Journal of Child Language Acquisition and Development – JCLAD
Vol: 13 Issue: 1 1150-1169, 2025
ISSN: 2148-1997

The acquisition of pharyngeals by Arabic-English bilingual and monolingual Arabic children: A case study

Received : 11.06.2024
Accepted : 23.11.2024
Published : 30.12.2024
DOI: https://doi.org/10.5281/zenodo.14946676

Hakam Ghanim[1]
Carleton University

Abstract

This study investigates and compares the acquisition of pharyngeal consonants /ħ/ and the /ʕ/, which are part of the guttural consonants in Arabic, by Arabic-English bilingual children and Arabic monolingual children based on a case study of two children. The study also looks at claims made by researchers regarding the order of acquiring these sounds. The study was conducted by collecting speech samples from two children: one is monolingual in Arabic, and the other is an English-Arabic bilingual child. Data were collected using the free speech method and picture naming while recording the children as they were speaking. The analysis of the recordings is focused on whether the child can pronounce these pharyngeals or not and compares the two cases, the monolingual and the bilingual. The results of the study show that phonological complexity does not play a big role in the acquisition of these sounds, as claimed by Jakobson (1968). Moreover, the findings of this study also show that bilingual children acquire pharyngeals later than monolingual children despite the fact that these sounds are common in Arabic and have a high functional load.

Keywords: first language acquisition, child language, linguistics, phonology, phonetics, acquisition of pharyngeals

1. Introduction

Child language acquisition is one of the most significant areas in linguistics as it allows us to understand more about how humans learn and develop the intricate skills involved in language. This field encompasses various research domains, such as the acquisition of speech sounds, phonology, syntax, and semantics. This paper will focus on the acquisition of speech sounds, specifically the pharyngeals /ħ/ and /ʕ/, by a bilingual Arabic-English child under the age of three and will compare it with the acquisition of the same sounds by a monolingual peer of similar age. The goal of this comparison is to determine whether the sequence of acquisition for these two sounds is similar in children who speak only Arabic as well as those who speak another language alongside Arabic. Moreover, the observations drawn from this comparison are valuable when analyzed alongside the insights provided by other scholars regarding the sequence of acquisition of these sounds.

[1] Hakam Ghanim is currently a PhD candidate at Carleton University. His research area covers language documentation, language mapping, and language revitalization through child language acquisition. He is specialized in language documentation and revitalization. Corresponding author: hakamghanim@cmail.carleton.ca
ORCID: https://orcid.org/0009-0001-9370-3236

Pharyngeal sounds are not among the first sounds to be acquired by children despite the fact that they are common sounds in Arabic and have a high functional load. There are many views on the acquisition of pharyngeal sounds. For instance, Ingram's (1989) argues that the acquisition of sounds depends on the frequency of their occurrence and their functional load in the language. So, according to this claim, children would acquire these sounds and produce them accurately as long as they are getting a lot of input regardless of their age (Ingram, 1989). Moreover, Jakobson (1968) claimed that the acquisition of speech sounds is universal because the complexity of sounds plays a role in their acquisition. Additionally, Mashaqba et al. (2022) studied the acquisition of gutturals, and their results indicate that non-native speakers do not produce sufficient primary constriction in the posterior regions of the vocal tract when producing these sounds (Mashaqba et al, 2022). In contrast, findings from a study conducted by Mashaqba and Hadban (2024) indicate that by age six, children typically acquire the consonants /x/, /ħ/, /ʕ/, and /ʔ/. They also mention that when mispronouncing these sounds, children often substitute them with other guttural or non-guttural sounds. The study also observed patterns of guttural sound deletion, varying across different sounds and their positions within words. Generally, accuracy in producing these guttural sounds increased with age (Mashaqba and Hadban, 2024). Moreover, according to a study by Amayreh and Dyson (1998), there are three stages of the acquisition of consonants in Arabic: the early stage, the intermediate stage, and the late stage. The pharyngeal /ħ/ is in the intermediate stage, and it should be acquired between the age of 2-4, while the other pharyngeal /ʕ/ is a late acquisition consonant, and it is acquired after the age of 4 (Amayreh and Dyson, 1998). Bilingual language acquisition and pharyngeal sounds will be reviewed to consider what other researchers have said about their stage of acquisition, as well as the theories that were proposed about the acquisition of these two sounds. Then, the data and the results will be presented as detailed observations based on the subjects of this study on the acquisition of pharyngeal by an Arabic-English bilingual child and an Arabic monolingual child.

1.1. Scope of the study

This study compared the acquisition stages of the pharyngeal sounds /ħ/ and /ʕ/ by an Arabic monolingual child living in Iraq and an Arabic-English bilingual child living in the United States. The study used the case study technique, recording and filming the subjects after obtaining all the necessary ethical approvals. The phonetic analysis of the subjects' production of the pharyngeals was then presented.

1.2. Goals and needs for the study

The acquisition of pharyngeal sounds in Arabic was investigated, and this is necessary because it will help us better understand Arabic phonology and add more to the study of this field. Many of the studies that were done are about Indo-European languages. Still, not as many studies have been done on Arabic, not to mention the importance of the acquisition of

pharyngeals and how controversial these sounds are in Arabic. Moreover, many scholars have debated the stage of their acquisition by children.

The remainder of this research paper is organized as follows: section two is on the rationale for studying bilinguals, a section demonstrating the significance of examining language acquisition in bilingual children. Section three is an overview of pharyngeal sounds in Arabic, which includes details about pharyngeals, their definition, and their order of acquisition, according to various researchers. Section four explores the case study, where the subjects, methodology, and findings are presented. Section five presents the findings and the observation of the study, while in section 6 the discussion is presented. Section seven shows the implications and the relevance of this study to the field, and section eight is the conclusion.

