

The Accuracy of Producing the Emphatic and Non-emphatic [s] Among Arabic-English Bilingual Children

Shadden Ahmad Alfadhil
George Mason University
English – Linguistics

Abstract

Arabic-speaking children may find difficulties in producing emphatic consonants, which include the emphatic voiceless alveolar fricative [s^ʕ], since it involves secondary articulation. Because of its difficulty, the most common error among children is producing the non-emphatic consonant [s] in the place of the emphatic counterpart (Amayreh, 2003). This type of error is known as de-emphasis, which is an error pattern that may occur among young Arabic-speaking children (Alqattan, 2015). Some studies have shown that children acquire the emphatic and non-emphatic [s] before the age of 6 (Alqattan, 2015; Amayreh & Dyson, 1998; Dyson & Amayreh, 2000; Owaida, 2015) and other studies have shown that children acquire them after the age of 6 (Amayreh, 2003; Hamdan & Amayreh, 2007). Most, if not all, previous studies have focused on the acquisition and production of Arabic among monolingual Arabic-speaking children and not bilingual Arabic-speaking children. This study examined an 8-year old Arabic-English simultaneous bilingual child's ability to accurately produce the non-emphatic voiceless alveolar fricative [s] and the emphatic voiceless alveolar fricative [s^ʕ] in word-initial position. A picture-naming task was used to obtain 20 single word responses with the target phonemes in word-initial position from the child. The child was more accurate with the production of [s] and was slightly less accurate with the production of [s^ʕ]. One type of error that occurred was de-emphasis and another type of error that occurred was the child not knowing what the words were in Arabic. This may be because of her dominant language, which is English, and its relation to

vocabulary acquisition. The results of this study suggest that like monolingual Arabic-speaking children, bilingual Arabic-English-speaking children may still have difficulties with the production of emphatic consonants, specifically the emphatic voiceless alveolar fricative [s^ʕ], even when they are older.

Keywords: phonetics, emphatic consonants, child language acquisition, de-emphasis, bilingualism

Introduction

In languages spoken all over the world, some consonants are harder for children to acquire than others. In the case of Arabic-speaking children, emphatic consonants, which are found in Semitic languages, are often difficult to acquire. Emphatic, or pharyngealized, consonants are consonants that involve secondary articulation, where the tongue root retracts towards the pharynx (Dyson & Amayreh, 2000; Ladefoged & Maddieson, 1996). They are considered difficult consonants because two places of articulation occur simultaneously (Alqattan, 2015). Some emphatic consonants also have non-emphatic cognates, which is the case with the emphatic voiceless alveolar fricative [s^ʕ] and the non-emphatic voiceless alveolar fricative [s].

Acquisition of the emphatic and non-emphatic [s]

Arabic-speaking children acquire emphatic consonants after acquiring non-emphatic consonants (Amayreh & Dyson, 1998; Amayreh, 2003). Because of the markedness and difficulty of [s^ʕ], the most common error among children is producing the unmarked non-emphatic consonant [s] in the place of the emphatic counterpart (Alqattan, 2015; Amayreh

2003). This type of error is known as de-emphasis. It is an error pattern that may occur among young Arabic-speaking children (Alqattan, 2015).

Previous research presented mixed results on monolingual Arabic-speaking children's ages of acquisition and accurate consonant production across different Arabic-speaking countries. Some studies have shown that children acquire the emphatic and non-emphatic [s] before the age of 6. Syrian children can correctly produce the non-emphatic [s] in word-initial, medial, and final position between 3;6 and 3;11 years old. Because the emphatic [s^ʕ] is considered a late acquired consonant, Syrian children master the production of the emphatic [s^ʕ] in word-initial, medial, and final position between 5;6 and 5;11 years old (Owaida, 2015). Kuwaiti children acquire the emphatic [s^ʕ] between the ages of 3;4 and 3;7 but at that age, the accuracy of production was around 75%. De-emphasis was observed among the emphatic consonant production of Kuwaiti children younger than 3;0 years old, and [s^ʕ] was one of the emphatic consonants that was most commonly produced incorrectly (Alqattan, 2015).

