



الحلقية والإطباق: التباينات الفونيمية والألفونية في صوتيات اللغة العربية الفصحى المعاصرة

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المخلص:

المصطلحان "الحلقي" و "التفخيم الحلقي" يعدان من المصطلحات الرئيسية في فونولوجيا اللغة العربية الفصحى الحديثة. ويصف المصطلح "حلقي" الأصوات الصادرة في الحلق، وهما الصوتان (/ع/، /ح/)، أما "التفخيم الحلقي" أو الإطباق فهو يميز فئة أخرى من الأصوات العربية تعرف بالصوامت المفخمة وهي (/ط/، /ض/، /ص/، /ظ/) عن نظيراتها غير المفخمة وهي (/ت/، /د/، /س/ و /ذ/). فبينما يعد الحلق مكاناً أولياً للنطق بالنسبة للصوتين (/ع/، /ح/)، فإنه يعد مكاناً ثانوياً بالنسبة للأصوات (/ط/، /ض/، /ص/، /ظ/). لأن هذه الأصوات المفخمة في الأصل صوامت لثوية. ومع اقتران ارتداد جذر اللسان (RTR) إلى الخلف، يعد التفخيم الحلقي في هذه الحالة سمة تثبت أن (/ط/، /ض/، /ص/، /ظ/) فونيمات مستقلة. بالإضافة إلى ذلك، تستخدم الفونولوجيا العربية مصطلح "التفخيم الحلقي" للإشارة إلى بدائل ألفونية للصوت نفسه تعرف في العربية بالتفخيم. ويحدث هذا الإبدال لبعض الأصوات حين تقع إلى جوار صوت مفخم حلق، وتعد هذه الأصوات الحلقية والمفخمة حلقياً، وبدائلها الصوتية صعبة النطق لدارسي العربية على أنها لغة أجنبية. وتهدف هذه الدراسة إلى التمييز بين مفهومي "الحلقي" و "التفخيم الحلقي"، وتسليط الضوء على الجوانب الفونيمية وبدائلها الألفونية في فونولوجيا العربية الفصحى الحديثة. كما تهدف إلى تقديم بعض التطبيقات التربوية في تعليم هذه الأصوات للناطقين بغير العربية. وتعتمد الدراسة على منهج التحليل المقارن للفونيمات وبدائلها الصوتية مستندة إلى مادة لغوية مقتبسة من سياقات لغوية مقتنة فونولوجياً.

الكلمات المفتاحية: العربية الفصحى الحديثة، الأصوات الحلقية، التفخيم الحلقي، الفونيمية، البدائل الألفونية

Pharyngeal and Pharyngealization

Phonemic vs. Allophonic Variations in Modern Standard Arabic Phonology

Abstract:

The terms of *pharyngeal* and *pharyngealization* are central to the phonology of Modern Standard Arabic (MSA). While *pharyngeal* describes sounds produced at the pharynx (/ʕ/, /ħ/), *pharyngealization* distinguishes another class of Arabic consonants called emphatics (/tˤ/, /dˤ/, /sˤ/, /ðˤ/) from their consonantal counterparts (/t/, /d/, /s/, /ð/). Whereas the pharynx is a primary place of articulation for (/ʕ/, /ħ/), it is a secondary place for (/tˤ/, /dˤ/, /sˤ/, /ðˤ/), because emphatics are primarily coronal. Together with the retraction of the tongue root (RTR), pharyngealization acts as a distinctive feature that establishes (/tˤ/, /dˤ/, /sˤ/, /ðˤ/) as separate phonemes. Additionally, Arabic phonology employs the term pharyngealization to refer to an *allophonic* variation known in Arabic as *tafkhim* 'sound thickening'. This phenomenon occurs to some sounds in the environment of a pharyngealized emphatic sound. These sound variations pose serious challenges for non-native speakers aiming to study Arabic as a foreign language. This paper aims to distinguish the concepts of pharyngeal and pharyngealization and sheds light on the phonemic and allophonic sides of the pharyngealization process in MSA phonology. It further aims to present some pedagogical implications for teaching Arabic as a foreign language. The study employs contrastive analysis of phonemic-allophonic variations based on linguistic data drawn from phonologically conditioned environments.

