

Alternations of Pharyngealization in Gulf Pidgin Arabic from Sociophonetic Perspective

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Abstract: *The study investigates pharyngealized consonant variations in Gulf Pidgin Arabic (henceforth GPA), a variety spoken by expatriates living in Saudi Arabia, Oman, Kuwait, Qatar and Bahrain (Smart, 1990). The study focuses on the production of pharyngealized consonants of Arabic from a corpus of GPA speakers working in Saudi Arabia. I analyzed two consonant alternations (local form vs. L1 form): (1) pharyngeal/emphatic¹ stop vs. alveolar stop and pharyngeal fricative vs. alveolar fricative. The study addresses how the length of residency (LOR) in Saudi Arabia and L1 of the GPA speakers influence their use of these segments and, in particular, how their realization approximates local norms. Participants of this study are male speakers who are native of India, speak Malayalam as their L1 and have been working in Saudi Arabia between 3 and 13 years. The L1 Malayalam participants were divided into two groups based on their LOR in Saudi Arabia: short stay group and long stay group. Data were obtained from picture task in which the participants had to locate pictures that contained target pharyngealized sounds in word-initial position in a carrier phrase. To determine to what extent their realization of the target sounds were influenced by the local variety of Arabic (i.e., the lexifier language), I relied on acoustic cues (analyzed in Praat). The results suggest that there is a variation within speakers and among both groups across the consonants that have been examined in this study. I have concluded that the variation of these consonants is influenced by the native language of the speakers and both groups tend to alternate by either producing the local variant of Arabic or replacing it with the counterpart in their L1. I find that the degree of alternation is significantly affected by the LOR with the pharyngeal stop in both groups. However, the effect of LOR has no effect on the pharyngeal fricative especially among the short stay group. Moreover, there is a clear shift to the local norm among participants who have a longer LOR in Saudi Arabia in both investigated sounds.*

Key Words: *Gulf Pidgin Arabic, pharyngealized sounds, lexifier language, short stay, long stay, Voice Onset Time, Formant frequency, length of residency.*

1. Introduction

¹ Pharyngeal and Emphatic consonants are used interchangeably in some Arabic works

1.1 Pidgin and Pidginization

The term “pidgin” refers to a particular sociolinguistic phenomenon: a language that emerges as a result of contact with or acculturation of the target language (Al-Jasser, 2012). Historically, the emergence of pidgins as well as creoles around the world can be attributed to factors such as migration, trade, slavery, colonization and an internationally mobile workforce (Bassiouney, 2010; Winford, 2003). Most commonly, pidgins emerge among traders who have a great deal of contact with a group of native speakers of the target language (Yule, 1996). Typically, according to Almoaily (2012) pidgin languages are made up of two languages: one substrate language (i.e., minority language or non-dominant language in a language contact setting) and one superstrate language (i.e., dominant language that the pidgin is mainly based on). pidgin is a reduced variety of a language used as a means of communication between two groups not sharing a common language in the same geographical region. In addition, it is no body’s native tongue (Wardhaugh, 2010).

A pidgin typically has general linguistic features, in that it has a simplified grammar structure, phonology, and limited lexicon. Pidgins have common characteristics in their phonology; they have a reduced inventory of consonants, and this reduction is mainly attributable to the highly marked sounds (i.e., less common in the world’s languages and typically more difficult to pronounce) that have been substituted by the closest equivalents in the speakers’ L1. Pidgin speakers mostly struggle in acquiring marked sounds, and they tend to simplify them by replacing them with the closest equivalents in the substrate languages. Accordingly, pidgins have reduced consonant inventories compared to their lexifiers.

Linguistic variations appear in a language at the phonological, morphological, and syntactic level (Tagliamonte, 2006). The current study examines variation of the pharyngeal consonants in GPA. Almoaily (2012) states that contact languages (e.g., pidgin and creole) develop in multi-ethnic communities. Accordingly, Almoaily claims that since “GPA is spoken by a non-indigenous workforce over a wide geographical area in a multi-ethnic speech community, language variation seems inevitable” (p. 66). So, linguistic diversity occurs within the expatriates in Saudi Arabia, who speak different languages might contribute to language variation. The variations in GPA, as we will see later in this paper, might be affected by non-linguistic factors (e.g., LOR in Saudi Arabia) and/or linguistic factors (e.g., difficulty of articulation or substrate language/ L1).

The present study investigates a couple marked sounds (i.e., rare in languages and difficult to pronounce) /tʕ/ and /sʕ/ appearing in the lexifier (e.g., Arabic, the dominant language) within the sound systems of GPA. It considers how the length of residency (LOR) in Saudi Arabia and L1 of the GPA speakers participating in this study influence their pronunciation.

1.2 Gulf Arabic and Gulf Pidgin Arabic

Gulf Arabic is a variety spoken by people residing in the Arabian Gulf countries (i.e., Saudi Arabia, Kuwait, Bahrain, Iraq, Oman, Qatar and United Arab Emirates). There are some differences in description regarding the speakers and the geography of GA. Holes (1990) refers to GA as the spoken language of the indigenous people of Oman, Southern Iraq and United Arab Emirates. It also forms some of the eastern dialects in Saudi Arabia. Almoaily (2012) and Smart (1990) assert that, in addition to Oman and the United Arab Emirates, the people of Qatar, Bahrain, Saudi Arabia, and Kuwait also speak the GA variety. My study will concentrate on the center of Saudi Arabia, specifically the Qassim Region/Central Region, where the data were collected. Thus, in this paper, the term GA will be used to indicate the variety that is spoken in the center of Saudi Arabia (i.e., Qassim).

