

THE ACQUISITION OF XHOSA PHONEMES

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Early development has been the focus of considerable research in the past few decades. However, only minimal information has been obtained on the phonological development among the speakers of Southern African indigenous languages, most particularly Xhosa.

This study is based on corpus collected from 10 Xhosa-speaking children aged 12 to 36 months, for the period of 12 months, recording their spontaneous vocalisations. Language and speech acquisition of Xhosa does not seem to follow the patterns of many Indo European languages studied. Xhosa possesses a large repertoire of phenomenon, such as clicks, which are unknown in other languages. The similarities and differences in existing data on other languages and their significance for professions such as Speech-Therapy and Education are identified and discussed.

Die afgelope paar dekades het 'n aansienlike hoeveelheid navorsing die fokus veral op vroeë taalontwikkeling laat val. Baie min inligting is egter ingewin oor die fonologiese ontwikkeling van sprekers van die inheemse tale van Suidelike Afrika, veral van Xhosa.

Die artikel gee in hooftrekke 'n oorsig oor navorsing wat oor 'n tydperk van 12 maande op 10 Xhosaspreekende kinders tussen die ouderdomme 12 en 36 maande gedoen is. Die spontane klankuiting van dié kinders is gedurende hierdie tydperk opgeneem. Die voorlopige bevindinge gee te kenne dat dit nie lyk asof taalverwerwing van uitlatings in Xhosa dieselfde patrone volg as baie Indo-Europese tale wat bestudeer is nie. Xhosa het 'n wye repertoire verskynsels, soos klikgeluide, wat onbekend is in Indo-Europese tale.

Hierdie artikel identifiseer en bespreek ooreenkomste en verskille wat tydens hierdie navorsing vasgestel is asook bestaande data oor ander tale. Dit dui ook op die belang van hierdie navorsing vir professies soos Spraakterapie en die Onderwys.

INTRODUCTION

Extensive research has been conducted in a number of countries on early phonological and morpho-syntactic language development (Kunnari, 2000) One of the purposes of these studies was to obtain data to provide a basis for comparative investigations into delayed or disordered development. Most of this research focussed on European and Asian languages: English (Brown, 1973; Stoel-Gammon, 1985 and 1988; Robb and Bleile, 1994; Watson and Scukanec, 1997), Finnish (Kunnari, 2000), Japanese and Swedish (Boysson-Bardies and Vihman, 1991). There are, however, some studies on specific aspects of language and speech acquisition in African languages. Thus far, acquisition studies have been done in siSwati (Kunene, 1979); Zulu (Suzman, 1980); Chichewa (Chimombo, 1981); Setswana (Tsonope,

1987) and Sesotho (Connelly, 1984 and Demuth, 1984). There have also been some studies on language specific phonological aspects. Connelly (1984) included a study of clicks in his work on the acquisition of noun morphology by Basotho children. Mowrer and Burger (1991) produced data on sound acquisition in Xhosa, and Lewis (1994) produced data on the order of acquisition of click phonemes in Xhosa.

There are serious gaps in the data. In places like Southern Africa, little work has been done in the area of acquisition on indigenous languages. It is vital that the kind of research done on speech and language acquisition in Indo-European languages be done here too. Slobin (1992) points out that existing theories of acquisition and learning need to be challenged by the widest typological diversity if they are to lay claim to factors of innateness and universality.

A further argument for studies in as many contexts as possible is that studies in the field of phonological acquisition have highlighted aspects of individual variation in the development of speech sounds (Goldfield and Snow, 1985; Goad and Ingram, 1986). Variations reported by Macken, 1980, for instance, may be due to restrictions imposed by developing cognitive and motor systems, as well as intrinsic phonological rules (Menn and Stoel-Gammon, 1995 in Kunnari, 2000). Cross-language variations in the early development of sound systems may also reflect language-specific characteristics, such as stress patterns, frequency of occurrence of sounds, and semantic factors. Slobin (1992), for instance, points out that the acquisition of Bantu languages (following established usage the term 'Bantu' is used in this discussion only as a technical term within historical linguistic discussion for the sub-family within Niger-Kordofanian) does not fit expectations of paradigm simplification and overgeneralization based on the acquisition of Indo-European inflections (e.g. English, Germans, and Polish). He points out that in Bantu languages both singular and plural are formed by the addition of a prefix to a stem with a large collection of apparently arbitrary noun classes.

Despite the reported variations, many common trends are noticeable (Rice and Avery, 1995) and these common trends continue to serve as the basis for assessment and remediation (Lewis, 1994). It is important that early educators and more specifically Speech-Language Pathologists are aware of common patterns in the early development of phonology, so that a clearer picture of what is atypical can be established.