A series of studies were conducted on Jordanian children to investigate the acquisition of Arabic consonants, which include the acquisition of the non-emphatic [s] and the emphatic [s^ʕ]. One study explored the sound changes and phonological errors produced by monolingual Arabic-speaking children. This study presented the percentages of consonants that were changed from Educated Spoken Arabic (ESA) by the Jordanian child participants as well as the percentages of the errors that they produced. "Changes from ESA" meant that the produced words were not ESA, and that included acceptable and erroneous words. "Errors" were produced words that were not ESA and they were not acceptable either. "Acceptable" meant that the produced words were not ESA and were a variant of a Jordanian dialect. For the youngest children (aged 2;0-2;4), [s^ʕ] was under the "most difficult" criterion, which meant that it was one of the consonants that

was produced with changes from ESA more than 75% of the time. On the other hand, [s^ʕ] was not a “most difficult” sound for the oldest children (aged 4;0-4;4). As for production errors, [s^ʕ] was still among the “most difficult” sounds for the youngest children (aged 2;0-2;4). No consonants were under the “most difficult” criterion for the older groups of children (aged 3;0-4;4) but interestingly, they had more than 50% errors with the production of [s^ʕ]. The “most difficult” consonants reported for other languages included back fricatives, voiced fricatives, and [r], which agreed with some of the consonants that were considered “most difficult” in Arabic: [d^ʕ], [t^ʕ], [ð^ʕ], [s^ʕ], [r] (Dyson & Amayreh, 2000).

Another study examined the ages of consonant acquisition among monolingual Arabic-speaking children. Like the previous study with Kuwaiti children, “acquisition” meant that the production was 75% correct. Jordanian children acquired the non-emphatic [s] between the ages of 5;0 and 5;4, and they acquired the emphatic [s^ʕ] after the age of 6;4. This study also compared between the ages of acquisition of Arabic-speaking children and English-speaking children in three studies. English-speaking children acquired the non-emphatic [s] between 3;0 and 5;0 years old in the first study (Smit et al., 1990), at 3;0 years old in the second study (Prather et al., 1975), and at 4;6 years old in the third study (Templin, 1975). This showed that English-speaking children acquire the non-emphatic [s] before Arabic-speaking children. (Amayreh & Dyson, 1998).

Other studies have shown that children acquire the emphatic and non-emphatic [s] after the age of 6. A study was conducted on older Jordanian children (aged 6;6-8;4) to examine the ages of ESA consonant acquisition. The study showed that [s^ʕ] was not acquired (meaning that it was produced with at least 75% accuracy) in ESA at age of 8;4, but it was produced in an acceptable form (not ESA and a variant of a Jordanian dialect) and the accuracy of production

was at 77%. [s^ʕ] was described as one of the “difficult” consonants in ESA. This particular study did not mention the acquisition of the non-emphatic [s] (Amayreh, 2003). A study on the consonant profile of Jordanian school-aged children showed different results than the previous study. Children with a mean age of 6;4 were able to produce [s] and [s^ʕ] correctly. The spontaneous production of [s] was correct 99% of the time, and the spontaneous production of [s^ʕ] was correct 93% of the time (Hamdan & Amayreh, 2007).

Bilingual acquisition

The studies above focused on the acquisition and production of Arabic among monolingual Arabic-speaking children and not bilingual children who speak Arabic in addition to another language. In addition, the studies were only conducted on monolingual Arabic-speaking children from Jordan, Syria, and Kuwait. The acquisition of the Arabic language among bilingual children should be investigated in addition to investigating children who speak different Arabic dialects and live in different parts of the Middle East, such as Saudi Arabia, Egypt, and Morocco.

The outcomes of a bilingual child being exposed to two languages is not easy to predict (Lleó, 2018). However, it is interesting to investigate because bilingual children differ depending on their dominant language and the exposure to the languages that they speak. It has been shown that language dominance is related to phonological errors among bilingual children (Dixon & Zhao, 2016). The development of English speech sounds of children aged 3 to 4 years old was examined in a study involved three groups: English-Spanish bilingual children with equal dominance in both languages, English-Spanish bilingual children with English as their dominant language, and monolingual English children. The English-Spanish bilingual group with equal

dominance in both languages made more errors with English speech sounds than the other two groups. The monolingual English-speaking group and the English dominant English-Spanish bilingual group performed better in English because of their exposure to the language. In addition, there was some interference from the Spanish phonology in both bilingual groups (Gildersleeve-Neumann et al., 2008).

