	naanna inTLoo leeDu 'daddy is not at home'
3.	pustakam kaavaali '(I, etc.) want the book'	pustakam oddu '(I etc.) don't want the book'
4.	idi pustakam 'this is a book'	idi pustakam kaadu 'this is not a book'

The following examples of the negative forms of the Telugu verb *ceyyu* 'to do' are taken from Arden (1873):

Positive Infinitive : *ceyya-* (*ceeyu* 'to do')
(negative forms are added to this.)
Past verbal participle : *ceyyaka*
Verbal noun : *ceyyakapoowaDam*
Indefinite relative participle : *ceyyani*

The indicative mood has the following four tenses:

Progressive present tense : *ceyyaDam leedu*
Habitual present and future tense : *ceyyanu*
Past tense : *ceyya leedu*
Indefinite : *ceeyyaka poodunu*
Imperative mood : *ceyyaku* (Sg.), *ceyyakanDi* (Pl.).

The structure of a simple negative sentence in Telugu is as shown below:

$$\left\{\begin{matrix}N\\NP\end{matrix}\right\} + \left\{\begin{matrix}N\\V\\A\\VN\\PP\end{matrix}\right\} + \left\{\begin{matrix}leedu\\voddu\\kaadu\end{matrix}\right\}$$

N=Noun, NP=Noun Phrase, A=Adjective or Adverb, VN=Verbal noun, PP=Postpositional Predicate.

Some examples from the sentences used in the study are given below:

(1) *amma* *annam* *vaNDa* *leedu*
mother rice cook not
'Mother did not cook the rice.'

(2) *miiru* *allari* *ceyya* *voddu*
you noise do don't
'(You) don't be naughty.'

(3) *naaku* *kaafii* *voddu*
to me coffee don't want
'I don't want coffee.'

(4) *aa* *pani* *ceesindi* *neenu* *kaadu*
that work did I not
'I am not the one who did that.'

(5) *aa* *pani* *ceyyaku*
that work do not do
'Don't do that work.'

(6) *akkaDiki* *veLLakaNDi*
there don't go
'Don't go there (honorific and pl.).'

(7) *aayanni* *inTiki* *pilawakunDaa* *eTLaa* *vastaaDu*
him to home without calling how comes he
'How will he come home without being asked for?'

(8) *miiru* *ceppina* *pani* *eppuDu* *ceeyyanannaanu*
you said work when do-not-said-I
'When did I say no to you when you asked me to do it?'

(9) *neenu allari ceyyanu, maa tammuDu kuuDaa ceyyaDu*
I mischief don't do my younger brother too will not do
'I won't be naughty and my brother won't be either.'

(10) *aayana vaccinappuDu DaaDii inTLoo leeDu*
He when came dad at home was not
'Dad wasn't at home when he came.'

(11) *meemu roTTelu tinam annamee tinTaam*
we rotis don't eat rice eat
'We don't eat rotis, we eat rice.'

In the selection of the sentences emphasis was given to relatedness of structures along with semantic or stylistic differences and complexity. No particular attention was paid to cover all the possible syntactic and semantic details of Telugu negation.

Results

Each constructional pattern was compared with the repetitions of the children of the same age group and then compared with the other age groups as well. It was observed that there were certain regularities in the imitation of the children correlating with (a) their age and (b) with the sentence pattern involved. The model sentences were, therefore, grouped into two sets: those that could be imitated correctly and those that could not be. Tables I and II show the percentage of children who repeated the sentences with no or a few errors and with many errors respectively.

A. Sentences containing the negative words *voddu* 'prohibition, and rejection' and *leedu* 'non-existence' were found to have been imitated 100% correctly by children of all groups, whereas sentences with *kaadu* 'denial' were found difficult to imitate for the children belonging to the lower age groups, that is, groups I and II, (the correct percentage of repetition being 66%, and 87.5% respectively). The rest of the groups imitated these sentences also 100% correctly.

B. The structures with imperative mood and past tense had also a 100% correct imitation by all groups, whereas non-past and interrogatives were found to be difficult by many groups of children. The percentage for these two types of sentences are as follows:

	I	II	III	IV	V
Non-past	16%	12.5%	25%	25%	37.5%
Interrogative	37.3%	25%	75%	100%	100%

The reasons for the difference in the percentage of children who imitated correctly in groups I and II will be discussed later.

The twelve sentences of correct imitation are listed in Table III, and will be described here individually:

(S 1) *amma rammanTee neenu veLLakunDaa unDanu*
mommy come-says I go-not remain
'I won't remain without going if mommy asks me to come.'

This sentence could not be imitated correctly by 100% children of groups I and II, and by 50% of children of groups III and IV. Contrary to the percentage of groups III and IV, 62.5% children of group V found it difficult to repeat. The incorrect repetition resulted in the following two sentences:

a. *amma rammanTee neenu veLLakunDanu*
b. *amma rammanTee neenu veLLakunDaa raanu*

Instead of *veLLakunDaa unDanu,* these two sentences have the verb forms *veLLaka unDanu* and *veLLakunDaa raanu* (neg. of *vacc-* 'to come').

(S 2) *Tiicar aDigitee neenu ceppaka maananu*
teacher asks-if I tell-not remain-not-I.
'I shall not fail to say it if teacher asks me.'

100% children of groups I to IV and 75% of group V failed to repeat this sentence correctly. The children rather left it incomplete and only a very few said it as *Tiicar aDigitee cepparaadu* 'one should not tell if teacher asks', or **Tiicar aDakkunTee jawaabu ceppu.*

(S 3) *pustakam balla miida undi balla kinda kaadu*
book table on is table under not
'The book is on the table, not under it.'

The percentage of children who could not repeat S3 was as follows:

I	II	III	IV	V
100%	67.5%	67.5%	37.5%	50%

Most of the children were confused with the postpositions *miida* 'on' and *kinda* 'under'. This was confirmed by asking them to show where the book was. It was easy for them to show the book on the table, and to place it on the table as well, but they could not do the same when they were asked to place the book under the table. Most of the children repeated *miida* 'on' twice. As for the negative form *kaadu* 'not' (denial) which was used with *kinda*, the children replaced it either with *leedu* 'not' (non-existence), or with the positive verb *undi* 'is'.

Setences 4 and 5 are analysed together as they both have more or less the same meaning with a shift of emphasis on negation. The sentences are :

(S 4) *maa annayya DaakTar awutaaDu ani anukoonu*
my brother doctor become that think-not-I
'I don't think my brother will become a doctor.'

(S 5) *maa annayya DaakTar awaDu/kaaDu anukunTaanu*
my brother doctor become-not think-I
'I think my brother will not become a doctor.'

These two sentences were repeated in the following way:

(4 a) *annayya DaakTar anukoonu*
'I don't think brother is a doctor.'

(4 b) *annayya DaakTar awutaaDu*
'Brother will become a doctor.'

(5 a) *anna DaakTar anukunTaanu*
'I think brother is a doctor.'

(5 b) *anna DaakTar awaDu/kaaDu anukunTaanu*
'I think brother will become/will not become a doctor'.

The percentage of children who could not repeat (4) and (5) correctly was:

	I	II	III	IV	V
(S 4)	100%	100%	62.5%	50%	37.5%
(S 5)	100%	50%	50%	62.5%	37.5%

(S 6) *atanni raavaddani analeedu kaani*
him don't come said-not but

rammani kuuDaa analeedu
come that also said-not

'I did not ask him not to come but I did not ask him to come either.'

The percentage of repetation of this sentence is interesting. While children of groups I and II made 100% errors, all the other groups repeated it correctly. I and II group children repeated either the first half or the second half of the sentence only leaving the rest out.

(S 7) *miiru baagaa cadavakapootee paas kaarulawaru.*
you pl. well read-not-if pass will not
'You (pl.) won't pass if you don't study well.'

The percentage of children who could not repeat this sentence correctly is, 100%, 37.5%, 37.5%, 37.5% and zero (i.e. nil) for Groups I to V respectively. While no single child in Group I could repeat it correctly, all the children of Group V could imitate it correctly. In the other groups only 37.5% of the children made errors.

(S 8) *rooju skuulku raaka tappadu*
daily school to without coming fail not

caduvukooka tappadu
study-not must-not

'One must not fail to come to school daily
and one must not also fail to study daily.'

This sentence has the verbs *raaka tappadu* and *caduvukooka tappadu* in which the negative habitual non-past *tappadu* is preceeded by a negative past verbal participle to give the force of a strong affirmative. The percentage of children who did errors in imitating this sentecne is : 100%, 50%, 37.5%, 37.5% and 25%

repeat the sentecne correctly while only 25% of group V could handle it correctly. The children of groups I-III repeated only the predicate of the first part *raaka tappadu* twice. Most of the children either repeated the first half or the second half by deleting some of the words.

Sentences (9-12) like sentences 4 and 5 are related in meaning with a difference in stylistic pattern of the syntactic negation. The sentences are given below:

(S 9) *neenu abaddhaalu ceppaDam DaaDiiki iSTam leedu*
I lies telling daddy to like not
'Daddy doesn't like my lying.'

(S 10) *neenu abaddhaalu ceppakapoovaTam DaaDiiki iSTam*
I lies tell-not daddy to likes
'Daddy likes me not to lie.'

(S 11) *DaaDiiki neenu abaddhaalu ceppaali ani unDadu*
daddy to I lies tell ought that be not
'Daddy doesn't think that I should lie.'