With respect to common trends, children learning any language progress through similar stages of development (Brown, 1973; Menyuk, 1971; Slobin, 1983). Locke and Fisher (1984) conclude that one outstanding fact about this sequence of development is that children all over the world regardless of the language they are learning or the culture they are part of, progress through these major periods in the same order and at approximately the same ages (see Slobin, 1973). That view, however, is disputed by Peters (1986) who contends that as more and more data on language acquisition are accumulated, it is becoming increasingly clear that all children do not proceed in the same manner, even when learning the same language. She warns that we must therefore be wary about generalising data collected in studies of a few children to all children (cf Connelly, 1984). It seems reading reveals that most children are using multiple strategies as they attempt to break into the language system. The above statement is relevant because although studies have been made on the acquisition of siSwati, Zulu, Setswana and Sesotho, all Bantu languages, we cannot generalise these to the acquisition of Xhosa. Similar studies will have to be conducted on Xhosa before this would be possible.

Templin (1953) reports that speech sound development occurs roughly between 1.0 and 8.0 years, with vowels developing earlier than consonants (Stoel-Gammon and Herrington, 1990 in Kunnari, 2000; Robb and Bleile, 1994). However, it is the area of consonant development that is of greater concern to early educators and Speech-Language Pathologists, as most deviations in normal phoneme acquisition involve consonants.

Stops are most frequently produced during early stages, with stops and nasals being acquired prior to glides (Robb and Bleile, 1994). Fricatives and affricates are generally acquired next, with liquids being the last to develop and mature (Lewis, 1994). The feature of place-of articulation generally assumes an anterior to posterior pattern of development, with labial sounds appearing before alveolars and velars (Edwards and Shriberg, 1983; Stoel-Gammon, 1988). Voiceless sounds are generally acquired prior to voiced sounds (Edwards and Shriberg, 1983).

With the exception of some few studies (see Suzman, 1982; Connelly, 1984; Demuth, 1992; Lewis, 1994), there is a serious lack of research focussing on the acquisition of phonology in Southern African languages, particularly the very early stages of Xhosa phonemes. This fact, together with a need for remediation based on guidelines provided by normative data, provided the rationale for a series of investigations into the phonological acquisition and processing strategies of Xhosa mother-tongue speakers.

METHODOLOGY OF THIS STUDY

Aims

The purpose of this study was to collect preliminary data on the phonological development of one- to three-year old Xhosa mother-tongue speakers.

More specifically, the study was aimed at

1. collecting data on vowel development;
2. collecting data on early consonant development
 - The order of emergence of consonants
 - The nature of consonant inventory change over time
 - The place and manner categories utilised by each age-group.

Description of Subjects

The initial sample consisted of ten male and ten female subjects. Ten of the subjects (5 males and 5 females) were 1.0 years old and ten (5 males and 5 females) were 2.0 years old. All lived in monolingual Xhosa mother-tongue homes in Gugulethu, Western Cape, South Africa. All children stayed at home and were cared for by a family member. Their motor, social and language development were within normal limits, as determined by health records and parent interviews. All subjects had normal hearing at the beginning of the study, as assessed by a third year Speech-Language Pathology/Audiology student on a portable audiometer.

During the course of data collection, ten children –7 one-year-olds and 3 two-year-olds – dropped out of the study leaving a total population of ten subjects: 3 one-year olds (2 males and 1 female) and 7 two-year olds (4 males and 3 females), whose development was followed for a year. Because of the unequal sizes of gender groups no comparison was attempted between phoneme acquisition for female and male subjects.

Procedure

The study was approved by the Cape Town Health Department. Nursing sisters in charge of two health clinics were approached, regarding health records of children. From these records children were selected on the basis of normal birth and health records. Parents of the selected children were approached for permission to include their children in the study.

Each child's speech was recorded on a fortnightly basis for one year. Each session lasted between 30 minutes and one hour. Samples were recorded on audio tapes, using small, high quality tape recorders. Notes on the communication situation and target words were taken at the time of the recording to assist with transcription. All recordings took place in the children's homes in free play situations. Books and toys were supplied.

The data collection was done by 8 field workers, who were Xhosa first language speakers doing undergraduate and postgraduate studies in Linguistics or Speech-Language Pathology. All field workers were trained in data collection and inventory techniques by the two principal investigators. All had previous experience with phonetic transcription. Transcription was done in teams of two using IPA symbols. Samples were played again and again until consensus was reached on each sound.