A study investigating the vowel systems of Spanish-German simultaneous bilingual children showed that the Spanish vowel production of the bilingual children was similar to the Spanish-speaking monolingual children. However, the bilingual children's acquisition of German vowels was delayed. In that study, the performance of a group of three bilingual Spanish-German-speaking children was compared to a group of three monolingual German-speaking children and a group of two monolingual Spanish-speaking children. The three groups of children were audio recorded from the beginning of word production to around the age of 3 years old. (Kehoe, 2002). The studies above show that bilingual children's phonemic and phonotactic development are affected according to the languages that they are exposed to (Gildersleeve-Neumann et al., 2008).

The current study

This study examined an 8-year old Arabic-English simultaneous bilingual child's ability to accurately produce the non-emphatic voiceless alveolar fricative [s] and the emphatic voiceless alveolar fricative [s^ʕ] in word-initial position. The child is aware that Arabic has the emphatic and non-emphatic [s] and she is able to pronounce those phonemes. This research focused on whether the child can produce those phonemes at the beginning of words correctly and consistently. Unlike previous studies, this study only focuses on the accurate production of

[s] and [sʕ] in word-initial position, and it focuses on a bilingual Arabic-English speaking child rather than a monolingual Arabic-speaking child. All aspects of the Arabic language require research (Amayreh & Dyson, 1998) and to this day, there is a lack of literature on monolingual and bilingual children's acquisition of Arabic, which includes children's acquisition of emphatic consonants.

Methodology

Participant

The data was collected from an 8-year old female Arabic-English simultaneous bilingual child, whose dominant language is English. The child was born and currently lives in Riyadh, the capital city of Saudi Arabia, and Arabic is the only official language that is spoken there. The language input that she receives is 50% Arabic and 50% English. Both Arabic and English are spoken by the parents and siblings at home¹. The parents' native language is Arabic, but they are fluent in English. The medium of instruction in her school is Arabic², and she speaks to her classmates in Arabic. She takes English classes in school but her proficiency level in English is higher than other students in her class because she speaks and reads in English at home. Although the child has the ability to speak Arabic and English, she usually feels more comfortable responding to people in English even when she is spoken to in Arabic, which makes her an interesting subject. Verbal consent for the child's participation in the study was received from the parents and verbal assent was received from the child participant.

Stimuli

¹ Najdi Arabic is the dialect of Arabic that is spoken by the child's family members. Two of the child's siblings are simultaneous bilingual native speakers of American English and Najdi Arabic.

² The child learns Modern Standard Arabic at school.

A picture-naming task (see appendix A for the list of words) was used to obtain data from the participant. There was a total of 20 pictures: 10 pictures for the non-emphatic alveolar fricative [s] and 10 pictures for the emphatic alveolar fricative [s^ʕ]. The pictures were pseudo-randomized and added to a slideshow in order for the child to see them clearly. The picture-naming task was tested on two adults before the child participant to ensure that the pictures are clear enough for a child to recognize. The target words that the child was expected to produce included several minimal pairs, such as [su:s] (cavity) and [s^ʕu:s^ʕ] (chick), [su:.ra] (chapter from the Quran) and [s^ʕu:.ra] (picture/photo), and [sajf] (sword) and [s^ʕajf] (summer). The target words used for the picture-naming task were simple words that both younger and older Arabic-speaking children would be familiar with.³ The target words were transcribed, translated to English, and tabulated.

Procedure

In the picture-naming task, the child was presented with a set of pictures to elicit single word responses with the target phonemes in word-initial position. Both the correct and incorrect attempts of producing the target phonemes were counted, and the child's responses were audio recorded. Hints were given when the child was unable to name the picture or when she produced a synonym instead of the word with the target phoneme. The researcher ensured that the hints would help the child guess the target word and that the hints would not give away the word. These were examples of some hints that were given to the child in order to produce the word

[sa.fi:.na] (ship):

³ No filler words that start with neither the emphatic [s^ʕ] nor the non-emphatic [s] were used. However adding filler words to the stimuli can be considered if the study is repeated.