Key words: Modern Standard Arabic, Pharyngeals, Pharyngealization, Phonemic, Allophonic

1.Introduction

Modern Standard Arabic (MSA) consonant inventory has been discussed extensively in the literature such as (Al-Ani, 1970) and (Holes, 2004). It includes 28 consonantal phonemes. Consonant sounds are those sounds which are produced with obstructing the air coming from the lungs throughout the vocal tract. The air is blocked or narrowed by the interaction of the tongue and different articulators. Consonant sounds can be classified on the basis of their manner and places of articulation in various categories. On the basis of places of articulation, they are classified into bilabials, labiodentals, dentals, alveolars, palatals, uvulars, pharyngeals and glottal. On the basis of their manner of articulation, they are divided into plosives, fricatives, affricates, nasals, laterals and semivowels. Consonantal sounds are further distinguished as voiced with vibration in the vocal folds or voiceless with no vibration. The inventory of Arabic consonants are presented the table 1 (A&B) below.

Table 1 (A): Arabic Consonants

place→ manner ↓	Bilabials		Labio-dental		Dental		Dental- alveolar	Alveolar
	-V	+V	-V	+V	-V	+V	-V +V	-V +V
Plosives	b						t d t ^s d ^s	
Fricatives			f		θ ð ð ^s			s z s ^s
Affricates								
Nasals	m							n
Tap/flap liquid								r
Lateral liquid								l
Glides								

Table 1 (B): Arabic Consonants

place→ manner ↓	Post-alveolar		Palatal	Velar	Uvular	Pharyngeal	Glottal	Labio- velar
	-V	+V	-V +V	-V +V	-V +V	-V +V	-V +V	-V +V
Plosives				k	q		ʔ	

Fricatives	ʃ		^x ʎ		ħ ʕ	h	
Affricates		dʒ					
Nasals							
Tap/flap liquid							
Lateral liquid							
Glides		j					w

Table 1 (A & B) show that MSA Arabic consonants are 28 phonemes: 8 plosives, 13 fricatives, one affricate, two nasals, two liquids, and two glides. The place, manner and voicing features combine together to distinguish the sounds in terms of contrastive features. The presence or absence of a contrastive feature distinguishes a phoneme from another. For example, the features [+pharyngeal, +voice] produce the Arabic sound /ʕ/ whereas [+pharyngeal, -voice] produce the sound /ħ/.

Arabic is distinguished by the pharyngeal phonemes /ʕ/ and /ħ/ whose primary place of articulation is the pharynx. The feature [pharyngeal] is also involved in the production of the phonemes (/s^ʕ/, /d^ʕ/, /t^ʕ/, /ð^ʕ/) known also as emphatics. Here we come across the phenomenon of simultaneous involvement of two places of articulations: one primary and another secondary. Pharyngealized phonemes (/s^ʕ/, /d^ʕ/, /t^ʕ/, /ð^ʕ/) are examples of sounds that are produced through a primary coronal constriction and a secondary one at the pharynx. Coronal sounds are those produced by raising the front part of the tongue towards the upper teeth or the alveolar ridge. Together with the retraction of the tongue root (RTR), pharyngealization in this instance is a distinctive feature that establishes (/s^ʕ/, /d^ʕ/, /t^ʕ/, /ð^ʕ/) as separate phonemes. The feature pharyngealization also plays an important role in the production of some allophones as well. The details of these variations are presented in the following sections.

Aim of the study

The study aims to provide an analysis of the features pharyngeal and pharyngealization in MSA, distinguishing between phonemic and allophonic variations; and identifying their implications for learning Arabic as a foreign language. It further aims to reassess the teaching methods employed to teach these sounds.

Significance of the study

Pharyngeal (/ʕ/, /ħ/) and pharyngealized (/sˤ/, /dˤ/, /tˤ/, /ðˤ/) consonants are considered among the most difficult sounds in MSA that face L2 learners whose mother tongues lack these sounds. These 6 Arabic consonants are phonemic, distinguishing minimal pairs and they are important for comprehension. However, pharyngealization plays an allophonic role arising from phonetic environment and it is not equally important for comprehension. Current pedagogical materials for MSA does not distinguish these phonemic vs allophonic variations. This study is important because it attempts to provide phonemic vs. allophonic analysis of the pharyngealization phenomenon specifically oriented towards language teaching. It is hoped that the findings will enable instructors to provide proper teaching materials that illustrate the pharyngeal and pharyngealization features in their curricular.