Data Analysis

Initially the data was grouped for twelve age groups, in two-month intervals from 12 months to 36 months. However, during the final analysis the data was condensed into four age groups, as the changes from one age group to the next were minimal. The final age groups were:

- 1 year 0 months to 1 year 6 months;
- 1 year 7 months to 2 years 0 months;
- 2 years 0 months to 2 years 6 months;
- 2 years 7 months to 3 years 0 months.

Phonemic inventories comprising only the fully emerged phonemes were compiled for each age group. According to Lewis (1994) a sound may be considered fully emerged if 75% of the subjects in a given age range produce the phoneme correctly at a criterion frequency of 66.6%. In addition, sounds were arranged according to their sequential acquisition, as determined by the frequency of correct production. Lewis (1994) provides a list of phonemes with a higher percentage.

RESULTS AND DISCUSSION

The following results were obtained from the 1.0 to 3.0 year-old Xhosa children. Because of their unique nature, data on the acquisition of click consonants are presented first. This is

followed by the description of the order of acquisition of other Xhosa phonemes. The specific phonemes that have fully emerged at each of the four age levels are discussed last.

Table 1: Order of Acquisition of Click Consonants

Frequency of Correct Production (%)	1,0-1,6 years	1,6-2,0 years	2,0-2,6 years	2,6-3,0 years
0-10	[-] c [„] x	[-] c [-i] ch [-&] nc [„] gx [<&] nq	[-i] ch [-3] gc [„] x [„3] gx [„&] nx [<] q [<&] nq [<i] qh [<3] gq	[-i] ch [-3] gc [-&3] ngc [„3] gx [„&3] ngx [<i] qh [<&3] ngq [N<] nkq
10-20	[<] q	[-&3] ngc [„] x [<i] qh [<3] gq [<&3] ngq	[-] c [-&] nc [<] q	
20-30				[-&] nc [<] q [<3] gq
30-40				[„] x [„&] nx
40-50				[<] q
50-60				[-] c
60-100				

Table 2: Order of Acquisition of Xhosa Consonants, Excluding Clicks

Frequency of Correct Production (%)	1,0-1,6 years	1,6-2,0 years		2,0-2,6 years		2,6-3,0 years	
0-10	[d9z] nz [k'] k [ndZ] nj [nd] nd [mb] mb [L] dl	[ts'] ts [μpf] mf [tS'] tsh [ntñ'] ntl [ndZ] [nj] [b9] bh [ndz] nz [pī] ph [kī] kh	[S]sh [nd] nd [mb] mb [c'] ty [N] ng [tī] th [tSi] tsh	[nd] nd [S] sh [V] gr [c'] ty [j] y [Ng] ng [ndz] nz ['] ny [d9z] dz [w] w	[tSi] tsh [ntS'] ntsh [ntñ'] ntl [ni] nh [μpf] mf [L] dl [x] rh [kx'] kr [li] ch	[r] r [tS'] tsh [V] gr [dz] nz [Ng] ng [kx'] kr [ndL] ndl [d9z] dz [ntñ'] ntl [ni] nh	
10-20	[h] h [w] w [d9Z] j			[mb] mb [ñ] hl [h] h [ndZ] nj [H] h [ts'] ts		[ndZ] nj ['] ny [x] rh [li] ch	
20-30	[g] g [b9] bh	[r] r		[kī] kh [pī] ph [Ng] ng		[c'] ty [mb] mb [L] dl	
30-40	[Ng] ng [v] v	[h] h		[tī] th [r] r		[ts'] ts [b9] bh	
40-50		[d9z] j [w] w		[w] w		[ñ] hl [nd] nd [tS'] ntsh [kī] kh [tī] th	
50-60	[s] s [z] z [l] l [p'] p [k'] k	[H] h		[H] h [d9Z] j		[pī] ph [g] g [S] sh	
60-70	[f] f [H] h [t'] t	[d] d [f] f [l] l [v] v		[v] v [b9] bh		[d9Z] j [v] v [r] r	
70-80	[d9] d	[°] b [s] s [z] z		[g9] g [d9] d [z] z		[d9] d	
80-90	[°] b [m] m [n] n	[g9] g [m] m [n] n [t'] t		[l] l [f] f			
90-100	[j] y	[k'] k [p'] p [j] y		[m] m [t'] t [°] b [k'] k [s] s [p'] p [j] y	[n] n	[l] l [s] s [°] b [f] f [g] g [k'] k [m] m	[n] n [p'] p [t'] t [w] w [j] y [z] z [H] h