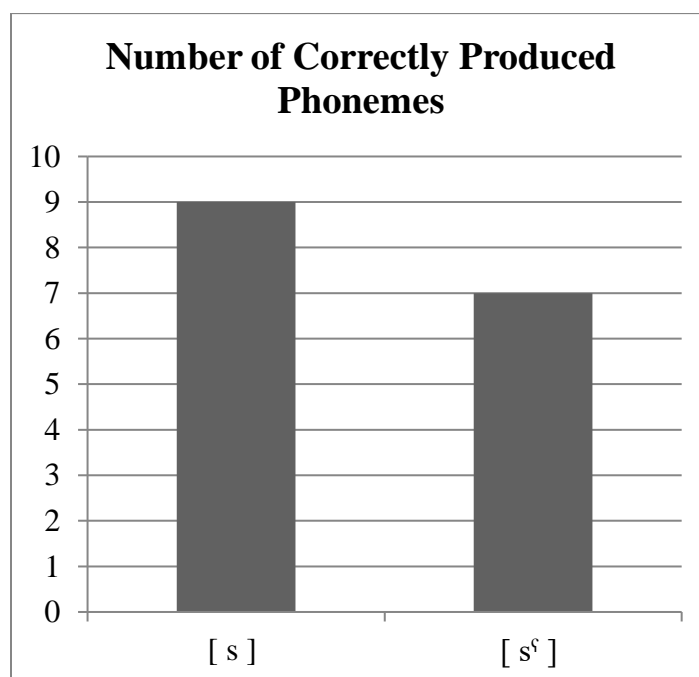
“We use it to travel from one place to another by sea.”

“Forms of transportation include cars and airplanes. What do we call this one?”

This was similar to what was done with the child participants who were unable to give a spontaneous response to the pictures presented to them in Dyson & Amayreh’s (2000) study.

Results

The table with the target words was used to mark the phonemes produced by the child. After conducting the picture-naming task, the researcher listened to the audio recording to double-check what was marked in the table, and counted the number of times where the child accurately produced the non-emphatic [s] and the emphatic [s^ɾ] in word-initial position in the target words. 9 out of 10 words beginning with [s] were produced correctly, and 7 out of 10 words beginning with [s^ɾ] were produced correctly (see appendix B and the chart below).



The child took some time to respond to many of the pictures. She also added the definite article (Al-) to some of the words she produced because they were nouns, and adding the article was not necessary because she was expected to produce single-word responses. The child clearly knew how to name the pictures in English but had to think about the target word to produce in Arabic. Hints were given to help her name some of the pictures when she was unable to do so spontaneously.

The child was unable to name two of the pictures that she was shown even after she was given hints, and the target words for both pictures had [s^ʕ] in word-initial position. She said that she can name the words in English, but she was unfamiliar with what they were called in Arabic. After audio recording the picture-naming task, I informed the child about the two words that she did not know. The child said that she never heard those words in Arabic but she knew the words in English. The words were [s^ʕa:ruχ] (rocket) and [s^ʕu:s^ʕ] (chick). This error may be related to language dominance and vocabulary acquisition. Because the child's dominant language is English, she would have a wide range of English vocabulary and a narrow range of Arabic vocabulary.

As for the phonological errors that occurred, de-emphasis occurred with one of the words beginning with [s^ʕ]. De-emphasis is a process where an emphatic consonant loses its secondary articulation (Alqattan, 2015). In this case, [s] would be produced in the place of [s^ʕ]. This error occurred with the word [s^ʕaħ.raʔ] (desert). The first syllable has the emphatic [s^ʕ] and the pharyngeal (back) fricative [ħ]. Both are difficult consonants (Dyson & Amayreh, 2000) and that may be the reason why the child produced the non-emphatic [s] in the place of the emphatic [s^ʕ]. Only one error occurred with the production of [s] and it was with the word [sa.bu:ra] (blackboard/whiteboard). The emphatic [s^ʕ] was produced in the place of the non-emphatic [s].

Discussion

One would expect that an 8-year old Arabic-English bilingual child's production would be the same as a monolingual Arabic-speaking child, but that was not the case here. The child was more accurate with the production of [s] and was slightly less accurate with the production of [s^ʕ]. Hints were given to help the child guess some of the words. An example of a word that she was given hints for was [sa.fi:.na] (ship). Once she saw the picture of the ship, she whispered "boat" but it was followed by a long pause because she was thinking of what it was called in Arabic. Giving hints to the child was helpful because she was able to name the picture correctly, even though it took her some time to think of what a ship was called in Arabic. The results of this study suggest that like young monolingual Arabic-speaking children, bilingual Arabic-English-speaking children may still have difficulties with the production of emphatic consonants, specifically the emphatic voiceless alveolar fricative [s^ʕ], even when they are older.