(S 12) *DaaDiiki neenu abaddhaalu ceppoddu ani unTundi*
daddy to I lies tell-not that be
'Daddy would like me not to lie.'

The percentages of children who made errors in the repetation of sentences (9-12) are as follows:

	I	II	III	IV	V
(S 9)	100%	75%	50%	50%	75%
(S 10)	100%	75%	62.5%	50%	75%
(S 11)	100%	87.5%	50%	50%	50%
(S 12)	100%	75%	75%	75%	87.5%

Sentences 9 and 11, and 10 and 12 are similar in their syntactic pattern as shown below:

(S 9) VNP—VN

(S 10) VNN—VP

(S 11) V-AuxP—VN

(S 12) V-AuxN—VP

(VN=Verbal Noun, V=Verb, Aux=Auxiliary, P=Positive, N=Negative.)

Sentences 11 and 12 contain the quotative marker *ani* 'that' (*anuTa* 'to say') added to the sentences to express an intention which is what makes these sentences differ from the other two. It is interesting to notice that sentences 9 and 11 have similar percentage of correctness whereas sentence 12 seems to be more difficult than the other three sentences for all the children. It is also interesting to note that children of group V found the sentences 9 and 12 more difficult to repeat than groups III and IV.

Discussion

The results indicate that it was easy for children to imitate simple sentences which were syntactically and/or semantically less complex. Children of group I reduced the length of the sentences while repeating the predicate phrase. The study shows all correct responses for *leedu* or *vaddu* by all children, whereas *kaadu* was replaced by either *leedu* or *vaddu*. For example, the sentence *pustakam balla miida undi balla kinda kaadu* 'book is on the table and not under it' was repeated as *pustakam balla miida undi balla kinda leedu*. Yet another sentence, *pencil ivvu, rabbar* kaddu 'give pencil, not rubber' was repeated as.....*rabbar vaddu* 'rubber don't'. As pointed out earlier, these forms are also correct with their lexical meanings by adult standards. Though the model was provided to the children with an instruction to simply repeat after the experimenter, the children seem to have processed the sentences within the limits of their linguistic abilitities. There was no evidence of use of *kaadu* in place of either *leedu* or *vaddu*. Nirmala (1981), in her study observes that the verb *vaddu* appeared in the speech of the four children of her study prior to that of *leedu*, and that *kaadu* emerged after *leedu*. The order of development, as she points out, is rejection, non-existence, and denial

for Telugu children. Lakshmi Bai (1984) also has similar findings for the two Tamil-Telugu bilingual children she studied. These two studies thus do not support the sequential order of negation proposed by Bloom (1970). The present finding based on Elicited Imitation also supports Nirmala and Lakshmi Bai's observations from naturalistic data.

Further, all the children of this study could imitate the negative sentences in past tense, but failed to do so in the non-past. Nirmala's data also show more occurrence of past tense forms than the non-past. Two observations may be made here which require further investigation: (1) Non-past form of the verb was difficult for the children to repeat as it appears to have a relatively more complex inflectional process than the corresponding past tense form; (2) The past tense form may be more unmarked in comparison with the non-past form in Telugu language as well as in child lnaguage.

Negative constructions in question were difficult to handle for both children of group I and II. But the percentage of children who could repeat better seem to be more in group I than in group II. The reason for this could be the failure of the children of group II in their immediate memory when compared with group I children. It should also be pointed out here that there were more number of girls in group I than group II. But as sex was not considered to be an important variable in the present study it was not controlled. It may be interesting to explore the possibility of sex as an important variable in child language studies in Indian languages.

As far as the linguistic factors responsible for incorrect imitations are concerned, the following points may be noted:

(1) The sentences used were long which might have affected the immediate memory and therefore their recall. The fact that many children imitated either the earlier or the latter half of the model sentence suggests that attention was being paid either to the first half or to the second half of the sentence.

(2) As has been revealed in the study of de Boysson-Bardies (1970), the usage of negation is linked to certain features of the

verbs employed. Sentences 4 and 5, and 9,10,11 and 12 could not be handled by the children successfully. This indicates that the syntactic complexity of negative connotation either in the embedded sentence or in the matrix sentence created a problem for the children to repeat it.

(3) The time gap provided for repetition was very small and it is likely that the children could not pay full attention either to the structure or to the meaning of the sentence. This has resulted in erros even by the children of group V, i.e., between 5;0-5;6 years.

(4) The greater disparity in the percentage of children of group I to group V (refer sentences 4-8) is due to the semantic connotation of the sentences included in the study. That is, the older children of groups III, IV and V could understand the meanings implied in these sentences particularly, sentences 7 and 8 which are directly related to their experience of schooling.

The sentence *Tiicar aDigitee neenu ceppaka maananu* 'I won't fail to tell if teacher asks' has the verb *maanu* 'to stop', which is used less frequently even by adults. This sentence had several different imitations tried by the children. *ceeppaka maananu* was replaced by *cepparaadu, ceppakapoonu,* and *ceppaka maanaddu* of which the second one is the equivalent of the verb in the model sentence. This suggests that certain verbs may be easier for the children to handle than the others.

Conclusions

1. The findings of the study support the observations based on naturalistic data by Nirmala (1981) and Lakshmi Bai (1984) regarding the developmental order of *vaddu, leedu,* and *kaadu* which goes against Bloom's study.

2. Negative sentences with syntactic or semantic complexities or both have a higher probability of errors than simple sentences containing negative verbs.

3. Length of the sentence is an important factor in determining whether a sentence is easy or difficult for a child to repeat.

4. The task of imitation performed by children may show the following three possibilities : (*a*) The children process and give a semantically or structurally approximate sentence if the structure and meaning is understood by them. (*b*) They may apply certain mechanical factors in repeating the sentence without having any insight into the form or content of the sentence. (*c*) They may repeat only a part of the sentence to the extent of the limitations of memory and recall.

5. Finally, this experiment shows that elicited imitation could be used as an effective method for tapping children's linguistic behaviour.

REFERENCES

ARDEN, A.H. 1873. *A Progressive Grammer of the Telugu Language* Madras: The Christian Literature Society.

BLOOM, L. 1970. *Language Development : Form and Function in Emerging Grammars.* Cambridge : M.I.T. Press.

——— and M. LAHEY (eds.). 1978. *Language Development and Language Disorders.* New York : John Wiley and Sons (Part 2).

DE BOYSSON-BARDIES, D. 1970. 'Syntax and semantics in memorization of negation'. In G.B. Flores D'Arcais, and J.M. Levelt (eds.), *Advances in Psycholinguistics.* Amsterdam : North Holland Publishing Company.

ERVIN-TRIPP, S. 1964. 'Imitation and structural change in children's language'. In Lenneberg, E.H. (ed.), *New Directions in the Study of Language.* Cambridge: Mass.M.I.T. Press.

FRASER, C., U. BELLUGI, and R. BROWN. 1963. 'Control of grammar in imitation comprehension and production'. *Journal of Verbal Learning and Verbal Behaviour* 2. 121-35

KLIMA, E. and U. BELLUGI. 1966. 'Syntactic regularities in the speech of children.' In Bar-Adon A. and W.F Leopold (eds.), *Child Language a Book of Readings.* New York: Prentice-Hall, Inc.

LAKSHMI BAI, B. 1984. 'Development of negation in Tamil-Telugu bilingual children'. Paper presented in the *National Seminar on Psycholinguistics and Historical Linguistics*, March 2-4, 1984, University of Delhi.

NIRMALA, C. 1981. *First Language (Telugu) Development in Children : A Short Descriptive Study.* Unpublished Doctoral Dissertation, Osmania University.

PIAGET, J. 1955. *The Language and Thought of Child.* Cleveland : The World Publishing Company. (First Published in 1926).

SLOBIN, D.I., and C.A. WELSH. 1973. 'Elicited imitation as a research tool in Developmental Psycho-linguistics'. In C.A. Ferguson, and D.I. Slobin (eds.), *Studies of Child Language Development.* New York : Holt, Rinehart and Winston.

SMITH, C.S. 1970. 'An experimental approach to children's linguistic competence'. In J.R. Hayes (ed.), *Cognition and the Development of Language.* New York : John Wiley and Sons Inc.

OPIL 9,10. 140-152 (1983, 1984)

SUBSTITUTION ERRORS BY APHASICS

USHA RANI

Osmania University

This paper presents an analysis of substitution errors by aphasics whose native language is Telugu. The aim is to describe the types of substitution errors found, and to test the hypothesis that phoneme substitution errors are more likely to occur between phonemes separated by a single feature difference than between phonemes separated by multiple feature differences. It also attempts to study to what extent the substitutions of aphasics are similar to those found in child language.

This paper presents an analysis of substitution errors in aphasics whose native language is Telugu. The aim is to describe the types of substitution errors found and assess to what extent they are similar to those found in child language.

In aphasia, which is a pathological disorder in language, many aspects of the linguistic code break down along certain parameters. The study of aphasia may give insights into the structure of these parameters. It has been observed by many investigators that the speech patterns of aphasics contain many types of phonological errors. The results of various studies have suggested that there is an underlying uniformity in the phonological patterns in the speech of these patients. This uniformity could be captured by the distinctive feature frame work discussed by Jakobson, Halle and Fant (1962). This framework was chosen because the original project was designed to test whether Jakobson's 'regression hypothesis' worked. According to this hypothesis 'the dissolution of the linguistic sound system in aphasics provides an exact mirror image of the phonological development in child language' (Jakobson 1968:60). Previous research provides evidence to show that errors made by aphasics include substitution, assimilation, addition and deletion.