Gulf Pidgin Arabic (GPA), on the other hand, is categorized as a pidgin by most scholars conducting research on this variety, including Smart (1990), Neass (2008), and Bakir (2010). It is defined by Bakir (2010) as “the reduced linguistic system used in communication between the non-national labor and the native Arabic-speaking community in the various countries of the Arab Gulf and Saudi Arabia” (p.202). It is also used as a means of communication by the expatriate labor force in this area, particularly those groups who have different linguistic backgrounds or who share no common language.

The development of GPA is little-documented, as is most common in pidgin languages, and there is no clear-cut evidence elucidating the early stages of GPA development. As previously stated, pidginization emerges as a result of sociolinguistic situations. Özüorçun (2014) states that pidginization arises under “political, social, and economic situations” (p.116). Accordingly, there are some essential factors which contribute to the emergence of GPA, such as a continual influx of expatriates, a social gap between Gulf speakers and expatriates, and linguistic diversity among GPA speakers.

Bakir (2010) and Bassioney (2010) speculate that the initial stages of GPA appeared when the influx of immigrant workers came to the Gulf area (i.e., Saudi Arabia, Qatar, Kuwait, Bahrain, and Oman) to work in the oil industry after the discovery of oil in the Gulf region in 1938. Saudi Arabia is one of the oil-rich Gulf countries and is considered one of the developing countries that witnessed massive development resulting from the oil industry, which in turn made its economy very robust. It has a strong petroleum-based economy, and roughly seventy percent of the national budget relies on oil (Ministry of Petroleum and Mineral Resources of Saudi Arabia, 2014). This massive discovery changed the economy and consequently created many kinds of employment that could not be performed by the locals. This significant development has caused a constant flow of expatriates into Saudi Arabia, and consequently many immigrant workers have been hired from varying linguistic backgrounds to work in different jobs. This

amalgamation of differing backgrounds fostered the development of GPA. This number has been growing consistently for decades. In 1974, the total number of the foreign workers in Saudi Arabia was roughly 1.8 million, whereas by 2010, that number had increased to 8.4 million workers, making up over 44% of the entire population of Saudi Arabia (The Central Department of Statistics & Information in Saudi Arabia, 2014).

Generally speaking, the different cultures and social distance between dominant and non-dominant groups lead to pidgin genesis. Alghamdi (2014) states that the expatriates in the Gulf countries “are kept socially distanced from the locals” (p. 114). Accordingly, the two groups (e.g., expatriates and locals) minimize social contact and limit it to business affairs (Naess, 2008). Naess claims that the native residents do not admit the expatriates fully into the Arabic (the language community), and the Arabs tend to use a simpler register to communicate with non-dominant groups. Therefore, the latter group (expatriates) might not make an effort to learn the language of the hosting country, and thus they tend to use a simplified and reduced variety of the dominant language (Arabic) for communication.

Finally, although Saudi Arabia hosts immigrant workers from different countries around the world, the majority of these workers have been hired from the south and southeast of Asia, including India, Pakistan, Nepal, Bangladesh, Sri Lanka, the Philippines, Thailand and Indonesia (Bakir, 2010 as cited by Avram, 2014, p. 8). Accordingly, linguistic diversity occurs within the expatriate community, who speak different languages, such as Urdu, Malayalam, Bengali, Indonesian, Tagalog, and many others. The presence of such diverse linguistic backgrounds with no language in common encourages forming a new variety with which the community is able to communicate. Such a great number of expatriates definitely breeds pidginization, and this incorporation of differing backgrounds has promoted the development of GPA. Accordingly, the GPA is assigned as a pidgin since it follows analogous developmental stages found in other pidgins, which are identified through linguistic criteria. It also resembles other pidgins in that there are no native speakers for GPA, and its usage is restricted for certain registers (work environment) and certain purposes (oral communication).

2. Previous Studies on Gulf Pidgin Arabic

Arabic-based pidgins are not as widespread as other pidgins, such as English-based pidgins (Versteegh, 1984). The Arabic pidgin was initially found only in Africa, not in other parts of the world (Versteegh, 1984). Versteegh presents two reasons to justify this limited appearance. First, Arab communities lived in isolation at the time of pidgin languages' emergence and consequently failed in spreading the use of Arabic. Second, Arabic is considered a religious language, and thus it is not likely to be pidginized.

As for GPA, although it has not received extensive attention by researchers, some qualitative works have been conducted on this variety discussing different linguistic features.

The term GPA was coined by Smart (1990), who conducted the earliest study on Gulf Pidgin Arabic (GPA). He provided an overview of the geographical and sociolinguistic situation in the Gulf region, and descriptively analyzed the features of the phonology, orthography, morphology, syntax and lexicon of this variety. The initial observations emerged during his work as an Arabic teacher for foreign petroleum workers in the Gulf area. Smart raised the question of whether or not this language constitutes a true pidgin. Smart addressed the previous question based on humorous printed material (jocular cartoon captions) that was published in two Gulf newspapers between the years 1986 and 1987. The Arab journalists created the captions to emulate the language of workers, thus representing the migrant workers' speech as a language. Besides the printed materials, he also based on his discussion on other immigrant communities that he personally observed, such as taxi drivers, shopkeepers and other unskilled workers. The findings illustrated one of the essential features in pidgin languages, namely reduction resulting from the simplification of complex linguistic elements. According to Smart's descriptive analysis, he stated that Arabic consonants are complicated and that GPA speakers tend to reduce the marked sounds to the nearest counterpart in their L1 (p.88). According to Smart, the following complex sounds are simplified by replacement processes: the voiceless pharyngeal/emphatic alveolar stop /tˤ/ and the voiceless pharyngeal/emphatic alveolar fricative /sˤ/ are replaced with their non-pharyngeal counterparts, the voiceless alveolar stop /t/ and the voiceless alveolar fricative /s/, respectively. His findings suggested that this variety (e.g., GPA) was an emergent pidgin.

