



Aspects of Phonological Acquisition in Children Speaking Sidaamu Afoo

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Abstract

This study tries to describe aspects of phonological developments in children speaking Sidaamu-Afoo, a Cushitic language spoken in Ethiopia, East Africa. Data were collected from six children aged between 3;6 and 4;9 years. The data were first recorded orthographically and then transcribed using IPA. Results showed the speech production patterns noted in the children studied here appear to be varied in type. Some of them can be taken as age appropriate, as similar patterns have already been reported crosslinguistically for the same age ranges, while others are language specific. There are still some developmental realisations, which do not appear to be age appropriate for the children studied. Whether the occurrence of these patterns at such late ages is typical in the language or signs of delayed phonological development needs to be verified with comprehensive data taken from larger sample size.

Keywords: language acquisition, phonology, phonological delay, crosslinguistic, Sidaamu Afoo

1. Introduction

Child language acquisition has been studied for a long time in different disciplines using various theoretical approaches. However, it is reasonable to state that systematic study of the acquisition of segmental aspects of phonology by children began with Roman Jakobson (Jakobson, 1941, 1963) who claimed that segments that are typically unmarked are acquired before more marked segments irrespective of language. Validating such claims has been a challenge partly because of the insufficiency of crosslinguistic data on language acquisition, and partly due to the fact that one child differs from the next in various aspects of language acquisition (e.g., Bloom, 1970; Nelson, 1981), particularly in the acquisition of phonology (e.g., Stoel-

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Gammon, 1985; Vihman and Greenlee, 1987; Vihman, 1993). With the advance in crosslinguistic research, it has become apparent that although most of the phonological acquisition patterns attested in children across languages are similar (e.g., Locke, 1983; Ferguson, *et al.* 1992), there are also language-specific features that are increasingly being reported in the literature. These differences often arise from variations, for example, in phonetic inventories, phonotactic constraints, and phonological system of individual languages.

Most of the studies conducted on phonological developments of children mainly focus on the acquisition of segmental aspects of language such as order of consonant acquisition, mastery of segmental features, e.g., voicing contrasts, and acquisition of phonological processes. Other studies have studied acquisition of various suprasegmental features such as syllable structure (e.g., Dodd, 1995; Watson & Skucanec, 1997; Xu Rattanasone & Demuth, 2014), tone, stress/intonation patterns, etc (e.g., Kehoe, 2001). The majority of these studies have been conducted in well-known European and Asian languages. This has made it difficult to make generalizations about patterns of language acquisition.

In Ethiopia, an East African country, where the current study was conducted, more than 80 languages are spoken. However, there is only very few sketchy study of language development on Amharic, the federal working language (Abebayehu, 2008, 2013). Very recently, graduate students of the Department of Linguistics at Addis Ababa University started to show interest in pursuing various aspects of language acquisition in another Ethiopian language, Afaan Oromo (Alemayehu & Abebayehu, forthcoming). Apart from these attempts, no other studies have been found on child language development in other Ethiopian languages. Lack of normative data on child language on Ethiopian languages has made it very difficult for various professionals, such as speech language therapists, to objectively determine what is typical in which language. Consequently, such professionals working with clients speaking less-known languages have been forced to use normative data from major European or Asian languages (e.g., Grunwell, 1981) to assess and manage, for example, communication and literacy issues. Examining various dimensions of language development not only helps us better understand “atypical” patterns of language development, but also enables us to learn more on how we as adults process language, by understanding how children acquire language, which in turn enriches theories and practices in disciplines dealing with language and cognition. Hence, it is hoped that the present study, which focuses on examining aspects of phonological development in children speaking Sidaamu Afoo³, can be considered a contribution to the efforts being made to narrow down the research gap in language acquisition, particularly in Ethiopian context.

