Phonological metathesis phenomenon in the early speech of Arabic-speaking children

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Abstract

Purpose – The purpose of this study is to investigate the phonological metathesis phenomenon in the early speech of Arabic-speaking children. Based on analysis of a longitudinal data from 11 children's speech, the study mainly aims at investigating (1) the characteristics/nature of the phonological metathesis process in early child speech and (2) how it is different from adult phonological metathesis. The study explores the causes behind the metathesis phonological process in child speech.

Design/methodology/approach – This paper explored the phonological metathesis phenomenon based on a longitudinal study of 11 monolingual Arabic speakers of Yemeni-Ibbi Dialect (YIA) and cross-linguistic data from various languages.

Findings – The data analysis showed that metathesis phenomenon in child speech has several characteristics. It occurs at an early age, at 2 years and decreases with age. It was found that metathesis occurs mostly in disyllabic and trisyllabic words or more complex syllabic words, but metathesis rarely occurs in monosyllabic words in children's speech. The results indicated that unlike metathesis in adult speech, metathesis in children's speech occurs in undeliberate, slow, fast speech. The study explored that adjacency of sounds with similar phonological features, the ease of pronunciation, or the sonority effect are the motivations that trigger metathesis phenomenon to occur in child speech.

Originality/value – In the literature, the metathesis phonological process has got a little attention from researchers, and this is due to the rare cases of metathesis and the inconsistency of cases and the occurrence of metathesis. However, there is no consensus among the researchers about the causes of emergence and the occurrences behind the metathesis process. However, this study argues that the metathesis process has unique characteristics in child speech in comparison to adult speech and that there are some causes for metathesis to occur in human speech particularly in children's data such as adjacency of sounds with similar phonological features or sonority effect.

Keywords Metathesis, Child speech, Phonological processes

Paper type Research paper

1. Introduction

Metathesis is one of the sporadic and interesting phonological processes that occurs mostly in child speech. Cross-linguistically, many linguists and research scholars have agreed upon the definition of metathesis. The comparable views showed that metathesis has to do with the transposition and the change of speech sounds at the phonological level, where the change occurs in the phonemes' order in a word (Montler, 1986) or the change of sounds' order within words (Crystal, 1994). Some linguists have gone a little far to look at the phonological metathesis process as a process where a change occurs not only within the words but also on the order of all sentence's sequence of words (Hume, 1991). Spencer (1996) related metathesis as speech error in child phonology, which is frequent in all languages as in "amina" for animal. Metathesis is referred to as Al-Qalb Al-Makäny, "the change of words place," in Arabic and is considered a

dialectal phenomenon by Morphologists (Al-Niaimi, 1980). Metathesis has been ignored as a phonological process and that is because it occurs in a smaller number of cases in children speech compared to other common prevailing phonological processes such as substitution of sounds, sounds' deletion, germination or vowel reduction. Therefore, Hume (1998) considered metathesis as a marginal or nonexisting process. However, the phonological metathesis process is still a very interesting process that needs to be explored and examined in several languages especially how it occurs universally in most of languages, colloquial varieties and dialects of languages. Most importantly, the motivation behind metathesis in child speech needs to be examined. This study aims at investigating the phonological metathesis phenomenon on 11 monolingual Arabic-speaking children speech and attempts to identify linguistic features of metathesis in child language in various languages in comparison to metaphasis adult speech.

2. Theoretical background

2.1 Description of adult speech of YAI

YIA as a dialect spoken in the middle of Yemen and has several phonological features and system similar to the Standard Arabic (SA) and many other varieties and dialects of Arabic. The dialect may have prominent differences in terms of morphosyntactic categories. The use of the voiceless velar /k/ at the end of the verbs for the first person singular for feminine and masculine is the most common in comparison to the other dialects in Yemeni and other Arabic dialects as in *katbuk Qasah* for *I wrote a story*. Since the focus of the research article addresses more on the sound patterns and on one of the phonological processes, metathesis, a phonemic inventory of YIA is represented in Table 1.