Hypotheses

(1) Phoneme substitution errors are more likely to occur between phonemes separated by a single feature difference (sfd)

than between phonemes separated by multiple feature difference (mfd).

(2) The analysis of substitution errors might show certain similarities with those found in the speech of children.

DATA

Subjects: The three subjects selected for the study were from Gandhi hospital (a general hospital in Secunderabad). Subjects 'M', 'A', and 'S' were 25 years, 35 years, and 65 years old respectively. All the subjects were native speakers of Telugu (Telangana dialect). The diagnosis of these subjects was made by the neurophysician and general physicians of the hospital. The aphasics represented in this study were drawn from a particular diagnostic group, i.e. Motor aphasics. Motor aphasia is also known as 'Broca's aphasia' or 'expressive aphasia'. The peculiarity of this kind of aphasia is that it affects the productive (expressive) skills of an individual most, i. e. the maximum amount of disturbance is caused in his ability to express ideas in speech or in writing (Weisenberg and Mcbride 1935). All the three subjects were predominantly 'expressive aphasics'. The subjects were found to have had brain damage resulting from a cerebro-vascular-accident (C.V.A.) resultlng in right side hemiplegia, i.e. their right upper and lower limbs were paralysed. In all the subjects the C.V.A. resulted from thrombosis. All the subjects were right handed. None of the subjects was undergoing any speech therapy at the time of the study.

MATERIAL

The data for the present study were obtained by using the phonology section of a comprehensive test, designed to obtain information on phonological, morphological and syntactic components of Telugu. Word lists were made to elicit all the phonemes of Telugu. For example, to elicit data on the phoneme /t/, the following words with /t/ phoneme in all the positions were listed. *tala* 'head', *kooti* 'monkey', *katti* 'knife', and *bənti* 'ball'. In Telugu this phoneme does not occur finally. All the words chosen in thc list in the phonology section were picturable. A wide variety of pictures, toys, and objects represent-

ing the words in the list were shown to the subjects for eliciting the data.

Elicitation Techniques. Controlled elicitation was the mode used to collect phonological data. Repetition had to be used as a mode of elicitation as the subjects lacked spontaneous speech. Very little data was obtained through conversation and interview. Whenever conversation was possible it centred around the patient's illness, work and hobbies.

Experimental procedure. Each subject was individually tested in a quiet room. A Philips casette recorder with a built-in microphone was used to record data in each session. The first recording of each subject was made approximately 4 weeks after the stroke. The subsequent two recordings were made at an interval of one month each. The recording typically started with an interview and conversation. To test the comprehension level of the subjects, they were given a set of instructions like, 'lift your right hand', 'close your eyes', etc. and a set of questions like 'where is the fan in this room?', 'is the light on in the room?', etc. All the subjects could understand the questions and instructions very well and responded accordingly, through gestures. Being motor aphasics, they lacked verbal expression. After these questions, the responses to the phonology section were recordrd. Objects and pictures representing the word list of the phonology section were shown to the subjects to elicit speech sounds of Telugu. Whenever the subject failed to identify the objects verbally, they were made to repeat the word in question after the investigator, with the help of objects and pictures. The responses were recorded. The same word list was used for all the recordings in the expectation of a systematic recovery in the subjects.

ANALYSIS

A distinctive feature matrix was used for the analysis of substitution errors. The following ten distinctive features were used for the analysis.

consonantal	(cons)
nasal	(nas)
lateral	(lat)

obstruent	(obs)
voiced	(vd)
strident	(str)
grave	(grv)
diffuse	(diff)
continuant	(cont)
retroflex	(ret)

The distinctive feature frame work used by Jakobson to study phonemic regression is used in this study since one of the aims of the study is to validate his postulation. However. one additional feature 'retroflex' has been introduced to distinguish the retroflex consonants of Telugu from the other consonants. The features 'obstruent' and 'lateral' also have been added to account for certain errors made by the subjects.

(1) A few examples of substitution are illustrated from the sample:

(i) /sabbu/ → [tabbu] 'soap'
(ii) /siisa/ → [tiita] 'bottle'

The initial segmental phonemes in (i) and (ii) and the inter-vocalic consonant in (ii) are substituted. Note that this exemplifies the process of stopping (i.e. fricative substituted by a stop), which is also common in child language (Ingram 1979). The above substitution can be analysed in terms of distinctive features as follows:

/s/ → /t/

(+ str)	(− str)
(+ cont)	(− cont)
(+ obs)	(+ obs)
(− vd)	(− vd)
(− nas)	(− nas)
(+ cons)	(+ cons)
(− lat)	(− lat)

(2) (iii) /gaaju/ → (gaadu) 'bangle'
(iv) /jiipu/ → (diipu) 'jeep'

In (iii) the intervocalic consonant is substituted, and in (iv) the initial consonant is substituted both of which can be represented thus:

$$/j/ \rightarrow /d/$$

$$\begin{bmatrix} (-\ \text{diff}) \\ (+\ \text{str}) \\ (+\ \text{vd}) \\ (-\ \text{nas}) \\ (-\ \text{grv}) \\ (+\ \text{cons}) \end{bmatrix} \quad \begin{bmatrix} (+\ \text{diff}) \\ (-\ \text{str})) \\ (+\ \text{vd}) \\ (-\ \text{nas}) \\ (-\ \text{grv}) \\ (+\ \text{cons}) \end{bmatrix}$$

(3) (v) /wankaaya/ → (wantaaya) 'brinjal'

(vi) /meeka/ → (meeta) 'goat'

In the above examples the medial consonant is substituted. This exemplifies the process of fronting, that is, the replacement of a velar stop by a dental or alveolar which is once again common in child language (Ingram 1979):

$$/k/ \rightarrow /t/$$

$$(+\ \text{grv}) \qquad (-\ \text{grv})$$

$$(-\ \text{vd}) \qquad (-\ \text{vd})$$

Note that examples (i) (ii) (iii) and (iv) involve multiple feature substitution while examples (v) and (vi) have single feature substitution. Following are a few more examples of substitutions with a description of the nature of substitution involved:

(4) (vii) /Dabbu/ → (dabbu) 'money'

(viii) /Dabba/ → (dabba) 'box'

In the above examples the initial consonant is substituted. Once again the replacement of a retroflex stop by an ordinary stop is a commonly found process in child language (Nirmala 1979).

$$/D/ \quad \rightarrow \quad /d/$$

$$\begin{bmatrix} (+\text{ ret}) \\ (+\text{ obs}) \\ (+\text{ cons}) \\ (+\text{ grv}) \\ (+\text{ vd}) \\ (-\text{ str}) \\ (-\text{ nas}) \end{bmatrix} \quad \begin{bmatrix} (-\text{ ret}) \\ (+\text{ obs}) \\ (+\text{ cons}) \\ (+\text{ grv}) \\ (+\text{ vd}) \\ (-\text{ str}) \\ (-\text{ nas}) \end{bmatrix}$$

The unchanged distinctive features for the segments are also given in the above examples to show that even when there was a possibility to change, no change had occurred. In (vii), (viii), (v) and (vi) the target phoneme and the substituted phoneme are separated by a difference of single feature (Sf). In (i), (ii), (iii) and (iv) the target phoneme and the substituted phoneme are separated by a difference of multiple features (mf).

In (i), (ii), (vii) and (viii) the substitution errors were of manner features and in (ii) and (vi) of place features. (iii) and (iv) have both kinds of substitution errors, one of place feature and one of manner feature.

Frequency counts[1] of the changed features and unchanged features were used to compute a percentage of substitution errors for each feature. Following the same method the percentages of place feature substitutions and manner feature substitutions were computed separately.

Fig. 1 (see pp. 146) showes the percentage of place feature substitutions in relation to manner feature substitutions in each subject's speech in the first recording.

[1]Frequency counts of the changed features and unchanged features were used to compute a percentage of substitution errors for each feature. For instance, all the segments with substitutions were first listed. Then for each segment the features, both changed and unchanged, were listed. Now for example, for feature 'gravity' all the segements which had the potential for error in this feature were separated. These constitute potential places for the substitution of feature +gravity with – gravity or vice versa. The actual number of changes were divided by the total number of potential places and then multiplied by 100 to arrive at the percentage frequency of change for this feature. Examples are listed in the appendix to show the above procedure for feature gravity.

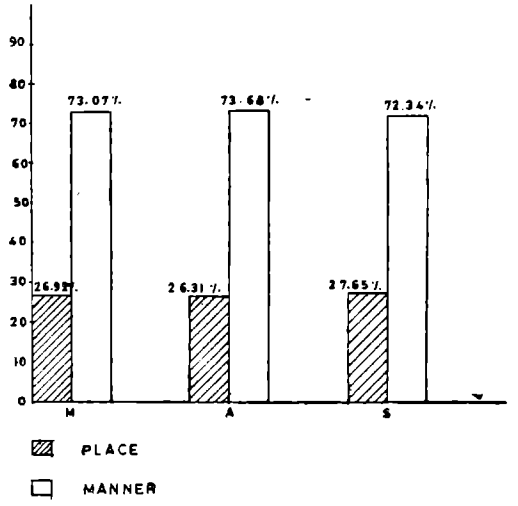

FIGURE 1 : BAR GRAPH SHOWING PERCENTAGE ERRORS OF PLACE FEATURE SUBSTITUTIONS AND MANNER FEATURE SUBSTITUTIONS IN ALL THE THREE SUBJECTS IN THE I RECORDINGS

The vertical axis indicates the percentage of place features and manner feature substitutions of the first recording. The subjects are arranged on the horizontal axis. The plain bars indicate manner features and the other bars indicate place features. It can be seen from the above graph that for the three subjects M, A and S, the percentage of errors in the manner features were 73.03%, 73.68% and 72.34% respectively. In comparison, percentage of errors in the place features were considerably low, i.e. 26.92%, 26.3% and 27.65% respectively.