Avram (2010) investigated Romanian Pidgin Arabic (RPA), which is considered a short-lived pidgin Arabic that was spoken in Iraq by Romanian and Arab oil workers. This variety emerged when the Iraqi petroleum organizations began hiring Romanian observers and technicians in the 1980s. Neither the Romanian nor the Arab group had any knowledge about the language of any other group. Thus, they used the RPA as a common language for communication. The variety of RPA lasted until the outbreak of the first Gulf War in 1990. On the basis of a corpus of data gathered during the fieldwork, Avram described the phonology and observed a significant inter-speaker variation among the speakers of the RPA that emerged from their L1 influence through replacement process with the counterparts in their L1. For instance, the Arab speakers lacked the phonemes /p/ and /v/ in their native phonemic inventory, and consequently they replaced them with their counterparts in their L1 /b/ and /f/, respectively. In addition, the RPA is characterized by consonant replacements, just as in other pidgins. The uvular voiceless fricative /χ/ is replaced with voiceless fricative glottal /h/ in word-initial position, but if /χ/ occurs finally, then it would be replaced by /h/ or ∅. Furthermore, the voiced uvular fricative /ʁ/ is replaced with the voiced velar stop /g/, the pharyngeal voiced fricative /ʕ/ is replaced with voiceless glottal stop /ʔ/, and the emphatic sounds are replaced with their non-emphatic counterparts. Avram concluded that RPA was a pre-pidgin (which is also called unstable pidgin or early pidgin (Holm, 2000). Unlike a stable pidgin that has less variation in structure, the pre-pidgin is confined in use and has a lot of variations and intense simplification

in structure. In addition, it is characterized by a lot of interferences from the substrate language (mother tongue) of the speakers (Kouwenberg, 2008).

Salem (2013) conducted qualitative research to describe the features of Pidgin Arabic in Kuwait that is spoken by Asian housemaids. The study focused on explaining the following linguistic features: phonology, syntax and lexicon. The study was based on recorded oral interviews conducted with forty Asian workers who had been living and working in Kuwait for periods ranging from 6 to 18 years. Salem analyzed his data based on other studies of Arabic-based pidgins. He claimed that there was an inter-speaker variation in the phonology of this variety resulting from the speakers' L1 influence. In addition, the marked sounds were either lost or replaced. For instance, the replacement of the emphatic sounds /tˤ/ and /sˤ/ with their non-emphatic counterparts /t/ and /s/, respectively.

Finally, Al-Abed Al-Haq and Al-Salman (2014) conducted a qualitative study attempting to describe the linguistic features of Jordanian Bengali Pidgin Arabic (JBPA), particularly the phonology, verbal system and the negation. The JBPA is spoken among Bengali workers and native speakers of Jordan in Al-Hassan Industrial City in the north of Jordan. Al-Abed Al-Haq and Al-Salman tried to figure out whether or not this variety constituted a true pidgin. The study was based on a total of four hours of recorded interviews conducted with ten male Bengali workers who had lived in Jordan for periods ranging from 3 to 8 years. The analysis of the study showed that the phonology of JBPA is characterized by reduction and simplification, and the sounds are either lost or replaced. As in most of the Arabic-based pidgins, this variety replaces the uvular voiceless fricative /χ/ with the voiceless velar stop /k/, and the voiceless glottal stop /ʔ/ would be replaced by either long vowel or \emptyset . Furthermore, the voiced uvular fricative /ʁ/ is replaced with the voiceless/voiced velar stop /k, g/. The pharyngeal voiced fricative /ʕ/ is replaced with voiceless glottal stop /ʔ/ or long vowel or \emptyset , the voiceless fricative pharyngeal /ħ/ is replaced with voiceless glottal fricative /h/, and voiceless dental fricative /θ/ is replaced with voiceless alveolar stop /t/. Finally, the emphatic sounds are replaced with their non-emphatic counterparts. Al-Abed Al-Haq and Al-Salman concluded their study by claiming that the JBPA is not a stable pidgin. Instead, it is considered an incipient pidgin (i.e., early and unstable pidgin).

Most Arabic pidgin studies I reviewed, such as Smart (1990), Avram (2010), Salem (2013), Al-Abed Al-Haq and Al-Salman (2014), as well as studies of other pidgin languages (e.g., English-based Pidgin), investigate the phonology of pidgin varieties descriptively using auditory perceptual analysis. However, this method lacks accurate, precise judgment and is often unreliable. Adopting acoustic measures in the study of GPA consonants is certainly an important contribution to the field of pidgin research, particularly on Arabic-based pidgins. Thus, it is useful for me to compare the accuracy of the aforementioned descriptive analyses of these consonants with my own acoustic analysis.

As mentioned above, the purpose of the present study is to discuss the phonological features of GPA, particularly marked consonants /t^ʕ/ and /s^ʕ/, and compare them to the consonants of the lexifier (Arabic) by asking the following research questions:

1. How do the GPA speakers pronounce the pharyngeal stop and fricatives of Arabic?
2. Do the substrate language (L1) of GPA speakers and/or the number of years of residency impact on their pronunciation?