³ It is common to come across in the literature the term “Sidaama” being used to refer to both the language and the ethnic group speaking the language. However, the term actually refers to the ethnic group or the people, whereas the language, as it is referred to as by the people, is “Sidaamu Afoo”, which literally means “the mouth of the Sidaamas”. The Sidaama people reside in the Southern Nations, Nationalities and Peoples Regional State (SNNPRs), the most ethnically diverse regional state in Ethiopia.



2. Methodology

2.1. Participants

Six participants, balanced for gender, were drawn from a nursery school, using purposive sampling. They were between the age of 3;6 to 5;0 years. Both the participants and their parents were all monolinguals in the language and had no apparent speech or hearing issues.

Table 1

Demographic data on the six children selected for the study

Participants	Gender	Age
MD	F	3;6
BR	M	4;1
MS	F	3;10
TB	M	3;8
MW	F	4;9
SL	M	3;7

2.2. Data collection and processing

Data were recorded in three contexts: single words, sentence repetition tasks, and spontaneous continuous speech. The data were first written orthographically and then transcribed in IPA. Sets of words and sentences were devised to collect data, using picture naming and picture description tasks. The audio data were recorded using Sony PCM-M10® portable audio recorder, while footages of the children's speech were captured using Sony CCD-TR380E® video camera recorder to supplement the audio data.

2.3. Data analysis

The research took a descriptive design, employing perceptual phonetic and phonological analysis. The childrens' productions were transcribed, using analytical listening technique, following Ashby *et al.* (1996). Perceptual phonetic and phonological analysis was used to analyse the data. Specifically, the analysis of the data was first done by identifying differences of realizations from the target productions, i.e., following error identification approach. Then, realizations of the children were grouped and analysed in terms of phonological processes. Following that, attempts were made to draw possible generalizations from the data.

3. Findings

In this section, the various developmental speech production features attested in the speech of the children studied here are described and discussed below in turn. In this article, only the phonological processes occurred on consonants are covered. Due to spatial limitations, other aspects of phonological developments such as acquisitions of vowels, syllable structures, and other suprasegmental features are not covered here.

3.1. Fronting

Fronting refers here to the replacement of a target phoneme for one produced further back in the oral cavity. Four of the children studied exhibited fronting patterns. Consider the following data and examples.

(1)				
Process	Pattern	Word Position	Children	Age respectively
Fronting	/k/→[t], /g/→[d]	WI & WM	MD, TB, MW	3;6, 3;8, 4;9
	/k'→[t']	WI & WM	MW, TB	3;8, 4;9
	/ɲ/→[n]	WI & WM	MD, BR, MW	3;6, 4;1, 4;9
	/s/→[ð]	WM	BR, SL	4;1, 3;7
	/ʃ'→[t']	WI & WM	MW	4;9
Examples	Pattern	Target	Realization	Gloss
	/k/→[t]	/kila/	[tila]	armpit
	/g/→[d]	/goʃ'o/	[dot'o]	sheep
	/k'→[t']	/k'as-i/	[t'aʃ-i]	he/it pierced
	/ɲ/→[n]	/ɲammo/	[nammo]	taste
	/s/→[ð]	/kisi/	[kiði]	he/it touched
	/ʃ'→[t']	/hoʃ'o/	[hott'o]	cloth

Fronting is one of the developmental phonological processes commonly reported cross-linguistically. Ingram (1974), for example, reported the realization of [t] for /k/ and [d] for /g/ by a 1;9 year old English speaking boy. Ababayehu (2008, 2013) provided data from Amharic. These studies reported some fronting patterns in the speech of 2;0 to 3;11-year-old Amharic-speaking children who realised /k/ as [t] and /g/ as [d], in such words as /kənfər/ 'lip' realized as [tətəj]; and /gəbəja/ 'market' realized as [dəbəja].