Unlike Modern Standard Arabic (MSA), YIA does not have sounds such as /dˤ/ Voiced velarized dental-alveolar plosive. Interestingly, in most of the places where YIA is spoken, it is found also that speakers of YIA have only voiced velar plosive /g/, but not voiced postalveolar fricative /ʒ/. In comparison to English, YIA does not have some sounds such as the voiceless bilabial plosive /p/, the voiced postalveolar affricate /dʒ/, the voiceless postalveolar affricate /tʃ/, and the voiced labiodental fricative /v/.

2.2 Metathesis in crosslinguistic studies and Arabic

Child speech and fast speech in adults' natural communication are known to exhibit numerous phonological processes. These processes are widely discussed in the literature including deletion, substitution, assimilation and epenthesis. Several interesting studies have been conducted cross-linguistically, providing detailed analysis of these processes (Black, 1974; Blevins and Garrett, 1998, 2004; Clark, 2009; Hume, 1998; Ingram, 1981, 1986; McCarthy, 1989, 2000; Mielke and Hume, 2001; Muller, 1998; Thompson and Thompson, 1969; Uwaezuoke and Onwudiwe, 2022). Similarly,

	Labial	Labio-dental	Inter-dental	Dental alveolar	Palatal alveolar	Velar	Uvular	Pharyngeal	Laryngeal
Plosive	b		t, d			k g	q		ʔ
Emphatic			tˤ						
Fricative		f	θ ð	s, z	ʃ ʒ	X ʁ			h
Emphatic			ðˤ	sˤ			ħ ʕ		
Nasal	m			n					
Lateral				l					
Tap				r					
Glides	w				j	w			

Source(s): The phonemic inventory of Yemeni Ibbi Arabic adapted from Watson's (2007) work on Arabic dialects

Table 1.
List of YIA consonant phonemic inventory

Welna (2002) provided a detailed analysis of metathesis process considering the temporal and spatial development and spread of the sounds change. Welna differentiated between two kinds of metathesis in the history of English, which he referred to as (1) permanent and (2) sporadic metathesis and which are distinguished by the presence of metathesis in a Modern English reflex of an Old English word (i.e. permanent metathesis) or lack of a metathesized reflex (i.e. sporadic metathesis). Strazny (2005) also classified metathesis types under four parameters: (1) Synchronic metathesis that occurs within one chronological period and appears from one period to another. (2) Adjacent metathesis that occurs when two contiguous sounds are transposed with nonadjacent or "long distance" metathesis. (3) Regular or sporadic metathesis that is applied to many different words. (4) Abrupt metathesis completely transposes sounds in a single step.