1.3. Why study bilinguals

Most studies on phonological acquisition in Arabic-speaking children have focused on the acquisition or sequence of sounds (Ingram, 1989; Jakobson, 1968; Mashaqba et al., 2022; Mashaqba and Hadban, 2024), with few examining the comparison of guttural acquisition between monolingual and bilingual Arabic-speaking children. Bilingual children around the globe exhibit varying patterns in language acquisition, influenced by factors such as the timing of exposure to each language and the sociolinguistic contexts of their languages. These variations affect acquisition patterns, rates, and proficiency in each language (Paradis, 2007), so researching bilingual children's speech production provides insight into how they develop two separate yet interacting linguistic systems (Saadah, 2008-2009).

1.4. Bilingual language acquisition

There are two types of bilingualism: simultaneous and consecutive (Baker, 2011). Simultaneous bilinguals acquire two languages concurrently and become native speakers of both (Genesee, 2000). In contrast, consecutive bilinguals learn one language before the other; in this scenario, the child becomes a native speaker of the first language, which is typically the dominant one (De Houwer, 2009). The bilingual subject in this study was exposed to Arabic during the first six months of her life and then to both English and Arabic simultaneously, making it somewhat challenging to determine whether she is a simultaneous or consecutive bilingual. This uncertainty arises from not knowing how much Arabic input she received during those first six months or whether that input influenced her language acquisition. However, she is categorized as a consecutive bilingual since she was monolingual for the first six months of her life. The monolingual subject, on the other hand, is exposed to Arabic only from birth.

Bilingual language acquisition is fascinating because children develop two linguistic systems simultaneously, while their monolingual peers develop only one. They typically do not receive equal amounts of input in both languages, and occasionally, one language becomes more proficient or dominant than the other. This explains why some bilingual individuals acquire their languages at a different pace compared to their monolingual peers (Paradis, 2007). The literature generally agrees that bilingual children learning more than one language do not need to exert twice the effort as

their monolingual peers; it does not require them more time than children learning a single language (Paradis, 2007). For example, Fabian-Smith and Barlow (2010) indicated that bilingual children establish two separate linguistic systems by the age of two (Keshavarez and Ingram, 2001; Meisel, 1989).

Furthermore, bilingual children can make language-specific categorical distinctions between the two languages they are learning. Additionally, Watson (1991) mentions that most bilingual children are unaware that they are engaging with two distinct linguistic systems until they reach the age of two, by which time they are nearly phonologically developed. In fact, the bilingual individual in this case study can differentiate between Arabic and English; when she speaks to her mother, she uses Arabic, and with her father, she uses only English. On one occasion, she was asked to relay to her father what she had said to her mother earlier, and she articulated her response in English.

1.5. Theories on the acquisition of phonetics and phonology

There are many theories in the literature about the acquisition of phonetics and phonology, such as the maturationalist theory of phonological acquisition and the NeoJakobsonian theory of phonological acquisition. These two theories are concerned with phonological acquisition in general (Shahin, 1994). According to the maturationalist theory, the articulatory difficulty determines the order of acquisition, that is, the harder the sound, the later it is acquired by children. Iraqi Arabic is a dialect with many hard sounds, and the pharyngeals, which are the core of our study, are two of these hard sounds. Evidence against this view was presented by Ingram and List (1987). For instance, Ingram (1989) said that the functional load of a certain phoneme determines the acquisition rather than the articulatory difficulty.

The other theory assumed is the NeoJakobsonian theory on phonological acquisition. Jakobson (1968) proposed this theory, as it is obvious from the name. He said that the phonological complexity of the acquired phonemes governs the acquisition of phonological contrast. According to this theory, the first words show linguistic organization and ambient language effects. In the beginning, children have phonological representations when they start to produce words, and then they acquire phonological features for these representations (Shahin, 1994). This theory enables us to find out the order of the acquisition of each phoneme depending on the complexity of the phoneme. For instance, the acquisition of the /b/, which exists in all of the languages of the world, is universal among all children no matter what language they are acquiring, but what about other sounds that do not exist in all of the languages of the world and their order of acquisition. Pharyngeals are an example of sounds that do not exist in all languages so we need to know the order of the acquisition of these sounds, which we cannot just guess by Jakobson's theory of the universality of the order of the acquisition since this theory also tells us that the order of the acquisition of speech sounds is universal and fixed because all the phonemes have the same qualities across all languages.

There are other theories that are concerned with bilingual language acquisition, such as acceleration, deceleration, and transfer. According to Fabian-Smith and Barlow (2010), these theories appeared in the areas of the acquisition of syntax and the acquisition of phonetics and phonology. Bilinguals develop two separate linguistic systems at the same time their monolingual peers are developing one linguistic system. Paradis and Genesee (1996) proposed a series of hypotheses about the way bilingual children acquire two linguistic systems. The hypotheses they proposed are acceleration, deceleration, and transfer.