My hypotheses, based on the speakers' number of years spent in Saudi Arabia, are as follows:

- 1- GPA speakers who have stayed longer in Saudi Arabia tend to have a higher rate of realizing the pharyngeal consonants more than those who have been shorter in Saudi Arabia, and they also realize them more than substituting it.
- 2- GPA speakers who have stayed shorter in Saudi Arabia substitute the pharyngeal consonants more than realizing it, and tend to have a lower rate of realizing them than those who have stayed longer in Saudi Arabia.

3. Methodology

3.1 Subjects

A total of 15 male participants from India, particularly from the state of Kerala were chosen for the current study. All of whom had been working in Qassim, Saudi Arabia for between 3 and 13 years. The participants range in age from 23 to 50 years old, and all had Malayalam as their first language and some speak Urdu as a second language. The participants were divided into two groups based on their length of residency (LOR) in Saudi Arabia: a short stay group (those who have lived in Qassim for 5 years or less) and long stay group (6 years or more). The researcher met each participant in his house or work place (e.g., vegetable markets, car accessories stores, cell phone stores). The researcher used the GPA variety to communicate with the participants as well as to introduce his study to them. The exact purpose of the study was initially not revealed to the participants so that they would not become overly aware of their speech and speak unnaturally. Thus, participants could be relied upon to produce a natural spoken language.

3.2 Materials and Procedures

The data were collected by recording oral interviews with the participants. The interview addressed diverse matters, including personal information (e.g., name and marital status), education, and family life. Then, the participants were asked questions related to language(s) they speak, their age, their daily use of Arabic and L1, and their length of stay in Saudi Arabia. The main goal of these questions was to help the researcher to extract some participants' information that might play a role in their pronunciation of sounds (e.g., the amount of GA input, effect of other languages). To elicit the data used in this study, participants were recorded as they

completed a picture task in which they were asked to identify 10 pictures that contained target marked sounds: one pharyngeal stop /t^ʕ/ and pharyngeal fricative /s^ʕ/in word-initial position. I recorded the sounds as .wav files in a quiet area by using a portable high-quality digital recorder with sampling rate of 44.1 kHz. The prompts were presented with a word in a carrier phrase, as in [ha: ða ____] ('this is a' ____). Each speaker had only one session for both the interview and the picture naming which lasted for approximately ten to twenty minutes. The number of tokens analyzed was 150 (10 target words with the seven sounds x 15 participants). To determine if their realization of the target segments was influenced by the local variety of Arabic (i.e., the lexifier language), I relied on acoustic cues (analyzed in Praat) to determine how to classify each segment. Each file of the recording was divided into a smaller file consisting of a word with the target sound. After that, I created a TextGrid that contained a tier with the target phoneme and then analyzed it acoustically rather than impressionistically by scrutinizing acoustic cues.

3.3 Acoustic Parameters

For each segment, I show how it is articulated and how it is realized with the support of acoustic cues, including measurements. As stated above, this work mainly depends on acoustic analysis, and it involves analyzing the data using some relevant acoustic measurements of the target sounds. Therefore, in order to determine the realization of the target segments (local variants) and their alternations (L1 variants) among the GPA speakers, I should specify which acoustic correlates are relevant to the target segments and their alternations. Some major acoustic cues were taken into consideration, including the acoustic measurements of Voice Onset Time (VOT) of the pharyngeal/emphatic stop and F2 frequencies of the vowel following the pharyngeal sounds, and friction noise duration of the target pharyngeal fricatives.

Voice Onset Time is one of the most reliable acoustic cues in determining the phonemic categories of stop consonants in various languages. The term VOT is measured in milliseconds (ms) and defined as the durational interval from the release of the stop to the start of the voicing of the following vowel (Lisker & Abramson, 1964). In the current study, the VOT is used because we have the pharyngeal voiceless alveolar stop /t^ʕ/ that alternates with its non- pharyngeal counterpart /t/, and both of them belong to the same category (i.e., voiceless alveolar stop). Thus, VOT plays a major role in perceptual discrimination of the phoneme pairs that occur in the same place of articulation (AlDahri, 2012).

Formant frequencies labeled as F1, F2, F3, etc., are the resonances of the vocal tract, and these resonances change depending on the shape and size of the vocal tract (Kent, 1992). The formant frequencies are measured in Hertz (Hz) and are considered a major tool for describing vowel quality. The current study considers the measurements of the second (F2) formant of the onset and steady portion of the vowel following pharyngeal sounds (/t^ʕ/, /s^ʕ/). Acoustically, the second formant is related to tongue backness/advancement (Zsiga, 2013). The pronunciation of pharyngeal sounds involves raising the back of the tongue (Al-solami, 2013). So, the vowel in

the vicinity of the pharyngeal consonants tend to have lower F2 compared to the F2 values of the vowel neighboring non-pharyngeal consonants. Accordingly, the relationship between F2 and the articulation of pharyngeal sounds can show an acoustic correlate in distinguishing sounds articulated at the back of the oral cavity from their non-emphatic/pharyngeal counterparts or any other sounds with which they alternate.

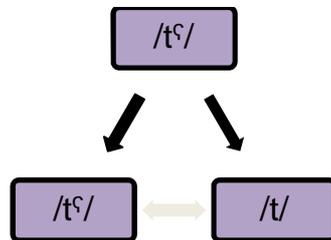
Frication noise is a turbulence that comes from the air flow that passes through a constriction of two articulators in the oral cavity. The aerodynamic turbulence is the essential source of fricative consonants (Al-Khairi, 2005). Davenport (2010) states that in a spectrogram, the frication noise (turbulence) appears as irregular striations resulting from aperiodic noise. The current study considers the friction noise duration of the target pharyngeal fricative that serve to distinguish the voiceless alveolar fricative /s/ from its pharyngeal counterpart /s^h/. The noise duration is measured in milliseconds (ms), and the duration measurement is taken from the beginning of the high energy of the noise to the start of vocalic voicing pulse.