As can be seen from the above data, some of the fronting patterns noted in the current study are rather uncommon, which may partly be due to the phonological system of the language. The patterns: /k'→[t'], /ʃ'→[t'], for example, are not commonly reported in the literature because the development of non-pulmonic consonants has not well been studied. While /k/→[t], /g/→[d] are common fronting patterns reported in several previous studies, /ɲ/→[n] and /s/→[ð] are rare patterns. It is interesting however to note that the ages of three of the four children who exhibited fronting patterns in Sidaamu Afoo are older than the age at which fronting patterns are *normally* expected to be eliminated, i.e., 3;6 (Grunwell, 1997; Bowen, 1998; Hegde, 2001). This may suggest a degree of phonological delay in these children, which of course needs confirmation by considering crosslinguistic data, as the majority of the normative data come from Endo-European-speaking children.

3.2. Backing

In this study backing is taken to refer to the substitution of a consonant for one produced further forward in the vocal tract. In this study, four children exhibited backing patterns. Consider the data and examples below.



(2)				
Process	Pattern	Word Position	Children	Age respectively
	/s/ → [ʃ]	WI & WM	MD, MS, MW	3;6, 3;10, 4;9
Backing	/f/ → [ʃ]	WI & WM	MS	3;10
Examples	Pattern	Target	Realization	Gloss
	/s/ → [ʃ]	/sima/	[ʃima]	seedling of weese
	/f/ → [ʃ]	/fani/	[ʃani]	he/it opened

Backing of the alveolar fricative /s/ to post-alveolar place [ʃ] is not commonly reported in the literature. In contrast, Abebayehu (2008) noted that such pattern is one of the most frequent backing processes observed in Amharic-speaking children aged between 2;00 and 3;4 years. A rather similar pattern has also been observed in Japanese-acquiring children, who substitute the more posterior [ɕ] for target /s/ (Nakanishi *et al.*, 1972; Beckman *et al.*, 2003; Li *et al.*, 2009; Li *et al.*, 2011). However, a converse process is common in children acquiring English, where /ʃ z/ are fronted to alveolar place and realised as [s z], respectively (Weiner, 1979). As can be seen from the data, in Sidaamu Afoo, as it is the case in Amharic, /s/ → [ʃ] is a common processes observed in the children as old as 4;9 years. Whether the occurrence of this process at such late age is typical in the language needs to be confirmed by considering more data. Crosslinguistic comparison is rather difficult as some scholars (e.g., Dean *et al.*, 1990) label backing as an ‘unusual’ or ‘atypical’ process, while others (e.g., Weiner, 1979; Shriberg and Kwiatkowski, 1980; Ingram, 1981; Grunwell, 1985) do not even include it in their classifications of typical phonological processes in child speech.

3.3. Gliding

Gliding refers to the substitution of liquid by glide, such as /l/ or /r/ → [w] or [j]. This process was noted in four of the children studied here. Consider the data and examples below.

(3)				
Process	Pattern	Word Position	Children	Age respectively
	/l/ → [j]	WI & WM	BR SL	4;1, 3;7
Gliding	/r/ → [j]	WM	MD MW	3;6, 4;9
Examples	Pattern	Target	Realization	Gloss
	/l/ → [j]	/lalo/	[jajo]	cattle
	/r/ → [j]	/risa/	[jisa]	hawk

The literature (e.g., Grunwell, 1997; Bowen, 1998) generally suggests that gliding should typically be gone by the age of five years. Hence, it can be taken that the gliding patterns exhibited by the children studied here were age appropriate, as the children were all under the age of five.

3.4. Deaffrication

Following O’grady (2003), de-affrication is taken here to broadly refer to the process in which affricates are replaced by non-affricate sounds. De-

affrication of fricatives was noted in the speech of three of the children studied. See the data and examples below.