Acceleration means that bilinguals show a faster rate of acquisition of certain linguistic features than their monolingual peers. Deceleration is when a bilingual child is delayed in acquiring certain linguistic features and shows a slower rate. It is hypothesized that the reason is that a feature in one of the two languages impedes the acquisition of the same feature in the other language. Transfer means that bilinguals transfer units or interact between the two languages (Fabian-Smith and Barlow, 2010). According to Fabian-Smith and Barlow (2010), deceleration has been accounted for in the literature in the area of phonological acquisition (e.g., Fabian-Smith, Goldstein, Gildersleeve, Davis, and Stubbe, 1996). Goldstein and Washington (2001) studied children acquiring English and Spanish and found that bilinguals are less accurate than monolinguals in some sound classes. Paradis (2007) also discusses whether bilinguals have two phonological systems or one mixed system. Some bilingual children lag behind monolinguals in their acquisition rates (Kehoe 2002, Kehoe, Lleo and Rakow 2004). They also display crossover effects from one phonological system to the other (Paradis, 2007). The next section includes an overview of the pharyngeal sounds, their nature, and their acquisition.

1.6. A preview of pharyngeals and their acquisition

As mentioned earlier, the stage of the acquisition of pharyngeals by Arabic-English bilingual children and Arabic monolingual children is investigated in this paper. The subjects are acquiring a dialect of Iraqi Arabic known as the Moslawi dialect spoken in the city of Mosul in the north of Iraq. There are two pharyngeal sounds, the /ħ/ and the /ʕ/, both are fricatives. The way these two sounds are produced by speakers is by narrowing the pharyngeal wall while letting air escape through the mouth. The /ħ/ is a voiceless pharyngeal fricative, and the /ʕ/ is a voiced pharyngeal fricative. According to Omar (1970), the occurrence rate of pharyngeals in Egyptian Arabic is 7.6%. This rate may not reflect the same occurrence rate of the same sounds in Iraqi Arabic since pharyngeals are very common in Iraqi Arabic. Pharyngeals are also common in baby talk or motherese in words such as /baʕija/, which means “any four-legged animal,”/ʕanʕan/, which means “car,” / ħuwwa/, /ʕamʕam/ which means “food,”/baħ/ which means “finished,” and /ʕaʕʕaa/ which means “I want to go potty.” These words are all proto-words, and they are used by children in the early stages of language acquisition as they are part of their earliest lexicon.

According to Al-Ani (1970), pharyngeals have distinct vertical places of articulation. Vertical place of articulation is "a set of anatomical locations from the palate to the glottis, inclusive," different from the horizontal, which is "from the lips to the uvula, inclusive." These sounds are very hard to investigate since the place and manner of articulation lie in the pharyngeal and laryngeal areas, so they are not as easy to access as the other sounds.

Concerning the acquisition of these sounds, the initial step in determining the stage of phonological acquisition is to understand the beginning and end of the acquisition process. In phonology, it is suggested that this process starts with the first words at around 6 to 12 months and concludes at approximately six years or older with the mastery of more difficult speech sounds. Some researchers argue that it actually begins at an earlier age when infants start cooing and babbling (Ingram, 1989). According to a study conducted by Omar in 1973, the pharyngeal fricative /ħ/ is typically acquired by the age of 3. Occasionally, it may be produced as the glottal fricative /h/, while the pharyngeal fricative /ʕ/, on the other hand, is acquired by the age of 4.5 years. Others, such as Amayreh and Dyson (1998), state that pharyngeals appear in the intermediate and late stages of acquiring Arabic consonants. Furthermore, Khattab (2007) notes that children have various phonological targets, which are not fixed. There are internal and external factors that influence this variability. For bilingual children, exposure may vary to different language varieties, including standard, non-standard, and non-native forms, which applies to both languages to which the child is exposed. On the other hand, Saleh, Shoeid, Hegazi, and Ali (2007) propose that there are three aspects of phonological development to examine: universal development, specific language development, and specific child development.

Amayreh and Dyson (1998) found that the acquisition of consonants falls into three stages: the early consonants (2 to 4 years), the intermediate consonants (4 to 6 years), and the late consonants (6 and up). According to this classification, the pharyngeals are in the intermediate and late acquisition. They also explain why some consonants are late in another study that they did about the completion of the phonemic inventories of Arabic, and they give two reasons for that. The first reason is that some consonants are variable and not yet produced because of the lack of input, so the input is important, and this, of course, supports Ingram's (1989) claim about the functional load. The second reason is simply that the sound is difficult, and this means that they support the other claim proposed by Jacobson about phonological complexity. Moreover, Amayreh and Dyson (1998), in their study of the acquisition of Arabic consonants, mention that there are marked sounds and unmarked sounds, and they are marked or unmarked by definition. Unmarked sounds are acquired before marked ones. Marked sounds are more difficult to produce, and they occur less in a language. Children may replace the marked sounds with their unmarked counterparts. If the sound has a secondary articulation, for example, then the child would pronounce it without the secondary articulation (Amayreh and Dyson, 1998). This point will be elaborated more upon in the discussion section. Ingram (1989) explains the early acquisition of some of the unmarked sounds during an early stage, and he argues that these

unmarked or difficult sounds are acquired early because of their functional load in the language. A sound that occurs frequently in a language functions in many phonological oppositions, so it has a high input level for the child learning to speak. We can also compare these sounds with other languages with the same sounds and see how the markedness affects the stage of the acquisition. In the next section, I talk about the case study and look at the data and the findings concerning the acquisition of pharyngeals.

Most recent studies on the acquisition of these sounds are those done by Mashaqba and Hadban (2024) and Mashaqba et al. (2022). Mashaqba and Hadban (2024) investigated the phonological development of six guttural consonants (/x/, /ʁ/, /ħ/, /ʕ/, /ʔ/, and /h/) in typically developing, monolingual Ammani-Jordanian Arabic–speaking preschoolers aged 2 to 6 years. The study employed an articulation test consisting of two tasks: picture naming and repetition. Forty children were divided into eight age groups. The analysis focused on production accuracy to determine three developmental stages for each guttural customary production, acquisition, and mastery. The results of their study indicate that /x/, /ħ/, /ʕ/, and /ʔ/ were acquired before age 6. On the other hand, Mashaqba et al. (2022) examined the production of Arabic guttural consonants by native speakers and non-native speakers of Arabic. The study involved 40 participants who provided 240 tokens through free speech and nonsense word tasks. The findings revealed that non-native speakers exhibited less coarticulatory influence on neighboring vowels, indicating insufficient constriction in the posterior vocal tract during guttural articulation. Auditory assessments ranked the voiced pharyngeal fricative /ʕ/ as the least accurately produced.