This preliminary analysis involves categorizing each token and then calculating overall percentages that reflect the relative frequency distribution of each sound pattern. As mentioned earlier, the participants were divided into two groups based on their length of residency (LOR) in Saudi Arabia: a short stay group (those who stayed 5 years or less) and a long stay group (those who stayed 6 years or more). The participants might variably produce the pharyngeal Arabic sounds (i.e., /s^h/ & /t^h/) depending on their length of stay and/or influence of L1. Both groups pronounced the same words, and in order to examine the influence of the LOR or L1 of the groups, I compared the rates of occurrence or absence of each target sound pronounced by each group by comparing relative frequency. Each relative frequency is expressed as a percentage and represents how often a target sound alternates in the data. These percentages are calculated by dividing the number of observations of each target sound by the total number of the specific target sound in the data set and multiplied by 100.

4. Results

This section presents the results of the observed target sounds (/t^h/ & /s^h/) and their variants. Each table displays the overall results of both groups' productions of each sound under investigation among GPA speakers. These results will be discussed in more detail in section 5.

4.1 Alternation of Pharyngeal Alveolar Stop



In this study, GPA speakers pronounce the voiceless pharyngeal alveolar stop as either /tʕ/ or /t/ (the closet counterpart in Malayalam). Table 1 illustrates the rates of occurrence of the GA and GPA variants of the sound /tʕ/, demonstrating how often /tʕ/ was produced as in Standard Arabic or replaced with /t/ for each group (long and short stay group).

Table 1 Percentages of /tʕ/ production per group (number of observations indicated in brackets)

Variant	Short Stay Group	Long Stay Group
Local variant /tʕ/ (GA)	29% (10)	50% (20)
L1 variant /t/ (GPA)	71% (25)	50% (20)
Total of both variants in the data	35	40

Table 1 displays the percentages of all variants for the sound /tʕ/ including both groups. As illustrated, the long stay group produced the local variant /tʕ/ with 50 %, compared to 29% for the short stay group. When comparing the two groups in substitution, the highest frequency of substitution to the /t/ variant (L1 variant) occurred amongst the short stay group with 70% compared to 50% for the long stay group. A chi-square test was performed to see the difference between the groups, and the test reveals that the difference is not statistically significant (chi-square = 3.5714; p-value = 0.058). This result is not significant at $p < .01$.

As for the acoustic results, the next table displays the mean values of VOT of the pharyngeal stop consonant /tʕ/ and its non- pharyngeal counterpart /t/ together with their statistical results. It is shown that the VOT of the pharyngeal stop were shorter in comparison to

the average VOT values of its non- pharyngeal counterpart /t/. Both mean values show a statistical difference between their measurements.

Group Statistics

	Group /tʕ/	N	Mean	Std. Deviation	Std. Error Mean
VOT	0	33	16.91	5.186	.903
	1	42	34.62	10.772	1.662

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
VOT	Equal variances assumed	22.571	.000	-8.678	73	.000	-17.710	2.041	-21.777	-13.643
	Equal variances not assumed			-9.362	61.860	.000	-17.710	1.892	-21.491	-13.929

The second acoustic cue is the measurements of the F2. Table 2 displays the average values of F2 of the vowels next to the pharyngeal stop consonant /tʕ/ together with their statistical results. It is shown that the F2 values are lower with the pharyngeal stop in comparison to the average F2 values of its non- pharyngeal counterpart /t/.

Table 2 Mean values of F2 of the vowel following the pharyngeal stop /tʕ/ vs. plain /t/ by GPA speakers.

Word	Mean F2 with /tʕ/	Std.	Mean F2 with /t/	Std.	t	df	P-value (* Sig <.05)
tʕin ‘clay’	1834 Hz	114.551	2208 Hz	218.130	-2.327	13	*.037
tʕi:r ‘bird’	1551 Hz	103.764	1796 Hz	200.388	-2.729	13	*.017
tʕawilah ‘table’	1177 Hz	79.179	1312 Hz	70.088	-3.232	13	*.007
tʕul ‘length’	837 Hz	49.410	1095 Hz	80.226	-6.525	13	*.000
tʕub ‘brick’	895 Hz	20.736	1030 Hz	76.190	-4.830	8.167	*.001

4.2 Alternation of Pharyngeal Alveolar Stop

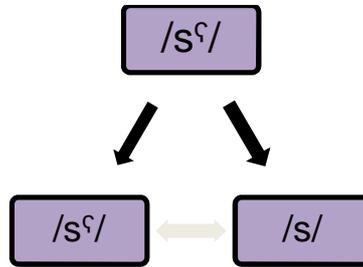


Table 3 below demonstrates the results of the variation for the target sound /sʕ/ in the two groups.

Table 3 Percentages of /sʕ/ production per group (number of observations indicated in brackets)

Variant	Short Stay Group	Long Stay Group
Local variant /sʕ/ (GA)	57% (20)	77.5% (31)
L1 variant /s/ (GPA)	43% (15)	22.5% (9)
Total of both variants in the data	35	40

Both groups pronounce the local variant /sʕ/ more frequently than substituting it. However, as expected, the higher rate of producing the given target sound /sʕ/ occurred amongst the long stay group with 77.5 % compared to 57 % for the short stay group. As for the substitution, the short stay group replaces the sound /sʕ/ with its non-emphatic counterpart /s/ in 43 %, whereas people who have stayed longer in Saudi Arabia show a lower rate in substitution with only 22.5 %. A chi-square test was performed and the test reveals that the difference is not statistically significant (chi-square statistic = 3.555; p-value = 0.059). This result is not significant at p < .01.).