(4)

Process	Pattern	Word Position	Children	Age respectively
	/ʃ/ → [t]	WI & WM	MD, TB, MW	3;6, 3;8, 4;9
	/dʒ/ → [d]			
Deaffrication	/ʃʰ/ → [tʰ]	WI & WM	MD, MW	3;6, 4;9
	/ʃʰ/ → [t]	WI & WM	TB	3;8
Examples	Pattern	Target	Realization	Gloss
	/ʃ/ → [t]	/kinʃo/	[kinto]	stone
	/dʒ/ → [d]	/dʒaala/	[daala]	friend
	/ʃʰ/ → [t]	/ʃuʃʰi/	[tuutʰi]	feed oneself/another person

Studies (e.g., Bleile, 1995; Bowen, 1998; Hegde, 2001) state that deaffrication should be gone at the age of three, implying that the deaffrication patterns noted in the children studied here may be manifestations of phonological delay, which again needs to be checked with more data. The case of one of the children (i.e., MW) appears to be rather different in that she exhibited three of the four identified deaffrication patterns at the age of 4;9, which further suggests that she, in particular, could be phonologically delayed.

3.5. De-ejectivisation

De-ejectivisation is taken here to refer to realizations of ejectives as non-ejective consonants such as pulmonics, implosives or clicks. In almost all cases, the children studied here de-ejectivised the ejectives of the language and realized them as pulmonic consonants. See the examples below.

(5)

Process	Pattern	Word Position	Children	Age respectively
	/pʰ/ → [p]	WI & WM	BR, MS, TB, SL, MW	4;1, 3;10, 3;8, 3;7, 4;9
	/pʰ/ → [b]	WI	MS, TB, MW	3;10, 3;8, 4;9
De-ejectivization	/tʰ/ → [t]	WI & WM	BR, MS, TB, SL	4;1, 3;10, 3;8, 3;7
	/tʃʰ/ → [tʃ]	WI & WM	BR, MS, TB, SL	4;1, 3;10, 3;8, 3;7
	/kʰ/ → [k]	WI & WM	BR, MS, TB, SL	4;1, 3;10, 3;8, 3;7
	/kʰ/ → [g]	WI & WM	SL	3;7
Examples	Pattern	Target	Realization	Gloss
	/pʰ/ → [p]	/kʰuuppʰe/	[kʰuuppe]	eggs
	/tʰ/ → [t]	/wotʰe/	[wote]	money
	/tʃʰ/ → [tʃ]	/ʃʰaffa/	[ʃʰaffa]	swamp
	/kʰ/ → [k]	/kʰas-i/	[kas-i]	He/it pierced
	/kʰ/ → [g]	/maakkʰe/	[maagge]	pot

Realizing ejectives as their pulmonic counterparts is seen often in the speech of children with speech delayed (Abebayehu, 2008). However, there is also evidence, from Amharic, (Abebayehu, forthcoming) that a child as young as



eleven months old produces ‘adult-like’ /tʰ/. This suggests that all the children studied here must have been physiological mature enough to be able to produce ejectives. It is not surprising therefore that the children (BR, MS, TB, SL) who were not able to produce /tʰ/ could not produce the other ejectives as well, again suggesting some degree of phonological delay. A rather unusual realization was noted in the speech of SL, aged 3;7, who sometimes realized /kʰ/ as [k], when the target is singleton, and as [g] when it is geminated. This may have happened as a result of the child’s effort to make perceptual distinction between the singleton and geminated /kʰ/. This could clearly have phonological implications, as /g/ is also contrastive in the language.

3.6. *De-implosivisation*

In this study, de-implosivisation refers to a replacement of the implosive /d/ with non-implosive consonants such as pulmonics, ejectives and clicks. Such realizations were noted in four of the children studied here. Consider the examples below.