2. Methodology

2.1. The case study

This section looks at the data from the bilingual and monolingual subjects, the methodology of the research, and the empirical findings. This research was conducted using a case study since a case study is research, an isolated case study is very important since findings can be different from those of a group case study. According to Schneider-Zioga (2012), case studies are important because they can show unusual results that we cannot find in a group study.

2.2. Participants

Two typically developing female children were selected: an Arabic-English bilingual and an Arabic monolingual, both with no apparent speech impairment or other physical or mental disabilities. It is also noteworthy that the monolingual child is two months older than the bilingual child. Data were first collected from the bilingual child at 26 months of age, while data from the monolingual child were collected at 28 months. Data collection spanned two months for the monolingual child and eight months for the bilingual child. It should be mentioned that the duration of data collection does not influence the results or findings of the study, as children master sound production as they grow. In this case, the monolingual child was 30 months old when data collection concluded, while the bilingual child was 34 months old. The reason the data collection extended an additional six

months for the bilingual child is that the data from the monolingual child were sufficient to demonstrate her ability to produce the /ħ/ and /ʕ/ sounds, but the data from the bilingual child were inadequate after two months of recording. Therefore, it was necessary to extend the data collection period to determine when she could produce the /ħ/ and /ʕ/ sounds. Regarding the participants' locations, the monolingual child resides in Iraq, while the bilingual child lives in the United States.

The monolingual child, referred to here as Mimo, is exposed to Iraqi Arabic mainly through her mother, as well as her father and other family members, including cousins of the same age and adult uncles and aunts living in the same household. The bilingual child, referred to here as Lulu, is exposed to both English and Arabic from the age of six months. She receives English input from various sources, including her father, who is not a native English speaker, through book reading and storytelling, and at daycare from her caregivers, who are native English speakers, as well as other children at the daycare with whom she spends three hours a day. Although the extent to which TV shows influence language acquisition is debated, Lulu does receive some English input from children's television programs. Lulu can be considered bilingual since she speaks English and Arabic simultaneously, producing more English words and phrases than Arabic. The question arises as to whether she is a native English speaker or a native Arabic speaker. Considering that her mother is a native Arabic speaker, it can be claimed that Lulu is a native Arabic speaker. However, she started receiving more English input than Arabic at six months old and is more comfortable using English than Arabic. Thus, as mentioned earlier, the bilingual child in this study is a consecutive bilingual since the second language input came after six months of the Arabic input. However, for the purpose of this study, whether she is a native speaker of English or Arabic does not impact the results or objectives, as the study investigates and compares the acquisition of pharyngeals in a monolingual Arabic-speaking child and a bilingual English-Arabic speaking child, regardless of whether the child is native in Arabic or English, focusing on the aspect of bilingualism, which Lulu demonstrates by speaking both languages.

2.3. Stimuli

The data from Mimo was collected using the free speech approach where her mother was asked to record her speaking about different things on different occasions. The mother stimulated the child to speak by engaging her in turn-taking conversations such as asking her 'what did you do yesterday?', 'Where did we go this morning?', 'Who did you see?', and 'What does someone do?', etc., and by some naming activity, such as the mother would point at something, and the child would name it. As the child spoke, she uttered words containing the pharyngeals in different word positions.

As for Lulu, data was collected through pictures of animals, places, and people where the sounds /ħ/ and /ʕ/ can be found a lot, as well as through free speech with turn-taking conversations between the mother and the child. In some cases, the mother tried to bring about some questions with words that have pharyngeal so that the child could utter these words in her answers. For instance, the mother would say, "Do you want to go to the

bathroom?" and the child replies, "Yes" then the mother says, "Where do you want to go?". Additionally, both children did not know that they were being recorded, so they may not get distracted or feel shy to speak. This was done mainly to ensure that all the collected data came out of the subjects naturally and spontaneously.

2.4. Procedure

Recordings of Lulu were also done by the mother, but with the researcher's supervision, since this child is living in the same area where the researcher lives. The reason why the recording was done by the mother is the Arabic input that the child gets is from the mother, and she is used to talking in Arabic with her mother. The mother recorded the child during turn-taking conversations during play and mealtimes. Another way data was elicited is by showing pictures with names of things, animals, or persons with pharyngeal in them. So, the child would look at the picture, and the mother would ask what this was while the camera was filming for the whole session. Data transcription started after completing all the data collection and the recording. After that, words with pharyngeal sounds were listed and counted to see the number of words that have pharyngeal sounds and the number of times where the pharyngeal was pronounced correctly, whether in word-initial, word-medial, or word-final positions.