As can be seen from tables 1.1 and 1.2, clicks were produced with least frequency of all sound types, with the possible exception of affricates. Only between 2.7 and 3.0 years the

frequency of correct production of clicks increased noticeably. Even by three years of age no click had fully emerged at criterion level, although some occurrences of all 15 clicks were evident at 3 years (see Table 1.1). The first three clicks to emerge were: [ʘ], [Ɂ] and [!]. These clicks reached 20 – 60 % correct production by age 3. The results are in agreement with those of Lewis (1994) in whose rank order of click acquisition [!] and [ʘ] were ranked first and [!] was among the three clicks in the second rank. The three clicks also reached the acquired stage at age level 3.6-3.11, which again is very similar to the present study. According to Mowrer and Burger (1991), the first two clicks to occur were [!] and [!] which were acquired at two and a half years. [ʘ] occurred next between 3.6 and 4 years, which is remarkably similar to the present results.

Table 3: Phonemes to Emerge within each Age Group

	1,0-1,6 years	1,6-2,0 years	2,0-2,6 years	2,6-3,0 years
Fully Emerged Consonants	[ɓ] b [dʒ] d [m] m [n] n [tʰ] t [j] y	[gʷ] g [kʰ] k [pʰ] p [s] s [z] z	[f] f	[l] l [w] w [H] h
Fully Emerged Vowels	[a] a [E] e [i] i [O] o [u] u			

Perusal of Tables 1.2 and 1.3 reveals several trends, both within and across age-groups:

The five Xhosa vowels had all emerged by 1 year 6 months, which in agreement with studies which suggest that vowels emerge very early (Stoel-Gammon and Herrington, 1990).

Nasals, stops and the glide (j) were the earliest consonants to emerge and fricatives and liquids came last. In general the consonants that emerged between 1 and 3 years corresponded to the ones listed by Mowrer and Burger (1991) in their initial level (2.6 – 3.0). However, Mowrer and Burger also listed several other sounds eg, /x, cʰ, kxʰ, v, l, t/ which occurred at less than criterion level in the study discussed in this article.

In many instances anterior sounds appeared to occur earlier but some alveolar and velar sounds (/s, n, kʰ/) also seemed to occur quite early. Mostly, however, the manner of articulation appeared to dominate the emergence of sounds.

In contrast with other researchers (Edwards and Shriberg, 1983 and Macken, 1980) the feature of voicing did not assume a definite pattern of emergence. Although voiced sounds are more frequent earlier on, both voiced and voiceless sounds evident in among earlier and later emerging sounds.

A particularly interesting finding was the early appearance of sibilants (/s and z/) between 1.6 and 2.0 years. This contrasts with previous findings relating to the acquisition of sibilants in other languages (Olmstead, 1971; Prather et al., 1975) which generally agree that sibilants are fully acquired later. However, the present results are similar to those of Mowrer and Burger

(1991) who found that these sounds were acquired at 3.0 to 3.5 years of age. The difference may be due to differences in setting the criterion level, which might have been slightly lower in the present study, or it might be possible that children who learn Xhosa learn this sound earlier due to its possible high frequency of occurrence.

Another interesting point is the fact that by the age of 3 years all Xhosa consonants were occurring in the speech of at least some children even if at a relatively low level of frequency.

CONCLUSION

The acquisition of Xhosa phonology shows many of the same patterns previously reported for other languages. Some differences were also evident. Although the manner of articulation followed the predicted patterns, the pattern for place of articulation was not as clear anterior – posterior pattern as expected. The feature of Voicing also did not show as clear a pattern as expected. Interestingly the sibilant, in particular /s/ and /z/, which are considered difficult sounds to acquire, emerged fairly early in this study.

The results outlined above give only an overview of preliminary findings. Further analysis will be made in a further in-depth discussion, thus addressing several issues which have not yet been dealt with in the study of acquisition of other Bantu languages. Demuth (1992) mentions amongst others a topic in serious need of research, namely that of verbs and argument structure. She points out, for instance, that there has been no systematic study of the acquisition in verbal extensions that change transitivity relations, nor of the verb classes with which verbal extensions can occur. There is much work remaining to be done, both on the linguistic analysis as well as the acquisition of other Bantu languages.

It is hoped that this attempt will stimulate interest among scholars of African languages, in general, and those of Bantu languages, in particular, to engage in child language acquisition research. More studies with larger and more gender representative populations are needed to gain more accurate knowledge on the early sound acquisition among Xhosa-speaking children.

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