There are also many studies conducted on the adult speech in many languages focusing on the phonological metathesis process as in *Spanish* (Bradley, 2007; Holt, 2004; Lipski, 1990), in *Hebrew* (Aïm, 2004; Yanagawa *et al.*, 2003), in *Persian* (Ahmadkhani, 2010; Behnam and Rassekh-Alqol, 2012; Keshavarz, 2000) and in *Arabic* Alqahtani (2018). There are quite less studies covered metathesis as separate phonological process in the child language acquisition of Arabic or other languages and attempt to find how metathesis could have different phonological characteristics compared to metathesis in adult speech. In Arabic, the discussion of metathesis as a phonological phenomenon, as cited in Khassawneh *et al.* (2018) started reporting the works of great traditional linguists such as Sibawau and Al-khalil Ibn Ahmad Alfarahidi. Sibaway has ignored the idea of metathesis being as clear and important phonological phenomenon existing in Standard Arabic (SA) but Al-khalil has given more importance to metathesis process. He has categorized metathesis into two types: (1) derivational metathesis which is governed by a rule and (2) arbitrary metathesis which exists and prevails due to the linguistic dialectal differences or errors or through diachronic changes. All these arguments on metathesis written in Arabic by traditional linguists are found in Arabic and are represented and reported in previous studies. To support these arguments, Banjar (2003) gave a synchronic analysis of metathesis in Eastern Arabic Makkan and Cairene dialects with a description of the sequential change in the two dialects. The metathesis process occurred in both dialects within the adjacent or none-adjacent speech sounds between root radicals of the same and root-infix. Younis (2008) presented a detailed study on some phonological processes spoken by a native-speaking children of Mosuli Iraqi dialect at the age of two till six. The study looked at consonant harmony, metathesis, substitution, cluster reduction, weak syllable deletion and reduplication. The study showed that consonant harmony occurs in voicing, place of articulation, manner of articulation and tafxim. Substitution frequently occurs at the age of two and continues till the age of six. Like many studies cross-linguistically, it was found that metathesis appears in a few numbers of words at the age of two and increases between the third and fourth years. For instance, the word, /ʃiʃtaːn/, *thirsty*, was used instead of /ʃitʃaːn/ and the child used /tikbiːn/. *you are crying*, instead of /tibkiːn/. Jasim and Sharhan (2013) similarly gave a synchronic description of the nature of metathesis in Iraqi Arabic dialect based on observations of adult speech. They attempted to identify the causes and motivations of metathesis to occur in the Iraqi Arabic dialect Arabic. It is found that metathesis involves the change in two adjacent and non-adjacent consonant sounds and the modification in the phonological process does not serve any grammatical function in Iraqi Arabic. Therefore, it is an abrupt and sporadic process rather than being gradual and regular. They identified that both Iraqi Arabic sonorant and obstruent sounds undergo the phonological process of metathesis with relatively significant differences. Haana (2018) explored the metathesis in the data of bilingual child speech among a study of the many phonological processes. The study found that the phonological metathesis process occurred in very few occasions including eight instances in Arabic. The study explored that the metathesis process affected just consonants and only one case which underlines a change in the linear ordering between two vowels in adjacent syllables.

Khassawneh *et al.* (2018) comparatively presented an analysis of some important aspects and instances of metathesis from Arabic traditional literature, English, and other languages though it

lacks genuine data from child or adult speech. The study approved some aspects of metathesis to show how metathesis is a universal phonological process that exists in all languages what causes metathesis to occur by looking at some justifications from Arabic and non-Arabic literature. Interesting cross-linguistic studies have also been done on the issue of phonological metathesis. Habib (2022) explored metathesis in Syrian Arabic (SyA). Based on the analysis of data from previous literature and SyA, she classified metathesis into two types of metatheses. Type-I is phonologically conditioned, that consists of at least one of the four root consonants, ʒ, f, ʕ and ħ with the fricatives (z, s), liquids (l, r) or gutturals (q/ʔ) in specific positions within the root regardless of word derivation. Type-II is morpho-phonologically conditioned that involves Standard Arabic reflexive Pattern VIII, (ʔi)ftaʕal. Al Huneety et al. (2021) recently examined the major phonological aspects of al-Issa Arabic, a Bedouin Jordanian Arabic (BJA) spoken in the north of the country analyzing data from 60 participants. They found that in some Arabic dialects, the syllable final gutturals are avoided in these dialects by a metathesis process, resulting in an onset clustering. Likewise, Mshaqba et al. (2019) addressed the early word syllable structure and the remarkable phonological processes in the speech of Jordanian Arabic (JA)-speaking children. The study reported interesting examples of metathesis where talafo:n was replaced by tafalo:n "phone" at the age of 1.0–1.6, ʕablah was changed into ʕalbah "proper name" at age of 1.7–2.0) and naskafe:h was substituted by sankafe:h "nescafe" age of 2.1–2.6. The study found the occurrence of metathesis but there was no rule of metathesis or other phonological factors such as sonority. Fukazawa and Miglio (2008) reported metathesis data from two children in a longitudinal study attempting to account for metathesis' process. The first child in the study is a monolingual Japanese and the other child is trilingual exposed to Icelandic from birth, Spanish and English. The study looked at metathesis data of adult speech and child speech. It was found that the two children act similarly when it comes to the metathesis process. Similar to the data from Arabic, it was found that the monolingual child, Eugene's (2.5) and the trilingual child, Lofture's, (2.5–3.5) metathesis is not occurring on the onset position. Consider examples (1) and (2).