As for the acoustic results, the next table displays the mean values of frication noise duration of the pharyngeal fricative /sʕ/ and its non- pharyngeal counterpart /s/ along with their statistical results. It is shown that the frication noise duration of the pharyngeal fricative was shorter in comparison to the average frication noise duration of its non- pharyngeal counterpart /s/. Both mean values show a statistical difference between their measurements.

Group Statistics

	Group /sʕ/	N	Mean	Std. Deviation	Std. Error Mean
Fri Dur	0	43	83.65	19.333	2.948
	1	32	116.25	26.272	4.644

Independent Samples Test

		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Fri Dur	Equal variances assumed	3.952	.051	-6.194	73	.000	-32.599	5.263	-43.087	-22.110
	Equal variances not assumed			-5.926	54.489	.000	-32.599	5.501	-43.625	-21.572

Another acoustic cue that is found in Arabic literature for the distinction between the pharyngeal fricative and its non- pharyngeal counterpart is the lowering of F2 for vowel that is adjacent to pharyngeal consonants (e.g., Abudaljuh, 2010; Wahba, 1996; Khattab et al., 2006; Al Bannai, 1992). Table 4 below demonstrates the average values of the F2 of the vowel following both the pharyngeal fricative consonant and its non- pharyngeal counterpart measured at the onset and steady portion of the vowel.

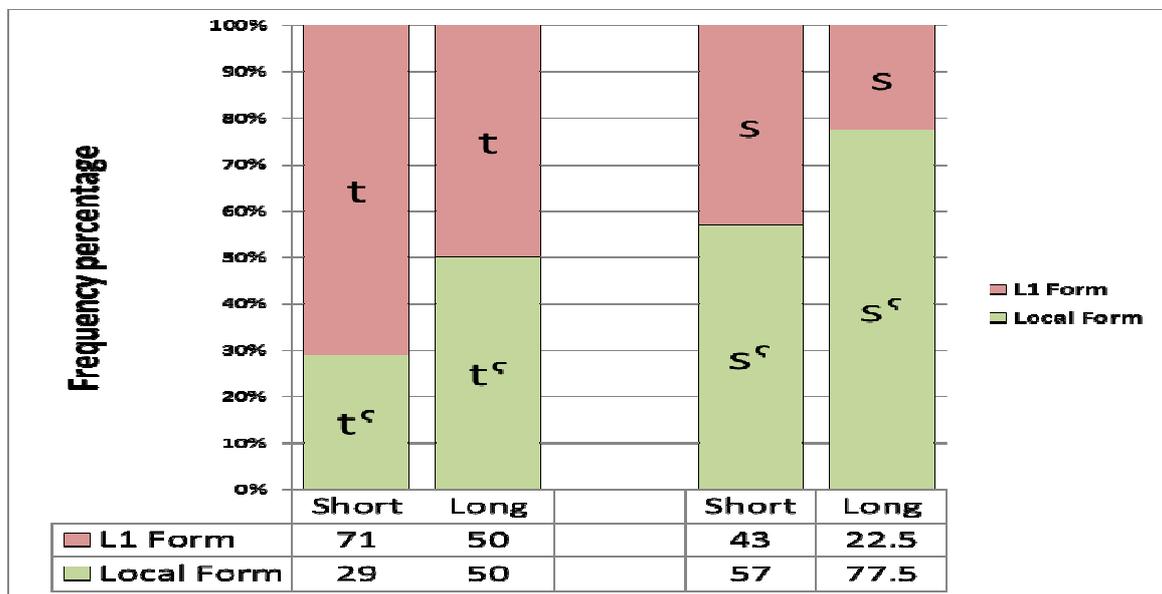
Table 4 Mean values of F2 of the vowel following the pharyngeal fricative /sʕ/ vs. plain /s/

Word	Mean F2 with /tʕ/	Std.	Mean F2 with /t/	Std.	t	df	P-value (* Sig <.05)
sʕifir ‘zero’	1180 Hz	86.397	1497 Hz	169.363	-4.465	8.659	*.002
sʕabun ‘soap’	1158 Hz	150.126	1492 Hz	26.870	-3.042	13	*.009
sʕamuli ‘bread’	1107 Hz	72.215	1346 Hz	48.031	-7.077	13	*.000
sʕandug ‘box’	1172 Hz	97.218	1417 Hz	57.671	-4.680	13	*.000
sʕu:m ‘fasting’	937 Hz	82.762	1110 Hz	62.132	-3.346	13	*.005

From Table 4, we notice that the average values of F2 are lower when the vowel is in the vicinity of the pharyngeal sound, and higher with the vowel following the non-pharyngeal variant. The emphasis in the consonant (coarticulation) spreads to the next vowel and results in lowering F2 due to the rise of the back of the tongue that accompanies the pharyngeal articulation.

The percentages of the overall alternations of both groups are integrated in a stacked graph below in Figure 1. The top bars represent the L1 variant, while the bottom ones represent the local form.

Figure 1 The overall observation between long stay and short stay groups.



5. General Discussion

As mentioned earlier, pidgins are characterized by phonological simplicity and have reduced phonemic systems resultant from the simplification of some complex phonemes that have occurred in the lexifier. According to Al Jasser (2012), “pidgin speakers are not aware of the intricate phonemic sounds” (p.72), and thus they tend to replace the less common sounds with more common ones. Gulf Arabic (the lexifier for GPA speakers) has a linguistic complexity in its phonology, and it contains some typologically unusual phonemes (marked sounds) including pharyngeal sounds (Almoaily, 2012). Therefore, the present results show replacements among both groups of GPA speakers. Both groups had different degrees of sound variation depending on the following possible factors: length of residency in Saudi Arabia, difficulty of articulation and L1. To begin, this paper will discuss the voiceless pharyngeal alveolar stop /t^ç/.