Two types of errors occurred with the 8-year old child's production of [s^ʕ]. The first type of error that occurred was the child not knowing how to name two of the pictures because she did not know what they were called in Arabic. The child's dominant language and its relation to vocabulary acquisition may be the reason why she was unable to name the pictures. The child's dominant language is English, and if the picture-naming task was testing English words, she may have responded to the pictures faster and performed better. The English-Spanish bilingual children with more exposure to English performed better with English speech sounds because English was their dominant language (Gildersleeve-Neumann et al., 2008). The second type of error was de-emphasis. This error pattern happened with young monolingual Kuwaiti Arabic-speaking children (Alqattan, 2015). This suggests that not only does de-emphasis occur with

young monolingual Arabic-speaking children, but it may occur among older bilingual Arabic-English speaking children as well.

The ages where monolingual Arabic-speaking children were accurate with the production of [s^ʕ] were different in each study but overall, it was clear that errors with the emphatic [s^ʕ] occurred among young children (Alqattan, 2015; Dyson & Amayreh, 2000; Owaida, 2015). Older Arabic-speaking children can produce [s] and [s^ʕ] correctly (Amayreh, 2003; Hamdan & Amayreh, 2007). However, the 8-year old bilingual Arabic-English speaking child in this study had a few errors with the production of [s^ʕ]. As for the production of the non-emphatic [s], the child only had one error. Monolingual Arabic-speaking children in other studies had errors but they were younger than the child in this study (Alqattan, 2015; Amayreh & Dyson, 1998; Owaida, 2015).

Research on children's acquisition of the Arabic language is needed, since there is a lack of research on both monolingual and bilingual Arabic-speaking children, and the studies on children's acquisition of Arabic that were mentioned in this paper are not recent. Having a large group of Arabic-English bilingual child participants may yield different results than what was presented here. The children could be Arabic-English bilinguals or they could speak another language in addition to Arabic. The child participants can be from one or multiple Arabic-speaking countries, since some words that are the same across Arabic dialects would have different consonants in initial, medial, or final position, depending on the dialect. It would also be interesting to test the emphatic voiceless alveolar fricative [s^ʕ] and its non-emphatic cognate in medial or final position. Testing the accuracy of producing other emphatic consonants and comparing them to one another can also be considered for future research.

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Appendix A

List of words used for the picture-naming task:

(Words beginning with [s] are on the left, and words beginning with [s^ʕ] are on the right)

[sa.ja:.ra] → car

[s^ʕa:.ruχ] → rocket

[sajf] → sword

[s^ʕajf] → summer

[su:s] → cavity

[s^ʕu:s^ʕ] → chick

[su:.ra] → chapter from the Quran

[s^ʕu:.ra] → picture/photo

[sa.fi:.na] → ship

[s^ʕah.raʔ] → desert

[sa.bu:.ra] → black/whiteboard

[s^ʕun.du:q] → box

[sa.la.t^ʕa] → salad

[s^ʕa:.bu:n] → soap

[sul.ha.fa:] → turtle

[s^ʕar.s^ʕu:r] → cockroach

[sa.ri:r] → bed

[s^ʕifr] → zero

[sa.ma.ka] → fish

[s^ʕaqr] → eagle

Appendix B

The child participant's responses to the picture-naming task

		[s]	[s ^ʕ]	Other
1	[sa.ja:.ra] car	✓		
2	[sajf] sword	✓		
3	[s ^ʕ a:.ruχ] rocket			Does not know what it is called in Arabic
4	[su:s] cavity	✓		
5	[s ^ʕ ajf] summer		✓	
6	[s ^ʕ u:.ra] picture/photo		✓	
7	[s ^ʕ u:s ^ʕ] chick			Does not know what it is called in Arabic
8	[sa.fi:.na] ship	✓		
9	[s ^ʕ ah.raʔ] desert	✓*		
10	[sa.bu:.ra] blackboard/whiteboard		✓*	
11	[su:.ra] chapter from the Quran	✓		
12	[s ^ʕ un.du:q] box		✓	
13	[sa.la.t ^ʕ a] salad	✓		
14	[s ^ʕ a:.bu:n] soap		✓	
15	[sul.ħa.fa:] turtle	✓		
16	[sa.ri:r] bed	✓		

17	[s ^ʰ ar.s ^ʰ u:r] cockroach		✓	
18	[s ^ʰ aqr] eagle		✓	
19	[s ^ʰ ifr] zero		✓	
20	[sa.ma.ka] fish	✓		

* Incorrect phoneme was produced