2.Theoretical Background

Rational for using MSA as the study material

This study adopted Modern Standard Arabic (MSA) as a study material rather than the regional dialects because MSA is still regarded as an indispensable linguistic medium for formal and cross-border correspondence use. It is still alive in journalism, broadcast media, literature and academic discourse. **Mastery of MSA remains a professional requirement across diverse fields.**

Phonemes vs allophones

A *phoneme* is an important unit in phonology. It refers to the sounds that are capable of changing the meaning of a word (Yule, 2020). A sound is phonemic if it stands in *contrastive distribution* with other sounds. Two sounds are said to be in contrastive distribution if replacing one with the other results in a change of meaning. This is often shown through the use of minimal pairs. The following examples show that the words in each couple are different because of one sound. In (1) for example, the difference is made by the sounds /r/ and /y/ whereas in (2) it is made by the sounds /ħ/ and /x/.

- | | | | | |
|-----|--------|-------------|-------|-------------|
| (1) | ward | “rose” | wayd | “scoundrel” |
| (2) | ħa:l | “situation” | xa:l | “uncle” |
| (3) | naðˤar | “saw” | naðar | “vowed” |
| (4) | darb | “way” | dˤarb | “beating” |
| (5) | saif | “sword” | sˤaif | “summer” |
| (6) | ti:n | “fig” | tˤi:n | “mud” |
| (7) | ʕaum | “swimming” | qaum | “people” |

Pharyngeal vs pharyngealized phonemes

The term ‘pharyngeal’ derives from the word “pharynx” which is the place of articulation of the consonants /ħ/ and /ʕ/. The tongue root with the pharynx wall narrow the air stream passage producing a voiceless fricative /ħ/ as in the words *laħm* “meat”, *ħulum* “dream” and *balah* “dates”; and a voiced fricative /ʕ/ as in *laʕib* “play”, *ʕalam* “flag” and *lamaʕ* “shine”. The pharynx in this instance is the primary place of articulation for these two sounds posing the feature [Pharyngeal] as a contrastive feature. The pharynx can also play a secondary role in the production of the phonemes /sʕ/, /dʕ/, /tʕ/ and /ðʕ/ commonly called “emphatics (Laufer et. al, 1988). The production of these emphatic consonants involves a primary coronal constriction and a secondary constriction at the upper part of the pharynx (McCarthy, 1994; Davis, 1995). Together with the retraction of the tongue root (RTR) alongside the coronal stricture, pharyngealization in this instance is a distinctive feature that establishes /sʕ/, /dʕ/, /tʕ/ and /ðʕ/ as separate phonemes. Pharyngealization as a secondary articulation in this instance is also considered contrastive because it is the feature that distinguishes /sʕ/, /dʕ/, /tʕ/ and /ðʕ/ phonologically from their plain, non-emphatic counterparts /s/, /d/, /t/ and /ð/, which are produced by a primary coronal stricture made by the tongue. This contrastive feature is illustrated in the following minimal pairs:

- | | | | |
|---------|-------------|------|------------|
| (1) ðal | “humiliate” | ðʕal | “remained” |
| (2) tal | “wire” | tʕal | “appear” |
| (3) sum | “poison” | sʕum | “fast” |
| (4) dam | “blood” | dʕam | “join” |

Allophonic pharyngealization

The other attested phenomenon is the different shapes one phoneme can have without affecting the meaning of the word. These sound variations are called allophones. They reflect the influence of the phonetic environment and they occur in *complementary distribution* with other sounds. The English aspirated [t^h], [k^h], and [p^h] syllable initially are good examples of this phenomenon (Ladefoged & Johnson, 2014). Some Arabic sounds undergo such complementary variation according to the phonological environment. The /l/ sound in the word “Allah” has two variants. It is pronounced as pharyngealized dark [lʕ] (also represented as [ɮ]) when preceded by a low back vowel /a:/, as in [fadʕlu lʕa:h] “God’s favor”, and in [jadu lʕa:h] “God’s hand”. The other variant is a light [l] when it is preceded by long or short unemphatic /i/ as in [bismila:h] “in the name of god” and in [sabi:lila:h] “God’s way”.