The pharyngeal alveolar stop /tʕ/ involves apical articulation (i.e., using tip of the tongue). Its articulation involves the tip of the tongue against the alveolar ridge and a secondary constriction in the pharynx resulting from lowering the tongue body further towards the pharynx (Jongman et al., 2011). The present findings reported that GPA speakers tend to alternate by either producing the local variant of Arabic /tʕ/ or replacing it with its counterpart in their L1 /t/. I relied on acoustic correlates to demonstrate accurate alternations of GPA speakers.

The alternations were confirmed acoustically and demonstrated that the sound /tʕ/ is more often replaced with /t/, a finding that is in agreement with previous impressionistic studies on GPA (e.g., Smart, 1990; Næss, 2008; Salem, 2013). I consider two acoustic cues to manifest alternations of the emphatic stops /tʕ/, including a VOT and a value of F2 of the vowel following the emphatic stop. The VOT was investigated in other Arabic studies such as Jordanian Arabic (e.g., Abudaljuh, 2010; Khattab et al., 2006), and has been shown to be a reliable acoustic cue for the emphatic stop /tʕ/, in which a significant effect of emphasis appears on the VOT. Thus, the VOT of the emphatic stop tends to be shorter than its non-emphatic VOT. Abudaljuh (2010) states that “the pharyngeal constriction, a secondary articulation of emphasis, increases the tension of the vocal tract during the closure phase of the voiceless emphatic stop resulting in a shorter delay in the commencement of voicing, i.e., shorter VOT” (p. 62). Therefore, the current study confirmed the acoustic cues of the emphatic stop attested in the previous studies in which GPA speakers produce the pharyngeal stop /tʕ/ with an average value of 16 ms (an average of all my data), compared to the VOT of its non- pharyngeal counterpart /t/, at 34 ms.

The second most common acoustic cue that is found in the literature related to the determination of pharyngeal consonants is lowering of F2. Several studies on other dialects of Arabic, such as Moroccan Arabic (Shoul, 2008), Jordanian Arabic (Abudaljuh, 2010; Khattab et al., 2006), Palestinian Arabic (Card, 1983), and Cairene Arabic (Kahn, 1975), have attested the F2 of the vowel following pharyngeal consonants, and reported that the F2 value is lower, compared to the value of the plain vowel (i.e., vowel in non-emphatic context). Similar results were found among GPA speakers (see Table 11 below), in which the average values of F2 of the vowels next to the pharyngeal stop consonant /tʕ/ were lower in comparison to the average F2 values of its non-emphatic counterpart /t/.

Malayalam (substrate language) does not have the sound /tʕ/ (voiceless pharyngeal alveolar stop) in its phonemic system. Thus, the alternation of this consonant /tʕ/ reflects influence from the speakers' L1, in that both groups tend to alternate by either producing the pharyngeal variant of Arabic or by replacing it with the counterpart in their L1. As previously stated, the voiceless pharyngeal alveolar stop is a co-articulated consonant, which means that this sound involves two articulators: a primary constriction in the alveolar ridge and a secondary constriction in the pharynx, which might result in difficulty in production. Sedlatschek (2009) states that learners of a language tend to change the linguistic elements that are difficult to acquire. Accordingly, GPA speakers, particularly those who belong to the short stay group,

encounter a difficulty in pronouncing /t^s/. As a result, they have the tendency to replace it with /t/; our study showed such replacement in 71% of the tokens. Therefore, when we compare the short stay group with the long stay one (see Table 1) in terms of pronouncing the voiceless pharyngeal alveolar stop, we would have different degrees of variation. We notice that the overall frequencies of occurrence of producing the pharyngeal variant /t^s/ are much higher with those who have been longer in Saudi Arabia, with a production rate of 50%, whereas the short stay group produced it in only 29 % of the tokens. Accordingly, the results of the pharyngeal stop alternations displayed in Table 1 correspond to our hypothesis that states that GPA speakers of the long stay group tend to realize the pharyngeal form at a higher rate than those with a shorter LOR in Saudi Arabia, and the short stay group tends to substitute the pharyngeal variant more often than producing it. This suggests that there is a correlation between the LOR in Saudi Arabia and the production of the local variant, in which the LOR entails increase in the amount of GA input.

On the other hand, the articulation of the voiceless pharyngeal alveolar fricative /s^s/ involves the tongue blade that is brought near the alveolar ridge and a secondary articulation, which involves raising the back of the tongue towards the pharynx (Al-Solami, 2013). Table 3 demonstrates the results that show that GPA speakers of both groups tend to alternate the voiceless pharyngeal alveolar fricative /s^s/ with either the pharyngeal variant /s^s/ or with its non-pharyngeal counterpart /s/ (L1 variant). The acoustic findings of /s^s/ in the present study are in agreement with the previous impressionistic studies on GPA (e.g., Smart, 1990; Avram, 2010; Salem, 2013; Al-Abed Al-Haq & Al-Salman, 2014), which mention that pidgin speakers tend to replace the pharyngeal consonants with their non-pharyngeal counterparts. The alternations of /s^s/ is supported acoustically by measuring the frication noise duration and F2 of the vowel following the emphatic consonant.