The number of manner changes have been artificially inflated to some extent by the inclusion change in voicing. However, even if we deduct this voicing change, manner changes still outnumber those in place of articulation. A physiological reason for the greater frequency of manner feature substitution could also be postulated. Manner involves complicated movement of the articulators whereas place change requires merely a change in the point of articulation on a linear plane. For instance, the production of a retroflex sound requires a greater control over the tongue than that of the non-retroflex plosives. Interestingly, the data provide ample instances of retroflex and strident sounds being substituted by plosives:

/D/ → (d)
/j/ → (d)
/T/ → (t)
/s/ → (t)

We have sufficient data to confirm the hypothesis that phoneme substitution errors are more likely to occur between phonemes separated by single feature differences than between phonemes separated by multiple features. Fig. II clearly substantiates this point (see pp. 148):

o-y axis in the graph shows the percentage errors of single feature substitutions and multiple feature substitutions. The percentage errors of I and III recordings are compared. The subjects are arranged on the o-x axis. Plain bars indicate multiple feature substitutions and the other bars indicate single feature substitutions.

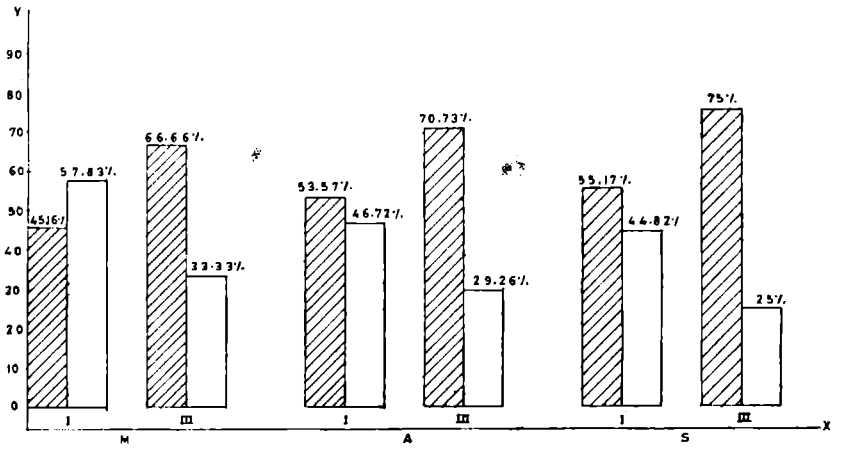

FIGURE 2 : BAR GRAPH SHOWING PERCENTAGE ERRORS OF SINGLE FEATURE SUBSTITUTIONS AND MULTIPLE FEATURE SUBSTITUTIONS IN THE I AND III RECORDINGS OF ALL THE SUBJECTS.

Fig. II shows that in the case of all the 3 subjects the frequency of single feature substitutions is more than multiple feature substitutions, in both recordings I and III. However, it is interesting to note that the gap between the frequencies of (sf) and (mf) increases considerably in the third recording. It is quite likely that many of the (mf) substitutions of the I recording were realized as (sf) substitutions in the III recording. This could explain the increased gap between (sf) and (mf) in the III recording. Probably it is a step towards getting cured and one could speculate here a stage after this when there would be no (mf) substitutions and only a few (sf) substitutions. One can further visualize a stage of 'no substitution' which is in fact the goal, if the recovery progresses in the same direction.

It is of course possible that repetition of the words in question amounted to some type of therapy, and provided practice in the words concerned. However, this is unlikely to account entirely for the big difference between the first and the third recordings.

The mean perecentage of substitution errors for each feature in the case of all the three subjects' first recording was computed. Each distinctive feature was arranged in the descending order of the percentage substitution errors.

The total percentage range, i.e. 1 to 100% was divided into ten equal logarithmic intervals, representing ten magnitudes with consecutive magnitudes bearing a constant ratio. This logarithmic scale[2] of magnitudes was used to rank the percentage errors. A hierarchy of distinctive features in Aphasic's dissolution of speech was thus arrived at which is respresented in Table I (see pp. 150).

[2]Log Scale used for determining the range of percentage errors.

1–6	2–5	4	6	10	16	25	40	62	100
10	9	8	7	6	5	4	3	2	1

Hierarchy of distinctive features in aphasics' dissolution of speech in descending order.	Mean % of the substitution errors of 3 subjects' I recording	Rank (Log. scale)
retroflex	84.17	1
continuant	62.96	1
diffuse	28.73	3
grave	27.73	3
strident	26,38	3
voiced	24.84	4
obstruent	20.58	4
lateral	18.16	4
nasal	10.19	5
consonantal	5.18	7

Table 1.

Regarding our second hypothesis, it is interesting that all the processes we noted had parallels in child language (Ingram 1979, Nirmala 1979). Moreover, we note that the hierarchy of dissolution in aphasics is the reverse of that proposed for acquisition by Jakobson. However, as Jakobson's views on child language are now regarded as oversimplified, this should not necessarily be taken as evidence in favour of the regression hupothesis. (A further analysis of the detailed similarities and differences between aphasics' speeach and child language is in progress.)

Conclusion

The present data from Telugu confirmed our hypothesis that substitution errors occur more often between phonemes separated by single feature difference than between phonemes separated by multiple features. Our second hypothesis, that the Telugu phonological substitutions of aphasics might show similarities with those found in the speech of children acquiring Telugu language seems to be confirmed in outline. However, more work is needed to see whether the similarities observed are more than superficial.

APPENDIX

1. /m/ →]n]

$$\begin{bmatrix}+\text{grave}\\+\text{cons}\\-\text{obs}\\+\text{vd}\\+\text{nas}\\+\text{diff}\end{bmatrix} - \begin{bmatrix}-\text{grave}\\+\text{cons}\\-\text{obs}\\+\text{vd}\\+\text{nas}\\+\text{diff}\end{bmatrix}$$ (place feature)

2. /d/ → [k]

$$\begin{bmatrix}+\text{vd}\\-\text{grave}\\-\text{nas}\\-\text{str}\\-\text{lat}\end{bmatrix} - \begin{bmatrix}-\text{vd}\\+\text{grave}\\-\text{nas}\\-\text{str}\\-\text{lat}\end{bmatrix}$$ (manner feature) (place feature)

3. /g/ → [l]

$$\begin{bmatrix}+\text{grave}\\-\text{lat}\\+\text{vd}\end{bmatrix} - \begin{bmatrix}-\text{grave}\\+\text{lat}\\+\text{vd}\end{bmatrix}$$ (place feature) (manner feature)

4. /g/ → [d]

[+grave] — [−grave] (place feature)

5. /p/ → [t]

$$\begin{bmatrix}+\text{grave}\\+\text{cons}\\+\text{obs}\\-\text{vd}\\+\text{diff}\\-\text{nas}\end{bmatrix} - \begin{bmatrix}-\text{grave}\\+\text{cons}\\+\text{obs}\\-\text{vd}\\+\text{diff}\\-\text{nas}\end{bmatrix}$$ (place feature)

6. /k/ → [t]

$$\begin{bmatrix}+\text{grave}\\-\text{vd}\\-\text{nas}\end{bmatrix} - \begin{bmatrix}-\text{grave}\\+\text{vd}\\-\text{nas}\end{bmatrix}$$ (place feature)

7. /g/ → [p]

$$\begin{bmatrix}+\text{vd}\\-\text{diff}\\+\text{obs}\\+\text{grave}\end{bmatrix} - \begin{bmatrix}-\text{vd}\\+\text{diff}\\+\text{obs}\\+\text{grave}\end{bmatrix}$$ (manner)

8. /m/ → [k]

$$\begin{bmatrix} +\text{diff} \\ +\text{nas} \\ +\text{vd} \\ +\text{cons} \\ +\text{grave} \end{bmatrix} \quad - \quad \begin{bmatrix} -\text{diff} \\ -\text{nas} \\ -\text{vd} \\ +\text{cons} \\ +\text{grave} \end{bmatrix}$$

(place and manner features)

Examples 1, 2, 3, 4, 5, and 6 show the substitution error in the feature gravity. In the examples 7 and 8 no substitution takes place in gravity. The total number of potential places for gravity in these examples is 8. Out of 8, 6 are actual number of changes and 2 are unchanged for the feature gravity. The percentage for the feature gravity is computed by dividing the actual number of changes by the total number of potential places and then multiplied by 100. So the percentage of error for gravity is 75%. Following the same method, the percentages of place feature substitutions and manner feature substitutions were computed. Following the same method percnentages of substitution errors in phonemes separated by single feature difference and phonemes separated by multiple feature difference are computed.

REFERENCES

BLUMSTEIN, SHEILA, E. 1973. *A Phonological Investigation of Aphasic Speech.* Paris : Mouton.