3. Findings

After completing the data collection, the analysis stage began, during which the recordings were examined using PRAAT following the writing and transcription of all the words containing the sounds //ħ/ and /ʕ/ (see the appendix). There are 25 words with the pharyngeal /ħ/ and 21 words with the pharyngeal /ʕ/ from Lulu, while Mimo produced six words with the pharyngeal /ħ/ and 15 words with the pharyngeal /ʕ/. One might expect more words with pharyngeals to come from Mimo; however, this study focuses on the mastery of these sounds by the child, regardless of the number of tokens, since Mimo did produce the sounds. Moreover, the timeframe for data collection was longer for Lulu than for Mimo. Furthermore, during the data discrimination, words were counted as types rather than tokens, primarily because pharyngeals are very common in Iraqi Arabic and have a significant functional load. Thus, every word that was said and repeated many times by the subjects in the recordings was recorded only once in the dataset. For instance, the word /ʔaħəbak/, which means "I love you," was uttered hundreds of times, yet I included it just once in the data. This word also has other derivations such as /ħabibi/ "my love," /ħubbi/ "my love," /ħabib/ "lover," and /ħub/ "love." I decided to include only types to avoid repetition of the same words.

Both subjects have uttered the word /ħabibi/ "my love" or one of its derivations many times, but I included only one type since for Mimo, the production of the /ħ/ was perfect, and for Lulu, the /ħ/ was produced as /h/ in all cases. So, the number of words is way more than that, and if all the words that were said by the two subjects were included, there would

have been hundreds of words, and that is why only the types were included, not the tokens, to avoid repetition.

It was mentioned earlier that Amayreh and Dyson (1998) claimed that pharyngeals are acquired in the intermediate and the late stage of acquisition, and this is different from what is found in the data from Mimo because she acquired the sound /ʕ/ during the intermediate consonant period, while the /ħ/ was acquired at the right time according to what Amayreh and Dyson claimed. Moreover, Omar (1973) claimed that the /ʕ/ is acquired at the age of 4.5 years, which is, in this case, in the late consonants period. It is noticed that Mimo is able to produce the pharyngeals in all the positions in the words, and she had no difficulty doing that. So, by the age of 26 months, Mimo has acquired the pharyngeal sounds. According to the data, the /ħ/ is also in the intermediate consonants period, and it matches Amayreh and Omar's findings. This, of course, supports Ingram's theory about the functional load. The sound /ʕ/ occurs a lot in Iraqi Arabic, so it is acquired early. Moreover, data from Mimo diverges from the findings of Mashaqba and Hadban (2024), who stated that gutturals are acquired by the age of six. However, Mimo was able to produce them at just 26 months, significantly earlier than the reported age.

Moving on to the data from Lulu, it is found that she produced the phoneme /ħ/ correctly only two times in the word /ɣoħ/ "you go" and also in /baħ/ "finished." However, it is also noticed that she produced it in the word /ʔaħ/ "he went." It is noteworthy that this word is mentioned earlier as a future marker, making it very common. Yet, Lulu did not articulate the /ħ/ every time she said this word. It is assumed that her articulation of the sound is at 25% compared to an adult's speech. This limited articulation can be attributed to the fact that Lulu said the pharyngeal /ħ/ in only two words: /ʔoħ/ "you go" and /baħ/ "finished." In all other instances, she replaced the pharyngeal /ħ/ with the glottal /h/ as in /hakira/ (the adult version being /ħaqira/), meaning "a mean girl," and with the glottal stop /ʔ/ in words such as /ʔʊbi/ (the adult version being /ħʊbi/), which means "my love." She also omitted it in some words like /wæs/, whose adult version is /ħwæs/ meaning "clothes." It seems she has difficulties articulating pharyngeals in word-initial positions. The pharyngeal /ʔ/ was never produced correctly, and the child simply replaced it with the glottal stop /ʔ/ in words like /ʔɪnab/ (the adult version being /ʕənab/), meaning "grapes," /ʔanʔan/ (the adult version being /ʕanʕan/), which is "a proto word for car," and /ʔanif/ (the adult version being /ʕanif/), which means "violent." She also deleted it in other words like /tam/ (the adult version being /matˁʕamʕ/), meaning "restaurant," /malaka/ (the adult version being /maʕlaqa/), meaning "spoon," and /samba/ (the adult version being /sabʕa/), meaning "seven." Below are two charts illustrating the number of words produced that contain pharyngeal sounds, the number of times they were produced correctly, and the phonological processes they underwent if not produced correctly. The data from Lulu somewhat aligns with the findings of Mashaqba and Hadban (2024) in that she deleted or replaced the pharyngeals with another sound. However, it corroborates with what Mashaqba et al. (2022) found in their study on the acquisition of gutturals by non-native speakers, indicating that the articulation was not accurate.

Table 1
Data from the bilingual subject

The voiced pharyngeal fricative /ʕ/	**The voiceless pharyngeal fricative /ħ/**
It occurred in 21 words	It occurred in 25 words
ʕ → ʔ: 15 words 75%	ħ → h: 16 words 65%
ʕ → Φ: 6 words 25%	ħ → ʔ: 4 words 20%
No deletion process 0%	ħ → Φ: 3 words 10%
No correct production 0%	2 correct productions 5%

Table 2
Data from the monolingual Subject

The voiced pharyngeal fricative /ʕ/	**The voiceless pharyngeal fricative /ħ/**
It occurred in 15 words	It occurred in 6 words
It was produced correctly in all the words 100%	It was produced correctly in all the words 100%

It is worth mentioning that Lulu uses many English words when talking in Arabic with her mother. When the mother was asked about this phenomenon, she said that Lulu uses English words when she speaks Arabic because she does not know the word in Arabic, so she uses the English version. It is obvious here that Lulu's mental lexicon of English is greater than her Arabic mental lexicon. If we are to compare the number of pharyngeals said by an adult, we would also find the same number of words since these are conversations with young children, and even if pharyngeals are very common in Iraqi Arabic, there are still many words with pharyngeals that are not in the lexicon of young children. Moreover, the words included in the data reflect the most used and most common words with pharyngeals.