Acoustically, the frication noise duration of the pharyngeal fricative /s^s/ tends to be shorter than its counterpart /s/ (Abudalbu, 2010). This pattern is evident in the present study, in which the average value of frication noise duration of pharyngeal fricative produced by GPA speakers is 83 ms, whereas the value is 116 ms for its non-pharyngeal counterpart.

Another acoustic cue that is found in Arabic literature for the distinction between the pharyngeal fricative and its non-pharyngeal counterpart is the lowering of F2 for vowel that is adjacent to pharyngeal consonants (e.g., Abudalbu, 2010; Wahba, 1996; Khattab et al., 2006; Al Bannai, 1992). From Table 4 above, we notice that the average values of F2 are lower when the vowel is in the vicinity of the pharyngeal sound, and higher with the vowel following the non-pharyngeal variant. The emphasis in the consonant (coarticulation) spreads to the next vowel and results in lowering F2 due to the rise of the back of the tongue that accompanies the emphatic articulation.

The results reported in Table 3 confirm our hypothesis, in that the highest rate of producing the given target sound /s^s/occurred amongst the long stay group, with 77.5 % of tokens, compared to 57 % of tokens for the short stay group. As for the substitution, if we compare the two groups, we notice that the long stay group replaces the sound /s^s/ with its non-pharyngeal counterpart /s/ in 22.5 % of tokens, whereas participants who have been a shorter time in Saudi Arabia show a higher rate in substitution with 43% of tokens. However, the hypothesis that states that participants in the short stay group tend to substitute the pharyngeal variant more frequently than producing it is not valid because participants who have been a shorter time in Saudi Arabia realize the pharyngeal variant /s^s/ more frequently than replacing it with the L1 /s/, at 57% and 43% of tokens, respectively. Therefore, from Table 1, we notice that the short stay group had a higher rate of substituting the voiceless pharyngeal alveolar stop /t^s/ than producing it; however, a reverse situation is found in Table 3 in which the short stay group produced the voiceless pharyngeal alveolar fricative /s^s/ more frequently than replacing it with its counterpart /s/, though both /s^s/ and /t^s/ have the same voicing, same place of articulation, and also involve the same secondary articulation (i.e., constriction in the pharynx). One possible reason for this tendency (the high rate of producing the pharyngeal fricative) may be attributed to an articulatory factor, as the voiceless pharyngeal alveolar fricative /s^s/ may not be as difficult to pronounce as is the voiceless pharyngeal alveolar stop. Alsayuty (1967) classifies the degree of strength/difficulty of Arabic pharyngeal consonants depending on the degree of contact (i.e., complete or partial contact etc.) between the articulators. Alsayuty sorts them from the most to the least strong pharyngeals as the following order: voiceless pharyngeal alveolar stop /t^s/, voiced pharyngeal alveolar stop /d^s/, voiceless pharyngeal alveolar fricative /s^s/, and voiced pharyngeal dental fricative /ð^s/.

Therefore, as stated earlier, the production of the voiceless pharyngeal alveolar stop involves a complete contact between the articulators, and thus this characteristic makes it stronger than the pharyngeal alveolar fricative. On the other hand, the articulation of the voiceless pharyngeal alveolar fricative involves sibilance that results from incomplete contact between the articulators (e.g., the blade of the tongue and alveolar ridge). Therefore, the sibilance feature makes the pharyngeal fricative less strong (Alsayuty, 1967) and thus easier to pronounce amongst GPA speakers. Consequently, both groups realize the pharyngeal variant /s^s/ more frequently than substituting it. Thus, if we compare the overall percentages in Tables 1 with those in Table 3, particularly the percentages showing the performance of pharyngeal variant of both groups, we notice that GPA speakers show the highest percentages in producing the pharyngeal alveolar fricative /s^s/, in 77.5 % and 57% of tokens for the long and short stay groups, respectively. In this case, we could say that the length of residency has no effect on the degree of alternation for the local form /s^s/, particularly among the short stay group. That is, people who have stayed a shorter time in Saudi Arabia tended to realize the pharyngeal form /s^s/ in a high rate despite the short period of their residency in Saudi Arabia. Accordingly, the results in Table 3 reveal that both groups have a noticeable tendency to shift towards GA.

6. Conclusion

To sum up, the results indicate that there is considerable inter-speaker variation between both groups of GPA speakers across all the pharyngeal consonants that have been investigated in the current study. I argue that the alternation of these consonants emerged from the influence of the speakers' L1 and that both groups tend to alternate by either producing the pharyngeal variant of Arabic or replacing it with the counterpart in their L1. Therefore, I find two consonant alternations (local form vs. L1 form) (e.g., /t^s/ vs. /t/, and /s^s/ vs. /s/). However, the degree of alternation is significantly affected by non-linguistic factors (e.g., the length of residency in Saudi Arabia) and/or linguistic factors (e.g., the difficulty of articulation). There is a negative/indirect relationship between the high rate of accuracy and difficulty of articulation, meaning that if the difficulty of the sound increases, the high rate of accuracy decrease and vice versa. For instance, in Table 3, the local variant /s^s/ shows the highest rate of accuracy in our corpus amongst both groups since it is described as a weak consonant and has sibilance feature that makes it easy to articulate (Alsayuty, 1967). In contrast, the voiced pharyngeal stop shows the lowest rate of realizing the local form in our corpus in both groups since it is described as the most difficult consonant in the corpus, and most non-Arabic speakers struggle with its production (Alotaibi & Muhammad, 2010). I find that the degree of alternation is significantly affected by the LOR with the pharyngeal stop in both groups. However, the effect of LOR has no effect on the pharyngeal fricative especially among the short stay group. Moreover, there is a clear shift to the local norm among participants who have a longer LOR in Saudi Arabia in both investigated sounds.

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