HYMAN, LARRY, M. 1975. *Phonology : Theory and Analysis.* New York : Holt, Rinehart and Winston.

INGRAM, DAVID. 1979. 'Phonological patterns in the speech of young children in language acquisition'. In Paul Fletcher and Michael Garman (eds.), *Language Acquisition.* London : Cambridge University Press.

JAKOBSON, ROMAN and MORRIS HALLE. 1956. *Fundamentals of Language.* The Hague: Mouton.

JAKOBSON, ROMAN, MORRIS HALLE, and G. FANT. 1962. *Preliminaries to Speech Analysis.* Cambridge, Mass : MIT Press.

JAKOBSON, ROMAN. 1972. *Child Language, Aphasia and Phonological Universals.* The Hague : Mouton.

NIRMALA, C. 1979. 'Medial consonant cluster acquisition by Telugu children'. *Journal of Child Language* 8. 63-73.

OPiL 9,10. 153-170 (1983, 1984)

SOME SPECTROGRAPHIC OBSERVATIONS ON THE SPEECH OF A SUBJECT WITH MYOSITIS

VASANTA DUGGIRALA

Osmania University and Memphis Speech and Hearing Center

Acoustic studies are increasingly being used in recent years to assess the anatomical and neuro-muscular maturation of speech mechanism. Kent (1976) described a system of iso-vowel lines, which permits graphic comparison of formant frequencies of disordered speech with those of normal subjects. This study, based on an eleven year old subject with myositis, demonstrates the usefulness of iso-vowel system and shows how spectrographic analysis can be used to : 1. estimate the deviations in formant frequencies of vowels; 2. measure speech segment durations in the order of hundreds of milliseconds; and 3. indicate presence or absence of hoarseness in speech. Clinical implications of the results are discussed.*

Spectrographic studies are being used more commonly in recent years to assess the development of motor control for speech. The acoustic data typically consists of 1. Formant frequency measurements to understand the positioning of articulators for vowel sounds, 2. Vocal fundamental frequency measures to study the laryngeal adjustments for vowels, and 3. Temporal properties such as voice onset time to assess articulatory-laryngeal coordination for production of certain consonants. Durational studies, although relatively limited are also being used to study development of timing control for speech. After making an exhaustive survey of these acoustic studies, Kent (1976 : 19) concluded that the maturational end point for adult-like precision of motor control is reached around the age 11-12 years. He added further that the variability in performance in speech-motor tasks progressively diminishes from age three through age twelve. The chronological profiles on the development of motor control for speech, developed on the basis of the results of these studies have a lot of diagnostic as well as therapeutic value.

* I would like to thank Dr. Walter H. Manning, Associate Professor, Speech-Language pathology at the Memphis Speech and Hearing center, for reading earlier drafts of this paper and for the encouraging comments.

A fairly consistent result of developmental studies on timing in speech is, that children younger than about six years have longer speech segment durations compared to adults and older children (Hawkins 1973 : 1; Gilbert 1977 :4; Smith 1978 : 6). The reduction of speech segment durations with age was attributed to the neuro muscular maturation because, available evidence points to the fact that many speech disorders, particularly those of neurological origin involve disturbances of timing control (Kent and Netsell 1975:40). Both young children and individuals with dysarthria of cerebellar origin tend to have speech segments that are longer and more variable in duration than those for normal adults (Kent, Netsell and Abbas 1979:22). However, these authors felt that the resemblance is only superficial and that more research is needed in this area.

Smith was of the opinion that developmental patterns in the control of duration are a necessary substrate for research on acquisition of phonological processes. Specifically, he commented: 'If children do require longer to produce speech segments, there are at least two alternatives that could occur in the development of phonological processes; they might learn to modify segments in an absolute sense that is equal in duration to adult performance or they could make relative adjustments commensurate with their own rate of production. Knowing which alternative occurs will help in understanding various phonological observations' (1978:39).

Some of the above mentioned considerations gave impetus to the present study, which is based on a single subject with neuro muscular problem (Myositis). Formant frequency and duration measurements were made and the values were compared to those reported by previous investigators for normals as well as dysarthric speakers.

Previous Research

In the past, researchers interested in the analysis of vowels in disordered speech frequently encountered with the problem of lack of a tool with which data from disordered speakers can be

compared with normative data. Kent (1979:44) offered a solution to this problem by developing what he calls a system of iso-vowel lines in F1-F2 and F2-F3 planes (see Fig.1 below) and demonstrated how this system can be applied to interpretation of data from individuals with speech disorders.

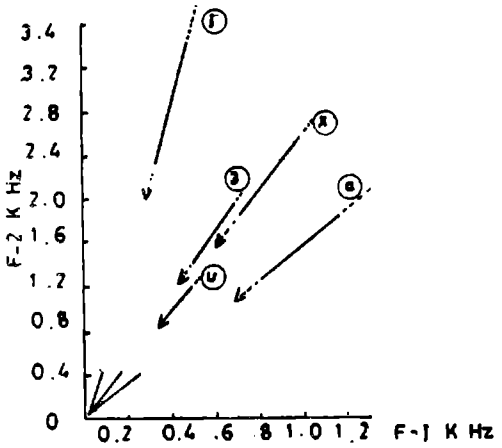

Fig. 1

Iso-vowel lines offer a graphic evaluation of formant structure for any given speaker. The solid mid point of each line indicates the range of formant frequency values for which normative data are available. The higher frequency end of each line is defined by results from four year olds and the low frequency or the origin of the line is defined by results from adult subjects. The broken extensions represent possible extrapolations to younger children (high frequency end) and adults with larger vocal tracts (low end). The author stated that each iso-vowel line is an acoustic life line of an average individual's vocal tract in that, as a person matures and grows, his/her vocal tract lengthens and vowel formants therefore, become lower in frequency.

Kent et al. (1979:22) studied the vowel formant structure and duration of speech segments in five individuals with ataxic dysarthria. Speech samples were obtained from these subjects in

a sentence context as well as in /d—d/ context. Spectrographic measurements were based on vowels / i,æ,a,u /. The data when superimposed on iso-vowel lines revealed that their vowel formant structure in CVC words was essentially normal, as the values fell on or very close to the lines as can be seen from Fig. 2. However, their speech segment durations were significantly prolonged relative to those of normals. There was a tendency towards equivalized syllable durations. They made smaller reductions (in duration) as suffixes were added. The disturbances of syllable timing were accompanied by abnormal contours of fundamental frequency, particularly monotone and syllable falling patterns. These dysprosodic aspects of ataxic dysarthria were related to the deteriorated cerebellar function.

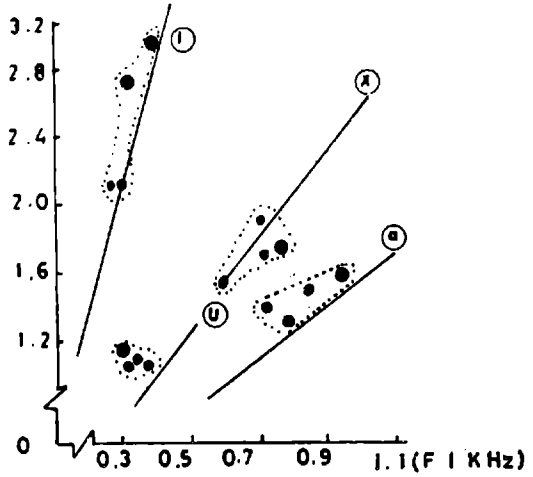

Fig - 2

Kent (1979:44) also cited the data of Angelocci (1964:29) based on normal hearing and hearing impaired boys aged 11 to 14 years. Iso-vowel lines for the test vowels indicated that there is a significant reduction in the acoustic vowel triangle for the hearing impaired and a close fit of data for normal hearing speakers.

In another spectrographic study, Kent and Forner (1980:8) studied speech segment durations in ten normal children in each

of three age groups; 4,6 and 12 years and ten normal young adults. Test stimuli consisted of 12 randomizations of three different sentences. Subjects' task was to recite each of these sentences in four different orders. Wide band spectrograms thus obtained were subjected to duration measurements in the order of hundreds of milliseconds. The results of this study indicated that the four year olds had longer segment durations and greater variability than adults and older children. The degree to which the segments were lengthened was found to depend on certain segmental and suprasegmental factors related to the stimuli. Specifically, the mean value for voice onset time for /k/ in *cat* was increased significantly, but not for /t/ in *took*. The authors felt that this was probably related to the fact that *cat* is a stressed utterance whereas the vowel /u/ in *took* is of shorter duration. They noted that although 4 year olds and cerebellar dysarthrics shared a tendency to prolong speech segments, the timing control for stress determined duration was different for these two groups.

Klatt (1974:17) demonstrated empirically that the duration of friction for /s/ varies with speaking rate such that the variance decreases as speaking rate increases,

The frequently reported acoustic features of nasal consonants /m/, /n/ and /ŋ/, viz., antiresonances and additional resonance bars do not always show up on the spectrogram in response to nasalized speech. Based on the spectrographic analysis of whispered vowels, Watterson and Emanuel (1981:18) commented that there may exist some acoustic features which cue perception of nasality and enable listeners to discriminate different degrees of nasality. They further added, 'it is challenging to observe that remarkably few facts are clearly established regarding the nature of such nasality cues in speech' (271).