3.1. Observations

In order for us to establish a generalization on the acquisition of phonology by children that are specific to this case study, the children's speech needs to be compared with the adult's speech as well as the way of producing speech sounds between the two groups. the production of the sounds under study with the adult version was compared, the sounds were included in the data set whether they were perfectly produced or not. Looking at the data and the findings, we can now make some generalizations about the acquisition of the pharyngeals /ħ/ and /ʕ/ by Arabic-English bilingual children and Arabic monolingual children. These generalizations are only related to the study and the subjects and findings may vary if we do a study on different or add more data from other children to our corpus.

Based on the longitudinal case study of two children, the following observations are presented within the limits of the acquisitional and production processes of the pharyngeal sounds /ħ/ and /ʕ/ observed in these two children:

1. ***Arabic-English bilinguals in this study*** *appear to acquire pharyngeals and the phonology of the language at a slower rate than their monolingual peers. This finding aligns with Paradis's (2001) theory of deceleration, which states that bilingual children may experience a delay in acquiring certain linguistic features due to simultaneous exposure to two languages.*
2. ***The Arabic monolingual children in this study*** *were observed to acquire the pharyngeals /ħ/ and /ʕ/ by the age of 26 months, which falls within the intermediate acquisition stage of 2 to 4 years. This suggests that the frequency and functional load of these phonemes in the language play a significant role in their early acquisition.*

It is important to note that these observations are based on the data collected from the specific subjects in this study. Whether these findings can be generalized to a larger population remains an open question, and future studies that replicate similar conditions and methodologies should address this question. Further research with a larger sample size and diverse linguistic environments is necessary to determine the extent to which these observations apply to a broader context.

4. Discussion

According to the data, it is clear that Mimo acquired the phonology of the language based on the functional load of the phonemes rather than the articulatory difficulty. The theories presented will be applied at the beginning of the study to the findings of this research to determine which of the theories align.

Let's start with the maturationalist theory that assumes that the articulatory difficulty determines the order of the acquisition of the phonemes (Paradis, 2001). The data from Mimo shows that the acquisition of pharyngeals occurred at an early age, although many researchers said that the acquisition of pharyngeals occurs at a late stage (Amayreh and Dyson, 1998; Mashaqba and Hadban, 2024). As for Lulu, it is difficult to tell whether the pharyngeals are difficult to produce or it is just that bilinguals are exposed to two systems at the same time, and this could result in some delay in the acquisition of some phonemes, which aligns with the findings of Mashaqba et al. (2022).

The NeoJakobsonian theory assumes that the phonological complexity determines the order of the acquisition (Jakobson, 1968). According to the data of this study, there might be something wrong with this theory since Mina acquired the pharyngeals, which are considered very complex sounds (Al-Ani, 1970) by the age of 26 months, and this is a very early stage of acquiring such complex sounds, she also has a native-like production of stops, nasal, glides, and fricatives. There are some sounds that were not acquired, such as the emphatic sounds, which are very hard to produce by young children since they involve a secondary articulation; Amayreh and Dyson (1998) said that emphatics are acquired after the age of six and Mashaqba and Hadban (2024) said these sounds are acquired before the age six. It is difficult to tell why Lulu has not acquired these two sounds yet, whether it is because they are complex or because something else is going on when children acquire two linguistic systems at the same time. Therefore, it

is thought that looking at her acquisition of other phonemes might provide an insight into her case.

It was mentioned earlier that there are theories explaining bilingual language acquisition, such as acceleration, deceleration, and transfer (Paradis and Genesee, 1996). Acceleration suggests that bilinguals acquire language faster than their monolingual peers who are exposed to one of the languages that the bilingual learns. In contrast, deceleration posits that bilinguals acquire language at a slower rate than their monolingual counterparts. According to the deceleration theory, the reason Lulu has not acquired pharyngeals is that certain features in the other linguistic system—English, in this case—are hindering some features in Arabic from surfacing. It appears that Lulu experiences a general delay in phonological acquisition, as she has not acquired many other common sounds either, while Mimo has mastered them, except for the emphatic consonants, which are generally difficult for children of this age and are regarded as late acquisitions.

5. Implications

This study is potentially useful in various fields, such as speech pathology and speech disorders. It is important to understand how children acquire speech sounds and, more significantly, how bilingual children develop these sounds, as this can often concern parents who notice their children seem slower than their peers in certain respects. However, by conducting studies and research, we can raise awareness and assist professionals from other disciplines in gaining the necessary knowledge. Furthermore, this study could prompt further investigations into the acquisition of pharyngeals by collecting additional data from a larger group of children.

6. Conclusion

In this study, a comparison of the acquisition of pharyngeals between an Arabic-English-speaking bilingual child and an Arabic-speaking monolingual child was made. the data shows, at least in the two subjects of the study, that bilinguals acquire the phonology of the language in general, at a slower rate as compared with their monolingual peers. The data was also applied to some theories in the literature, and it was found that bilinguals undergo a deceleration process because features in one of the languages they are exposed to are impeding other features in the other language. This, of course, does not happen with monolinguals since they only acquire one linguistic system. Moreover, the data from Mimo seem to contradict Amayreh and Dyson's claim that pharyngeals are late consonant since our data show that the monolingual subject acquired the pharyngeals at an early stage (26 months). The findings also disagree with Jacobson (1968), who claims that the order of the acquisition is universal since we also found out from our data that the acquisition varies and does not rely on the complexity or the difficulty of the phonological system of the language, but rather, it relies on the functional load of the phonemes and this is of course according to Ingram (1989) who claims that the frequency of the occurrence and the functional load of the phonemes determine the order of the acquisition. The acquisition is not a universal one, after all. Additionally, the

findings here disagree with Mashaqba and Hadban (2024) who claimed that gutturals are acquired before the age of six, which is also true for the monolingual subject, but 26 months is far away from six. The findings also are also different from those of Mashaqba et al. (2022) who found that the /ʕ/ is the least accurate sound to be articulated. It is worth noting here that the difference in findings between this case study and the other studies mentioned does not mean that other studies are incorrect since the variation in findings compared to previous studies may be attributed to several factors, including methodological differences, variations in sampling procedures, differences in dialects or varieties, individual differences, diverse analytical approaches, and the use of different stimuli.