(1) Example

Correct utterance	Metathesis	(Eugene, 2.5)
tsumiki "wood building block"	tsukimi	
nezumi "mouse"	nemuzi	
nemaki "pajama"	menaki	
sakippo "tip"	sapikko	

(2) example (2) Trilingual child

Correct utterance	Metathesis	(Loftur, 2:5 – 3:5)
klink 'coins' Ice.	[kinkl]	
leðurblökur 'bats' Ice.	[leðYrböklYr]	
kalt 'cold' Ice.	[klalt]	
fugl 'bird' Ice.	[flYg]	
calcetines 'socks' Sp.	[kaltesines]	
ask Eng.	[aks]	
gul blaðra 'yellow balloon' Ice.	[bYl glaðra]	
chocolate Eng.	[tloklet]	

Though in a smaller number of cases, the metathesis process is crucial and prevailing in child speech among many Arabic varieties. In a case study of three children speaking Nasiriya Iraqi Arabic, metathesis occurred along with other phonological processes such as assimilation, elision, gemination, nasalization and tafxiim (Betti and Igaab, 2019). In another study of the prevalence of consonants production errors and the phonological processes in Emirati Arabic-speaking children with DS, it was found that children had metathesis alongside with other phonological processes (Alzyoudi *et al.*, 2022). Adapting the Optimality Theory (OT) framework, Alqahtani (2014) attempted to examine some phonological processes such as CV metathesis, epenthesis, vowel shortening and syncope that have an impact on the syllable structure in Najdi Arabic (NA) to show the insights about syllable structures and capability of OT to account for the cross-linguistic variations and the phonological processes.

2.3 Argument of this study
In the literature, metathesis has received little attention from researchers, and this is due to the rare cases of metathesis that are inconsistent and that do not occur in a large sample. However, there is no consensus among the researchers about the causes of emergences and the occurrence behind the metathesis process. Hume (1998) considered metathesis as not a distinct process and does not have a phonological rule-based approach. Therefore, this study argues that metathesis process has unique characteristics in child speech in comparison to adult speech. Metathesis in child speech does not occur in every position and does not include the onset phonemes occurring word initially. Most of the cases in child speech in previous studies, metathesis does not occur in monosyllabic words but was found to exist in longer words, disyllabic and trisyllabic words. It was found that children make the metathesis process like adults but in child speech children other phonological processes such as substitution or deletion make occur along with metathesis process. All these phonological features attract the author's attention to examine the metathesis phonological process in child speech data and attempt to explore the distinct characteristics of metathesis in child speech and attempt to account for the emergence and existence of metathesis in child speech.

3. Method
The data of the study were collected longitudinally from Arabic-speaking monolingual children speaking YIA variety spoken in the central part of Yemen. The subjects were not exposed to any other L2 environment. They are 11 children and their age ranged between 2 and 5 years during the study. They are 5 males: Mohammed, Yunis, Khalil, Saleh and Ali; 6 female children: Shatha, Salwa, Salma, Maryam, Yasmean and Layan. All children are normal and do not suffer from any hearing problems or any language disorder. An ethical approval letter was obtained from the departmental research committee and consent forms were signed by children's parents to get the approval to conduct the study. Since the study is longitudinal, the data were obtained in different situations and stages by people who are experts in reporting the speech utterances of children. The participants who helped in collecting the data were the researcher, the parents, and some relative members of the children. The data are measured and analyzed through the comparison of child speech with to the correct utterances in the adult speech to obtain the phonological change in the words as in the examples (1a) and (1b).

(1) The child speech (metathesis)	The correct utterance	The description
a. *hasmah*,	*xamsah*	The phoneme, */m/ is replaced by /s/*
b. faleenah	faneelah	The phoneme, /n/ is replaced by /l/

For data analysis, 14 words were used to analyze the phonological metathesis in the early speech of Arabic. Some of the previous studies on the nature of adult metathesis were considered to account for the phonological differences of metathesis in child and adult speech.