Yanagihara (1967:10) reported the findings of spectrographic analysis and synthesis of hoarseness. He studied 167 cases of hoarseness with different etiologies. The narrow band and wide band spectrograms of vowels /u, ɔ,a, ɛ and i/ revealed three distinctive features;

1. Strong noise energy above 5KHz in vowels /a/ and /ɛ/.
2. Noise around formant one and two of vowel /a/.

3. No significant structural changes in the harmonic components of /u/.

Based on thses observations, he offered a classification system: In mild hoarseness, or Type-I spectrogram, noise components are limited to main formants of the test vowels. No remarkable noise can be noticed in higher frequencies. In Type-II spectrogram, the noise components are confined to second formants of /a/ and /i/ and slight noise in the high frequency region around 3KHz. In Type-III spectrogram, second formants of vowels /ɛ/ and /i/ are totally replaced by noise and there will be additional noise above 3KHz. In Type-IV spectrogram, the second formants of /a/, /ɛ/ and /i/ will be replaced by noise and even the first formants of all five vowels lose their periodic components. In addition, there will be more intensified high frequency noise. He demonstrated that Type-II is typical of patients with moderate hoarseness, Type-III moderate and severe and Type-IV corresponds to very severe hoarseness. He found a correlation coefficient of 0.65 between his four types of spectrograms and the perceptual judgments of hoarseness on the same patients. This system is currently being used extensively for diagnosis of hoarseness (Kelman et al. 1981:33).

The research reviewed hitherto indicates how invaluable spectrographic analysis has been in describing disordered speech. The methodology and normative data reported by Kent and Forner (1980:8) has been made use of in planning the present study which purports to answer the following questions.

1. Will the formant frequencies of test vowels in the subject's speech deviate markedly from the normal iso-vowel lines?

2. Will the duration values for different speech segments come close to any of the values reported for 4,6 and 12 year old normal children in Kent and Forner's (1980:8) study?

3. Will the breathy quality of subjects' speech alter the harmonic and/or formant structure of test vowels? Which one of the four types of spectrograms in Yanagihara's classification system describe her voice quality best?

METHOD

Description of the subject: An eleven year old black female served as subject of this study. From the case history and interviews with the parents of the subject, the following information was gathered:

Tiffany Sanders, the subject, was admitted to the Le Bonheur Children's Medical Center on March 23, 1981 with complaints of progressive muscle weakness, weight loss, dysphagia, skin rash and voice changes. There were no significant medical problems at or soon after the birth. She has been attending a normal school and her scholastic performance was described as 'average' by her teachers. Extensive laboratory and medical diagnostic tests were conducted. The results of muscle biopsy, electro myography and nerve conduction studies revealed extensive lymphocytic infiltration of the muscle fibres. The carbon dioxide levels in her blood were reported to be very high. Her problem was diagnosed as 'chronic myositis.'

On the morning of March 25, Tiffany had total respiratory arrest. Naso tracheal intubation was performed and she was placed in the intensive care unit of the hospital during the next one month. Steroid treatment and exchange of blood gases were continued during this period. Finally, when she was able to breath without mechanical assistance, she was discharged from the hospital. However, the medical treatment continued for several months after that, on an out patient basis.

Her speech and voice were first evaluated by the Speech-language pathologists at the Speech and Hearning Centre in Nov. 1981, six months after her discharge from the Le Bonheur hospital. Her speech was described as being characterized by 1. Breathy voice quality, 2. Nasalization and occassional nasal emission especially during the production of pressure consonants, 3. Reduced intensity, 4. Restricted pitch range and 5. Reduced phonation duration. The report also said that her vowels sound distorted. The movement of all her articulators were reported to be rather slow. A gap of approximately 2. cm was noticed between the distal portion of the soft palate and posterior pharyngeal

wall, indicating velopharyngeal incompetency. Hypo adduction of the vocal cords was suspected. Surgical reconstruction of the velopharyngeal mechanism, temporary prosthesis and voice therapy were recommended. Currently, she is receiving voice therapy at the Center (twice a week). Efforts are being made to increase her phonation duration, decrease breathiness, reduce nasality and increase vocal intensity.

MATERIALS

Test vowels: /i/, /æ/, /a/ and /u/. in isolation.
Test words: /i/ in *heed*, /æ/ in *had*, /a/ in *hod* and /u/ in *hood*.

Test sentences: They were essentially the same as those used by Kent and Forner (1981):

1. We saw you hit the ball.
2. The box is blue and red.
3. I took a spoon and a knife.

In addition to the formant frequency measurements, the following duration measurements were made on the test sentences:

Test sentence I: a. Duration of vowel /ɪ/ in *hit*, b. duration of /ə/ in *the*, c. duration of vowel /æ/ in *cat*, d. phrase duration, i.e. the interval from initiation of friction in *saw* to the closure for /t/ in *cat*.

Test sentence II. a. Duration of vowel /a/ in *box*, b. duration of /i/ in *is*, c. duration of vowel /u/ in *blue*, d. phrase duration, *i.e.* the interval from the release of /b/ in *box* to /r/ in *red*.

Test sentence III. a. Duration of vowel /u/ in *took*, b. duration of vowel /u/ in *spoon*, c. duration of /s/ in *spoon* and d. phrase duration - interval from the release of /t/ in *took* to the beginning of voicing for /u/ in *spoon*.

This test material, spoken by an adult native speaker of English male was recorded in a double walled industrial acoustics sound treated room using a stereo tape recorder (Tascom, 22-2) and a dynamic microphone. Subject was allowed to practice uttering these materials. Tape recorded signals were fed to sound spectrograph (Kay, 7029A). The frequency range was 80-8000Hz,

and the analysis time 2.4 seconds. Both broad band and narrow band spectrograms were obtained for the stimuli. The first three formants for the test vowels were measured using a transparent template. For duration measurements, the distance in inches was converted into milliseconds using the scale, 5 inches=1000 msec., commonly used by researchers dealing with spectrographic analysis.

RESULTS AND DISCUSSION

Table-1 displays the first three formant frequencies of test vowels in isolation. Due to the presence of noise components, it was difficult to make accurate measurements of the third formant. Therefore, only F-1 and F-2 are plotted on the iso-vowel lines (Fig.3 below):

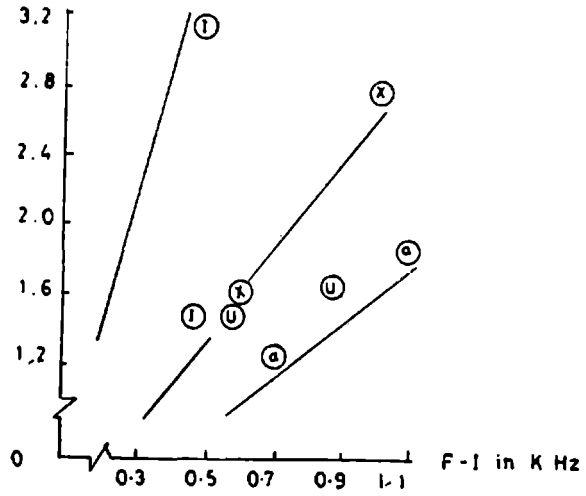

Fig. 3

While almost all the formant frequencies appear to be much lower than those expected for her age, vowels /i/ and /u/ are particularly more distorted than /æ/ and /a/, in that they fall furthur away from their respective lines whereas /æ/ and /a/ are on the same plane.

Acoustic and perceptual studies of Spriestersbach and Powers (1959:2) and Carney and Sherman (1971:14) indicated that high vowels are more affected by nasalization than low vowels. It has also been noticed that nasal speakers are more nasal on front vowels than back vowels. The reason for this is that for high front vowels, the velopharyngeal closure is more difficult to achieve because the constriction of the oral cavity covers a larger area. Consequently, the nasal resistance would be lower. Vowels adjancent to voiced consonants (as in h—d context used in this study) are noticed to be more nasal than those in voiceless environments. These contextual effects in addition to the velopharyngeal incompetency she already has, might be contributing to the vowel distortion in Tiffany's speech. The acoustic cues to her nasalized speech and distorted vowels appears to be a shift in formant frequencies of high front and high back vowels.

In order to facilitate comparison of present data (duration measurements) with those of Kent et al. (1979:44), vowel duration ratios were calculated by dividing the duration of lax vowels by duration of tense vowels. These values are displayed in Table-1.

Subjects Dysarthrics	Vowel duration ratios		
	The : Cat ə : æ	Took : Spoon U : u	A : Spoon ə : u
Kent et. al (1979:22)			
	0.35	0.65	0.60
2	0.44	0.67	0.70
3	0.53	0.70	0.73
4	0.81	0.89	1.00
5	0.17	0.38	0.48
Normals	0.22	0.30	0.34
Present study	0.75	0.40	0.41

Table 1.

Except for the ratio of vowels /ə/ to /æ/, all the others are within normal limits.

Kent pointed out that vowel duration ratio for this particular pair distinguishes disordered speech from developing speech. Specifically, even normal four year olds had a ratio of 0.18 for this pair of vowels, slightly lower than that of adults (0.22). On the other hand, the cerebellar dysarthrics had a vowel duration ratio ranging from 0.35 to 0.81 for these vowels. The subject of this study also yielded a value of 0.75, which is rather high compared to normal value. More samples of vowels /e/ and /æ/ should be collected and a through analysis made with the present subject.