The findings from Lulu's case show that the functional load theory did not work here. As mentioned, many common sounds in Iraqi Arabic and English were not produced by Lulu. Moreover, the tense markers mentioned earlier,/ɣaħ/ and /ʕa-/, are very common, and both have the pharyngeals, yet Lulu did not acquire or produce them. It may be challenging to say that bilinguals acquire pharyngeals late since there are many other sounds that are late as well. It might be the case that bilinguals are slower at acquiring the phonology of the language in general, or according to the bilingual subject at least, and that the process of acquiring two linguistic systems is slowing this acquisition since Mimo has developed a very good phonology by the age of 26 months. Bilinguals are not less proficient than monolinguals when it comes to language acquisition; they are just acquiring two different systems simultaneously, and this process may result in some delay, as the deceleration theory assumes. It is assumed here that when it comes to language acquisition, we might notice some delay in acquiring certain linguistic aspects, such as the case of this study, although this study is based on two subjects only, and this delay does not make bilinguals less proficient than monolinguals.

Acknowledgments

The author thanks the children who participated in the study and their parents for their help in making it possible.

Funding

This study received no funding from any institution of organization.

Disclosure statement

The author reports there are no competing interests to declare.

Data availability statement

The data supporting this study's findings are available in Appendix below. The tables show all the words produced by the two study participants.

References

Al-Ani, Salman H. (1970). *Arabic Phonology: An Acoustical and Physiological Investigation*, Berlin, Boston: De Gruyter Mouton. https://doi.org/10.1515/9783110878769.

Amayreh, M. M., & Dyson, A. T. (1998). The acquisition of Arabic consonants. *Journal of Speech, Language, and Hearing Research, 41*(3), 642-653. https://doi.org/10.1044/jslhr.4103.642

Baker, C. (2011). *Foundations of bilingual education and bilingualism* (5th ed.). Multilingual Matters.

De Houwer, A. (2009). *An introduction to bilingual development*. Multilingual Matters.

Fabiano-Smith, L., & Barlow, J. A. (2010). Interaction in bilingual phonological acquisition: Evidence from phonetic inventories. *International Journal of Bilingual Education and Bilingualism, 13*(1), 81-97.

Genesee, F. (2000). Early bilingual development: One language or two? In L. Wei (Ed.), *The bilingualism reader* (pp. 327-343). Routledge.

Goldstein, B., & Washington, P. (2001). An initial investigation of phonological patterns in 4-year-old typically developing Spanish-English bilingual children. *Language, Speech, and Hearing Services in Schools, 32*(3), 153-164. https://doi.org/10.1044/0161-1461(2001/014)

Hossein Keshavarz, M., & Ingram, D. (2002). The early phonological development of a Farsi-English bilingual child. *International Journal of Bilingualism, 6*(3), 255-269. https://doi.org/10.1177/13670069020060030201

Ingram, D. (1989). *First language acquisition: Method, description, and explanation*. Cambridge University Press.

Jakobson, R. (1968). *Child language, aphasia, and phonological universals* (A. Keiler, Trans.). Mouton. (Original work published 1941)

Kehoe, M. M. (2001). Prosodic patterns in children's multisyllabic word productions.

Kehoe, M. M., Lleó, C., & Rakow, M. (2004). Voice onset time in bilingual German-Spanish children. *Bilingualism: Language and Cognition, 7*(1), 71-88. https://doi.org/10.1017/S1366728904001282

Keshavarz, M., & Ingram, D. (2001). The early phonological development of a Farsi-English bilingual child. *International Journal of Bilingual Education and Bilingualism, 6*(4), 255-269. https://doi.org/10.1080/13670050108667732

Khattab, G. (2007). Variation in vowel production by English-Arabic bilinguals. *Laboratory Phonology, 9*, 383-410.

Mashaqba, B., & Hadban, F. (2024). Acquisition of gutturals by Ammani-Jordanian Arabic-speaking preschoolers. *Journal of Speech, Language, and Hearing Research, 67*(7), 2222-2243.

Mashaqba, B., et al. (2022). Production of gutturals by non-native speakers of Arabic. *Indonesian Journal of Applied Linguistics, 12*(2), 334-347.

Meisel, J. M. (1989). Early differentiation of languages in bilingual children. In K. Hyltenstam & L. Obler (Eds.), *Bilingualism across the lifespan: Aspects of acquisition, maturity, and loss* (pp. 13-40). Cambridge University Press.

Omar, M. K. (1973). *The acquisition of Egyptian Arabic as a native language*. Mouton.

Paradis, J. (2001). Do bilingual two-year-olds have separate phonological systems? *International Journal of Bilingualism, 5*(1), 19-38. https://doi.org/10.1177/13670069010050010201

Paradis, J. (2007). Early bilingual and multilingual acquisition. In P. Auer & L. Wei (Eds.), *Handbook of multilingualism and multilingual communication* (pp. 15-44). Mouton de Gruyter.

Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or independent? *Studies in Second Language Acquisition, 18*(1), 1-25. https://doi.org/10.1017/S0272263100014662

Pye, C., Ingram, D., & List, H. (1987). A comparison of initial consonant acquisition in English and Quiché. In K. E. Nelson & A. van Kleeck (Eds.), *Children's language* (Vol. 6, pp. 175-190). Erlbaum.

Saadah, E. (2008-2009). Gender differences in VOT production of Arabic-English bilingual children. In E. Broelow & H. Ouali (Eds.), *Perspectives on Arabic linguistics: Papers from the annual symposia on Arabic linguistics* (Vol. 22-23, pp. 125-143). John Benjamins Publishing Company.

Saleh, M., Shoeib, R., Hegazi, M., & Ali, P. (2007). Early phonological development in Arabic Egyptian children: 12-30 months. *Folia Phoniatrica et Logopaedica, 59*(5), 234-240. https://doi.org/10.1159/000105128

Schneider-Zioga, P. (2012). Phonological precedence in dyslexia: A case study. *Language Acquisition, 19*(3), 183-222.

Shahin, K. N. (1994). Child language evidence on Palestinian Arabic phonology. *Child Language Research Forum, 26*, 104-116.

Watson, I. (1991). Phonological processing in two languages. In E. Bialystok (Ed.), *Language processing in bilingual children* (pp. 25-48). Cambridge University Press.

Journal of Child Language Acquisition and Development – JCLAD
Vol: 13 Issue: 1 1150-1169, 2025
ISSN: 2148-1997

Appendix

Table 1A
Words with the pharyngeal /ʕ/ from Lulu

N	Lulu's word	Adult version	Meaning
1	ʔınab	ʕənab	Grapes
2	ʔaji	ʕali	Ali – male name
3	ʔam	ʕam	A proto word for candies or cookies
4	ʔanʔan	ʕanʕan	A proto word for car
5	tam	matˁʕamʕ	Restaurant
6	malaka	maʕlaqa	Spoon
7	saaba	sabʕa	Seven
8	ʔabbaʔa	ʔarbaʕa	Four
9	təsʔa	təsʕa	Nine
10	abataʔəʃ	ʔarbatˁaʕəʃ	Fourteen
11	ʔəʃin	ʕəʃin	Twenty
12	ʔabana	ʕarabaana	Stroller
13	ʔaoʔao	ʕaoʕao	Doggie
14	ʔɛɛb	ʕɛɛbɛ	Ethically wrong
15	ʔufini	ʕufini	Leave me alone
16	ʔanif	ʕanif	Violent
17	ʔaabət	ʕaabət	A word you say to somebody who you do not like his or her face
18	maaf	maʕɣəf	I do not know
19	naan	naʕal	Sandal
20	nəssaan	nəʕsaan	Sleepy
21	ʔankud ʔənab	ʕanqud ʕənab	Grapes bunch

Table 1B
Words with the pharyngeal /ħ/ from Lulu

N	Lulu's word	Adult version	Meaning
1	jaħ or jah	ɣaħ	He went
2	ʕoħ	ɣoħ	Go
3	baħ	baħ	Finished
4	hammam	ħammam	Bathroom
5	ʔʊbi	ħʊbi	My love
6	ʔahəbki	ʔaħəbki	I love you
7	wad	waħəd	One
8	ʔakomi	ħakomi	Hakomi – a male name
9	ʔabibi	ħabibi	My love
10	wæs	ħwæs	Clothes
11	həbini	tħəbini	Do you love me
12	həku	ʔaħləqu	I shave him
13	hakira	ħaqira	Mean
14	hɛwani	ħɛwani	Animal
15	maha	ħmaɣa	Donkey – for a female
16	hanafiji	ħanafiji	Water spout
17	ʔɛha	ɣɛħa	Perfume
18	ʔakam	ħakam	Hakam – a male name
19	hmæɣ	ħmæɣ	Donkey – for a male
20	dʒahəʃ	dʒaħəʃ	A kind of donkeys
21	hababa	ħabbaba	Lovely
22	ʔahəb	ʔaħəb	I love

23	hasan	ħasan	Hasan – a male name
24	hasuni	ħasuni	Hasouni – a male name
25	taha	ʔəftaħa	Open it

Table 2A
Words with the pharyngeal /ħ/ from Mimo

N	Mina's word	Adult version	Meaning
1	ħəlu	ħəlu	Beautiful
2	daħqi	daħqi	Look at me
3	ʔaħmaɣ	ʔaħmaɣ	Red
4	təfaħa	təfaħa	Apple
5	maliħa	maliħa	Fine
6	ħasan	ħasan	A male proper name

Table 2B
Words with the pharyngeal /ʕ/ from Mimo

N	Mina's word	Adult's version	Meaning
1	ʔaqaʕ	ʔaqaʕ	I fall down
2	maʕæki	maʕæki	With you
3	ʕamija	ʕamija	A proto word for a cookie or candy
4	qɛʕəd	qɛʕəd	He is awake/ sitting down
5	baʕija	baʕija	A proto word for an animal
6	waqqaʕu	waqqaʕu	He made it fall
7	ʕala	ʕala	On
8	ʕammo	ʕammo	Uncle
9	jəlʕab	jəlʕab	He plays

10	təqaʕ	təqaʕ	She falls
11	taʕæl	taʕæl	Come
12	təʕmal	təʕmal	She makes
13	ʕalɛna	ʕalɛna	On us
14	ʕali	ʕali	A male proper name
15	maʕa	maʕa	With