4. Results
The data analysis of the study showed that metathesis occurs in early speech of Arabic-speaking children between the age of 2 and 5 years. It was found that the metathesis in child speech occurred in the longer words, disyllabic and trisyllabic words, and more complex words, see Table 2.

The data analysis reported that metathesis in child speech happened to be inconsistent in most of the cases of children data (as in Table 3), and many facts and factors could be claimed to report the causes of metathesis differently in child speech.

5. Discussion
The discussion section focuses on two main parts in the study, (1) the phonological characteristics of metathesis of child speech and how it is different from adult metathesis, (2) what triggers metathesis in child speech.

5.1 Facts on metathesis in child speech
Based on the data analysis, it is found that all the examined data of metathesis in child speech occurs in the longer words, disyllabic and trisyllabic words and more complex words. Similarly, the study explored that phonological metathesis process does not occur at word's initial positions in the onset position as clarified in all the cases as highlighted in Table 1 and Table 2. For instance, the metathesis used in the data of the first child, **Mohammed** appeared in the age of 2; 3 years and disappeared when he was around 5 years. The common word he used to metathesize is *maʃa:jekh* "head of a tribe", to maja:ʃikh. He replaced /j/, the Voiced palatal semi-vowel for **/ʃ/** "sha", voiceless palate-alveolar fricative. The example of metathesis in Mohammed's data occurred in complex syllabic words in the third and fourth syllables specifically within the consonantal phonemes. The second child, **Shatha,** used the Voiced bilabial plosive /b/ in the place of Voiced pharyngeal frictionless continuant /ʕ/ as in the example, *lubuk,* "I played" but she simultaneously used to delete /ʕ/ sound from the original

	The children	Metathesized word	Original word	Words meaning in English
1	Mohammed	maja:ʃikh	maʃa:jikh	Tribe leader
2	Shatha	lubuʕuk	luʕubuk	I played (1FS)
3	Salwa	faleena	faneela	T.shirt
4	Yunis	hasemah	xamsah	Five
5	Khalil	ʔuskugeen	ʔuksugeen	Oxygen
6	Salama	masnafah	manshafah	Towel
7	Maryam	nasefi	nafesi	Myself
8	Yasmean	salʕanah	zaʕlanah	I am angry. (1SF)
		tabʕaanah	taʕbaanah	I am sick. (1SF)
9	Saleh	hawala	ħalawa	sweets
10	Ali	ʔams.hab	almas,bah	Swimming pool
		ʔaftaal	ʔa tˤ faal	children
		ʕast	ʕaks	opposite
11	Layan	saʕbah	sabʕah	Seven
Source(s): Data obtained from children's speech of YIA in this study				

Table 2.
Metathesis in child speech in comparison with adult speech

The target sound		Metathesized by	
/ʃ/	Voiceless palate-alveolar fricative	/j/	The Voiced palatal semi-vowel
/ʕ/	The Voiced pharyngeal frictionless continuant	/b/	The Voiced bilabial plosive
/n/	The voiced alveolar nasal	/l/	The voiced alveolar lateral
/m/	The voiced bilabial nasal	/s/	The voiceless alveolar fricative
/k/	The voiceless velar plosive	/s/	The voiceless alveolar fricative
/n/	The voiced alveolar nasal	/ʃ/	The voiceless palatal-alveolar fricative
/f/	The voiceless labio-dental fricative	/s/	The voiceless alveolar fricative
/ʕ/	The voiced pharyngeal frictionless continuant	/l/	The voiced alveolar lateral
/ʕ/	The voiced pharyngeal frictionless continuant	/b/	The voiced bilabial stop
/l/	The voiced alveolar lateral	/w/	Voiced labio-velar semi-vowel
/b/	The Voiced bilabial plosive	/h/	Voiceless glottal fricative
/tˤ/	Voiceless velarized alveolar plosive	/f/	Voiceless labio-dental fricative
/k/	Voiceless velar plosive	/s/	The voiceless alveolar fricative
/b/	The Voiced bilabial plosive	/ʕ/	The voiced pharyngeal frictionless continuant

Source(s): Examples taken from children's speech of YIA in this study

adult form, as in *luʕbuk*. The change occurred in the second syllable of the word. The third child, **Salwa** metathesizes one single segment, the voiced alveolar lateral /l/ for the voiced alveolar nasal, /n/ as in *faleena*, "T.shit" instead of the adult form, *faneela*.