A comparison is made between speech segment durations derived from the measurements of three test sentences uttered by the subject of this study and the values reported by Kent and Forner (1980:8), who also used the same test sentences and procedure. The result is shown in Table 2. below:

Measure	Present study	Kent and Forner's study			
		4 yrs.	6 yrs.	12 yrs.	Adults
'Saw you hit the cat'	1300 msec.	1241	1062	965	904
'Box is blue and red'	1000 msec.	1118	1016	890	846
'Took a spoon'	500 msec.	482	421	415	372

Table 2. COMPARISON OF SPEECH SEGMENT DURATION

It is clear from this table that the performance of eleven year old Tiffany is only comparable to that of four year and to some extent to the six year old normal children. It thus appears that the anatomical and neuromuscular status of her speech mechanism, which has been affected by the progressive muscular disease she is suffereing from, rendered her performance in this sentence repetition task to be equivalent only to that of children very much younger than her.

Wideband spectrograms of test sentences (Figures 4,5 and 6) and the narrow band spectrograms of vowels /i/, /a/ and /u/ (Fig. 7) clearly demonstrate the superimposition of noise components on the speech spectrum.

There is an intense noise energy around 5KHz for /a/ and an additional noise for /i/ and /a/. In contrast, the harmonic components of /u/ remained relatively undisturbed. This is close to Type-III spectrogram described by Yanagihara (1967:10), which means her hoarseness is of moderate to severe degree.

CONCLUSIONS

Based on the results of this spectrographic study, the following conclusions may be reached:

1. Vowels /i/ and /u/ appear to be more distorted than /æ/ or /a/.
2. Speech segment duration measurements indicate that the subject indeed has some problem with timing control. Her duration values are comparable only to normal 4-6 year old children.
3. Her voice quality may be described as moderate to severe hoarseness characterized by Type-III spectrogram.

Attempts should be made to achieve better velopharyngeal closure for nasals especially, in the context of high front vowels, by providing temporary prosthesis or by asking her to modify her tongue placements especially for these two vowels. Like ataxic dysarthrics, she too displayed the tendency not to reduce duration for stressed words. Training may be given, allowing her to compare stressed utterances with unstressed ones using auditory and/or visual feedback and stimuli such as *stick*, *sticky* and *stickiness*, in which duration of base word reduces as the utterance becomes longer. Speech spectrograms should be made periodically to monitor her progress in voice quality and vowel production as a result of medical treatment and speech therapy she is currently receiving.

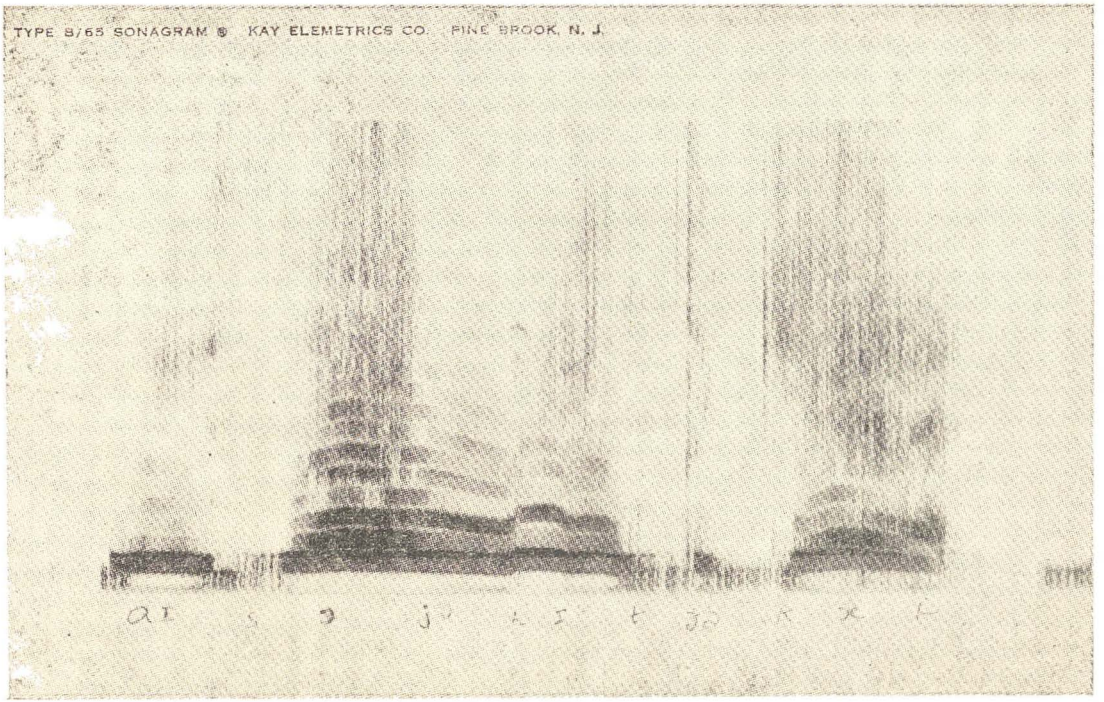

Fig. 4. Broad band spectrogram of the subject's production of the test sentence "I saw you hit the cat".

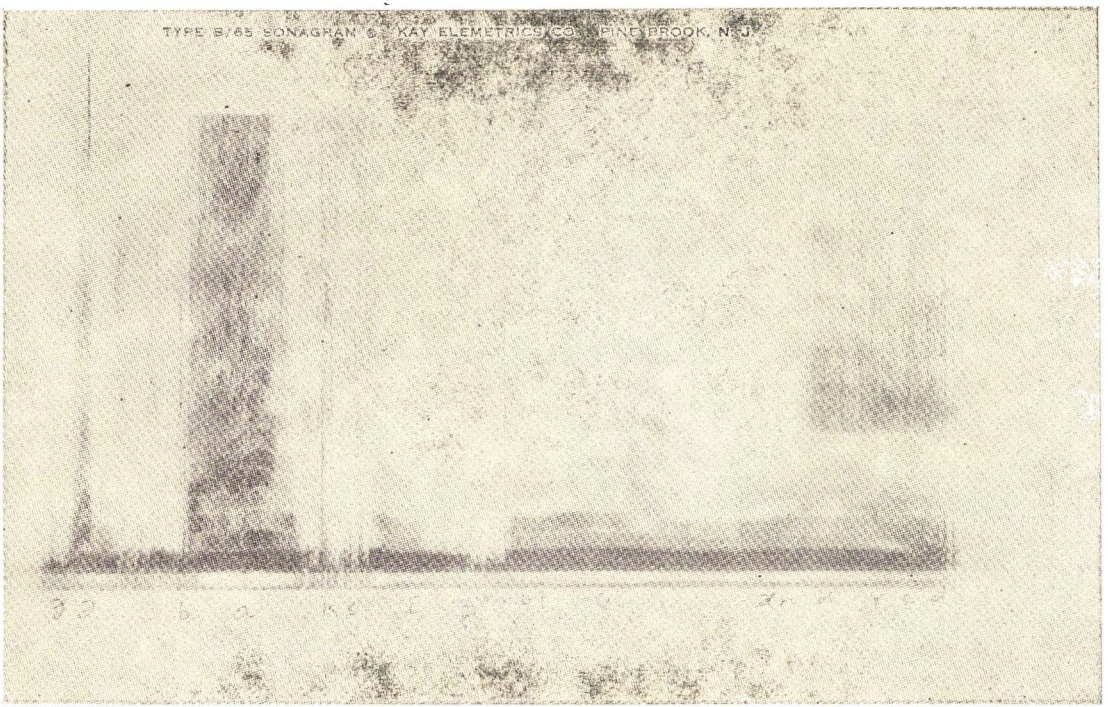

Fig. 5 . Broad band spectrogram of the subject's production of the test sentence "The box is blue and red".

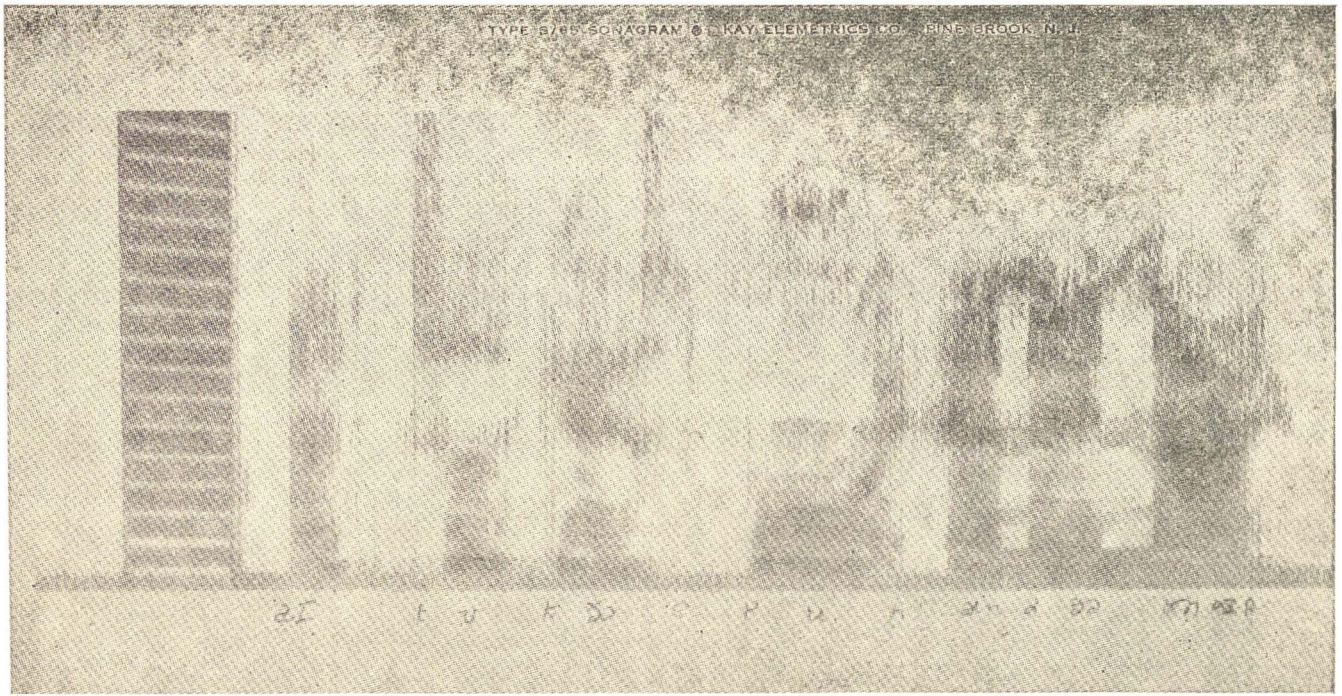

Fig. 6 . Broad band spectrogram of the snbject's production of the test sentence 'I took a spoon and a knife'.