(6)				
Process	Pattern	Word Position	Children	Age respectively
Implosive to pulmonic stops	/d/ → [t]	WI & WM	BR, MS	4;1, 3;10
	/d/ → [d]	WI	TB, SL	3;8, 3;7
Implosive to Ejective	/d/ → [tʰ]	WI	MW	4;9
	/d/ → [tʰ]	WM	MD	3;6
Implosive to glottal stop	/d/ → [ʔ]	WM	SL	3;7
Examples	Pattern	Target	Realization	Gloss
	/d/ → [t]	/dibba/	[tibba]	illness
	/d/ → [d]	/dibba/	[dibba]	illness
	/d/ → [tʰ]	/dibba/	[tʰibbba]	illness
	/d/ → [ʔ]	/woda/	[woʔa]	calves

Given that implosives present more aerodynamic and articulatory challenges than other groups of consonants (Ladefoged and Maddison, 1996), it may not be surprising that the children replaced /d/ with its simplified counterparts: [t], [d], [tʰ] and [ʔ]. However, even the youngest child studied here appears to be mature enough to produce /d/, as children acquiring another closely related Cushitic language, Afaan Oromo, are able to produce /d/, as early as at the age of 2;3 (Alemayehu & Abebayehu, forthcoming). This could further imply phonological delay.

3.7. *Devoicing*

Devoicing is the only assimilation process noted in the children studied, vowel harmony is disregarded in this study, as the focus is only on the acquisition of consonants. Three children demonstrated devoicing patters. In two of these children, devoicing was not context sensitive, while in the

speech of the third one, the process was noted only word-initially. Examples are presented below.

(7)				
Process	Pattern	Word Position	Children	Age respectively
Devoicing	/d/ → [t]	WI & WM	BR, MS	4;1, 3;10
	/ɖ/ → [ʈ]	WI	SL	3;10
Examples	/d/ → [t]	Target /kadi/	Realization [kati]	Gloss he/it kicked
	/ɖ/ → [ʈ]	/ʔaɖʒa/	[ʔaʈʒa]	young

Studies (e.g., Grunwell, 1997) suggest that devoicing of consonant in children often gets eliminated by the age of 3;0, which is not the case in the children studied here, again suggesting a delayed phonological development, particularly so with the child who is over 4 years old.

4. Conclusions

The speech production patterns noted in the children studied here appear to be varied in type. Some of them can be taken as age-appropriate, as similar patterns have already been reported crosslinguistically for the same age ranges, while others are language-specific. For example, the fronting patterns such as /kʰ/ → [tʰ], /ʃʰ/ → [tʰ], /ɲ/ → [n] and /s/ → [ð] are not commonly reported in the literature and may be considered as features specific to the language. The realisation of /kʰ/ by one of the children as [k] and [g] when the target is singleton and geminated, respectively, may also be dictated by the phonotactics of the language. There are still some developmental realisations, which do not appear to be age-appropriate for the children studied. The fact that the ages at which the children exhibited some of the fronting patterns could, for example, be indicative of a degree of phonological delay (Bowen, 1998; Grunwell, 1997). Similarly, the occurrence of backing of the alveolar fricative to its post-alveolar counterpart and deaffrication at the age of 4;9 could also suggest some level of phonological delay. Moreover, the de-ejectivisation and de-implosivisation patterns noted in this study do not seem to be age-appropriate, as evidence from other Ethiopia languages suggests otherwise. Of course, if the occurrence of these patterns at such late ages is typical in the language or signs of delayed phonological development needs to be verified with comprehensive data taken from larger sample size.



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Appendices

Consonant Phonemes of Sidaamu Afoo

	<i>Bilabial</i>	<i>Labio-dental</i>	<i>Dental</i>	<i>Alveolar</i>	<i>Palato-Alveolar</i>	<i>Palatal</i>	<i>Velar</i>	<i>Glotal</i>
Plain Stop	b		t d				k g	ʔ
Ejective	p'		t'				k'	
Implosive				d'				
Fricative		f	s		ʃ			h
Affricate					tʃ dʒ			
<i>Ejective</i>					tʃ'			
Nasal	m			n			ŋ	
Liquids Lateral				l				
Trill				r				
Approximant	w						j	

Adapted from Kawachi (2007)

Vowel phonemes of Sidaamu Afoo

	Short Vowels			Long Vowels		
	Front	Central	Back	Front	Central	Back
High	i		u	ii		uu
Mid	e		o	ee		oo
Low		a			aa	

Adapted from Anbessa (1987)