Yunis, the fourth child, used the voiceless alveolar fricative, /s/, for the voiced bilabial nasal, /m/ as in the example, *hasemah*, "five" for the adult form, *xasemah*. At the same time, Yunis substituted the Semi-voiced uvular fricative /x/ by the Voiceless glottal fricative /h/. The fifth child, **khalil** changed the position of the voiceless alveolar fricative, /s/, in the place of the voiceless velar plosive /k/ as in *ʔuskugeen* "oxygen" for the adult speech *ʔuksugeen*. The sixth child, **Salmaa** used the voiceless palatal-alveolar fricative, /ʃ/, in the place of the voiced alveolar nasal, /n/ as in *masnafah*, "tawel" for the adult from, *manʃafah*. The child here is not only using metathesis, but also, she substituted the voiceless palatal-alveolar fricative, /ʃ/ by the voiceless alveolar fricative, /s/.). **Maryam**, the seventh child, misplaced the voiceless labio-dental fricative /f/ in the place of the voiceless alveolar fricative /s/ as in *nasefi* "myself" for the adult form, *nafesi*. *The Eighth child*, **Yasmean** used the voiced alveolar lateral, /l/ in the place of the voiced pharyngeal frictionless continuant, /ʕ/ as in the example, *salʕanah* instead *zaʕlana* (I am angry). She also used the voiced bilabial stop /b/ in the place of the voiced pharyngeal frictionless continuant, /ʕ/ as it in the case of *tabʕanah* for *taʕbanah*, (I am tired). For more illustration a list of metathesis examples in the child-speaking YIA is given in Table 1 and Table 2.

Another common characteristic of children's metathesis in the child speech data of the participants is that metathesis can happen with some phonological processes like deletion and substitution of sounds. Unlike children's metathesis, adults usually make metathesis but with no deletion and substitution of sound. For instance, Yasmean substituted the voiceless alveolar fricative /s/ with the voiced alveolar fricative /z/. Similar results have been found quite often in child speech data in Iraqi dialect (Younis, 2008) and has been reported in the data of bilingual children speaking Jordanian Arabic and English (Haana, 2018).

5.2 What triggers metathesis in child speech?
Since metathesis is a rare phonological case, less studies have been done to account for the motivation and the reasons of metathesis. In this study we argue that several factors can be considered behind the phonological metathesis in child speech. Firstly, the

analysis of the data explores that metathesis in child speech occurred within the neighboring sounds. This suggests that the contingency/adjacency (two sounds are placed side by side in terms of place or manner) plays a major role in metathesis phenomenon. Another interesting fact in the data is that most of the metathesized cases occur among the sibilants and non-sibilant consonants without considering sonority as in r *f* + sibilant sounds as in *'nasfi'* instead of *'nafasi'*. This finding from children's data supports the fact that metathesis in semiotic languages including YA is prominent (Hock, 1985; Hume and Seo, 2004). Secondly, it was found that making pronunciation easier and simpler is another reason because that triggered metathesis in data of children's speech. The children preferred Sibilant sounds because they are easier for them and are more common in the speech they hear. Children also used more front sounds in the place of back sounds that are easier to learn compared to the back sounds. This supports the evidence about the ease of pronunciation and the natural order hypothesis that children go in natural order while acquiring any language they are exposed to and such phenomenon have been found similar in the data of Krashen's study (1983). Ahmadkhani (2010), in the same vein, identified that the ease of production and perception are the motivations behind metathesis phonological process.

Thirdly, the sonority effect could be one of the causes that motivated metathesis phonological process in child speech. There is a strong preference to make the higher sonority consonant the first consonant in the sequence. This suggests that children acquire high sonorant sounds earlier than sounds with less sonority. Generally, looking at the data in Table 4, it is shown that there is a strong tendency to place higher sonority consonants before lower sonority consonants. The sounds with higher sonority appeared in red and the sounds with low level of sonority, and the examples of sounds with the same level of sonority have been given blue color. This is to highlight that to a great extent in YIA metathesis in YIA is motivated by the sonority effect.