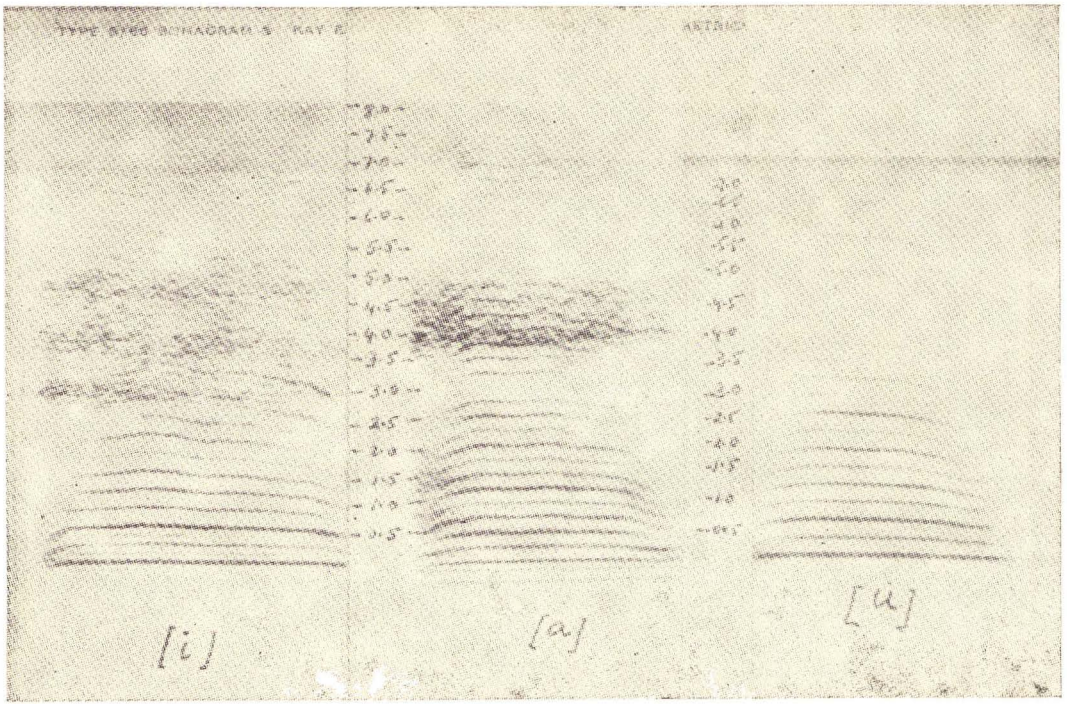

Fig. 7. Narrow band spectrograms of the test vowels /i, a, and u/ displaying the harmonic structure and the noise components.

REFERENCES

CARNEY, P. and J. SHERMAN. 1971. 'Severity of nasality in three selected speech tasks'. *J. Speech Hear. Res.* 14. 396-407.

GILBERT, J.H.V. 1977. 'Temporal constraints on consonant clusters in child speech production'. *J. Child Lang.* 4. 417-432.

HAWKINS, S. 1973. 'Temporal coordination of consonants in the speech of children : Prielminary data'. *J. Phonetics,* 1.181-218.

KELMAN, A.W., M.T. GORDON, F.M. MORTON, and I.C. SIMPSON. 1981. 'Comparison of methods for assessing vocal function'. *Folia Phoneatrica* 33. 55-65.

KENT, R.D. 1976. 'Anatomical and neuro muscular maturation of the speech mechanism: Evidence from acoustic studies'. *J. Speech Hear. Res.* 19. 421-447.

————--. 1979. 'Iso-vowel lines for the evaluation of vowel formant structure in speech disorders'. *J. Speech Hear. Dis.* 44. 513-521.

————-- and L.L. FORNER. 1980. 'Speech segment durations in sentence recitations by children and adults'. *J. Phonetics* 8. 159-168.

———————— and R. NETSELL. 1975. 'A case study of an ataxic dysarthric : Cineradiographic and spectrographic observations'. *J. Speech Hear. Dis.* 40. 115-134.

———————— R. NETSELL, and J.H. ABBAS. 1979. 'Acoustic characteristics of dysarthria associated with cerebellar disease'. *J. Speech Hear. Res.* 22. 627-648.

KLATT, D.H. 1974. 'The duration of /s/ in English words'. *J. Speech Hear. Res.* 17. 51-63.

SMITH, B.L. 1978. 'Temporal aspects of English speech production : A developmental perspective'. *J. Phonetics* 6. 37-68.

SPRIESTERSBACH, D. and G. POWERS. 1959. 'Nasality in isolated vowels and connected speech of cleft palate speakers'. *J. Speech Hear. Res.* 2. 40-45.

WATTERSON, T. and F. EMMANUEL. 1981. 'Observed effects of velopharyngeal orifice size on vowel identification and vowel nasality'. *Cleft Palate J.* 18. 271-278.

YANAGIHARA, N. 1967. 'Significance of harmonic changes and noise components in hoarseness.' *J. Speech Hear. Res.* 10. 531-541.

ERRATA

Page	*Line*	*For*	*Read*
11	12	hores'	'horse'
11	29	KalyanI	Kalyani
17	9	jobect	object
25	34	Jespersen 1922: 157)	(Jespersen 1922: 157).
27	26 and 28	vacEEru	vaccEEru
27	34	anmma	namma
27	34	taaiy	taayi
29	23	nound	sound
29	24	satural	natural
55	16	interloctor	interlocutor
55	18	muste	must be
56	12	o	of
60	1	multilingula	multilingual
67	11	prefix	Prefix
79	4	pronominail	pronominal
79	5	Taml	Tamil
83	20	thier	their
89	2	havinng	having
89	9	thal	that
91	22	aftee	after
91	24	thd	the
91	25	expresser	expressed
96	9	exemples	examples
107	19	othe	other
107	32	prineiple	principle

107	32	syliabicity	syllabicity
111	29	o	a
112	3	proceess	process
112	38	strenthening	strengthening
115	heading	ult	adult
124	2	subject	subjects
125	13	hit	it
133	30	sentencne	sentence
135	25	kaddu	kaadu
145	25	showes	shows
145	32	segements	segments
155	heading	sseech	speech
163	9	through	thorough

PUBLICATIONS OF THE DEPARTMNENT OF LINGUISTICS

I. Osmania Papers in Lingustics (Annual Journal)

Contents of previous volumes

Volume 1, 1975

Volume 2, 1976

Volume 3, 1977

Volume 4, 1978

SUPPLEMENT

(*Volume* 8, 1982)

William S.Y. Wang. Explorations in Language Evolution

II. Osmania University Publications in Linguistics

No. 1. Bh. Krishnamurti and P. Sivananda Sarma, 1968. A Basic Course in Modern Telugu (out of print).

No. 2. Bh. Krishnamurti and Aditi Mukherjee, eds. 1984. Modernization of Indian Languages in News Media. pp viii + 165. Hard cover Rs. 100; paper Rs. 70.

No. 3. Bh. Krishnamurti (editor). Colin P. Masica and A.K. Sinha (Associate editors). 1986.

South Asian Languages: Structure, Convergence and Diglossia. Published by Motilal Banarsidass, Delhi. pp. xxv + 396. Hard cover Rs. 200.

For copies of the above publications place your orders with the Head, Department of Linguistics, Osmania University, Hyderabad 500 007, India.

COMMITTEE ON PUBLICATIONS

Osmania Papers in Linguistics (OPiL) is an annual journal for publishing research articles by the staff, students and visiting faculty of the Department of Linguistics, Osmania University. Articles may occasionally be invited from scholars outside Osmania on special topics. Articles will be in English. The views expressed in OPiL are exclusively those of the authors.

This publication is supported by funds from the University Grants Commission and is supplied to institutions, societies and departments of Linguistics in exchange for similar publications. Individuals may order copies from the Editor at a nominal price of Rs. 10.00 or $ 2.00 each (excluding postage). The price of this special volume is Rs. 25.00 or $ 5.00.

All matters relating to payments, exchange, and change of address should be addressed to the Editor, OPiL, Department of Linguistics, Osmania University, Hyderabad-500 007, India.