In the case of the only example where sonority is level (f + s), the /s/ consonant was pronounced first, perhaps because it is a sibilant (characterized by the higher acoustic energy at higher frequencies than non-sibilant fricatives). In fact, the strong effect of sibilants is also observable in the case of the (n + ʃ) sequence, metathesized as (s + n) by Salama, even though /n/ is more sonorant than /ʃ/ (or /s/, as pronounced by the child). In the children's data, it was found in some cases that children prefer to use the more sonorant sounds in the place of less sonorant sounds. For instance, the metathesized word, '*salʕanah*' in one of the children's data, Yasmean placed the higher sonorant sound, /l/ in the place of less sonorant sound, /ʕ/. Similar case happens within the metathesized word, *'maja:ʃikh'*, where the child, Mohamed, used to use the higher sonorant sound, /j/ in the place of //ʃʃ the

Adult speech	Child speech with metathesis
b ħ	ħ b
k s	s k
tˠ f	f tˠ
ʕ l	l ʕ
l w	w l
n l	l n
ʃ j	j ʃ
f s	s f
n ʃ	ʃ n
ʕ b	b ʕ

Source(s): Data of Adult and child speech obtained from the data of this study

Table 4.
Sonority effect in
metathesis process
in YIA

less sonorant sound. In most of these cases in the children's data support the claim of sonority effect in metathesis process in the previous studies as in Ratcliffe's study (2004). What is found in this study and the pertinent literature of metathesis cross linguistically is that metathesis in child speech can be characterized by the following features:

(1) Metathesis occurs in child speech more than adult speech.

(2) It occurs in child speech whether in fast or slow speech.

(3) It occurs in adult speech only in fast speech/deliberate.

(4) It occurs in adult speech subconsciously and in fast speech.

(5) Generally, metathesis of some words started to occur at the age of 2.9 in child speech and decreases greatly at the age of 5 years.

(6) Comparatively, metathesis does not occur more in child or adult speech like other phonological processes such as deletion or clusters' substitution.

(7) Metathesis does not occur on the onset of the words (word's initial phonemes) or word-finally and usually the metathesis change occurred on the second or third syllable of a word. That is to say, the change of sounds (metathesis) occurs only word medially.

(8) Metathesis occurs in the more di-syllabic and complex words and does not occur in the mono-syllabic words.

(9) Metathesis can occur in child speech and noticeably motivated by the sonority sounds effect.

(10) The ease of pronunciation and the adjacency of sounds could be one of the reasons that trigger metathesis to occur in child speech.

6. Conclusion
The study aimed at exploring characteristics the metathesis phonological phenomenon of longitudinal data of 11 monolingual Arabic speakers of Yemeni-Ibbi Dialect (YIA), and other prevailing crosslinguistic studies. The study also attempted to account for the causes behind the metathesis in child speech. It was found that metathesis occurs within the disyllabic words and tri-syllabic words or more complex syllabic words but not commonly noticed in mono-syllabic words. The data analysis explored that the metathesis does not happen in the first syllables of words, words-initial phonemes in child speech and adult speech. What characterizes metathesis in child speech is that it occurs more often than in adult speech and in child speech metathesis occurs along with other phonological processes such as deletion and substitutions. Unlike metathesis in child speech, metathesis in adult speech is deliberate and occurs in slow, and fast speech and does not include any other phonological change such as substitution of sounds or deletion. The study found that metathesis phenomenon in child speech can occur due to the adjacency of sounds with similar phonological features to the ease of pronunciation. Metathesis can happen in child speech because of sonority effect that may play major role where high sonorant sounds could be replaced with less sonorant sounds that are easier for children to acquire first.

Further studies on metathesis with a larger sample of children speaking various dialects of Arabic and children's other languages would give more fruitful and plausible findings on the phonological metathesis process.

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