Unlike the emphatic consonants in Arabic /sʕ/, /dʕ/, /tʕ/ and /ðʕ/, which are phonemes that create minimal pairs, allophonic pharyngealized variations are predictable and their distribution is limited (Gouma, 2013). Pharyngealization exhibit co-articulatory effect, where it acquires or loses its emphaticness depending on the context such as occurring in the vicinity of /u/ or losing it with /i/ (Al-Ani 2002).



Pedagogical implications for teaching Arabic pharyngeal and pharyngealized consonants

Second language acquisition studies concerning learning Arabic as a second language such as (Binasfour et al, 2017; El Haimur, 2025; Nasirudeen, 2025; and Al Huthail, 2008) list the difficulties learners of Arabic face when confronted with pharyngeals and emphatic Arabic consonants. Learners frequently strip away the secondary pharyngeal constriction, for example (Al Huthail, 2008), who investigated the acquisition of Arabic by English learners, found that learners map unfamiliar Arabic sounds to the closest English equivalent, producing /t^ʕ/ as [t] or /s^ʕ/ as [s]. The tendency of replacing emphatics with their non-pharyngealized counterparts is well documented. Al Huthail's study results also show that learners consistently replace the voiced pharyngeal /ʕ/ with the glottal stop /ʔ/ and substitute the voiceless pharyngeal /ħ/ with the English fricative /h/.

Methods for teaching

In recent years, research in the field of learning foreign languages favored communicative practice built around gaining fluency rather than accuracy. Seeking communicative adequacy over phonetic precision led to pronunciation errors such as sound substitution and the loss of the emphatic quality of some Arabic sounds. Unless these errors are handled through raising phonological awareness of the Arabic speech sound system, they will be fossilized. Therefore, implicit exposure to the language is insufficient on its own. It must be supported by explicit lessons that target the complex phonological system of MSA.

Scholars such as (Binasfour, 2019) and (Al Huthail, 2008) strongly support moving away from immersion-only learning programs to integrating explicit phonological lessons combined with assisted visual feedback. Binasfour (2019) suggests using visualization of sound differences using spectrographic data to observe the difference between a plain sound and a pharyngealized one. Visual feedback and perception-first focus trains the learner to notice what the ear failed to distinguish. The use of minimal pairs is also helpful enabling learners to observe words that change meanings based purely on the pharyngeal constriction. Al Huthail supports Binasfour and states that explicit articulatory instruction is necessary combined with controlled repetition drills.

Previous studies and the gap in the literature.

Previous studies focused on the production of pharyngeals and pharyngealized sounds; and the allophonic features of pharyngealization. For example, in their acoustic study of the influence of emphatic /d^ʕ/ on Modern Standard Arabic vowels, (Kalalkeh & Al-Shdaifat, 2019) compared the effect of the both /d^ʕ/ and /d/ on the neighboring vowels in preceding and following contexts. The findings support previous studies that consider lowering of F2 of vowels adjacent to emphatics as the main acoustic correlate of emphasis (e.g., Jongman et al, 2011; Watson, 2002; and Zawaydeh, 1999). (Hermers et al, 2017) focused on articulatory differences between pharyngeals and pharyngealized consonants whereas (Butcher & Ahmed, 1987) focused on acoustic characteristics of both consonantal groups. Gouma (2013) dealt with allophonic pharyngealized variations.



While the phonetic and phonological properties of MSA's pharyngeal and pharyngealized consonants were well researched, there is need for reassessing the pedagogical implications and the methods of teaching employed. While the communicative approach in language pedagogy prioritized functional fluency, it has caused evident gap in learners' phonological accuracy. This study offers a critical reassessment of instructional methods, informing material designers to include more explicit phonological analysis alongside the communicative practice.

Method

Study design

This study employed a qualitative research design focusing on the systematic description of pharyngeal and pharyngealized consonants in MSA as well as pharyngealization as an allophonic sound distribution. This design suits the research questions which require categorical classification based on distributional criteria using minimal pairs for phoneme contrasts and complementary distribution for allophonic variation.

Study sample

The language material that illustrate the three phonological phenomena was withdrawn from Modern Standard Arabic focusing on documented phonological patterns of MSA. The sample includes minimal pairs contrasting pharyngeal and pharyngealized consonants and their non-pharyngealized counterparts.

Scope and delimitations

This study was limited to MSA phonology. Colloquial Arabic varieties were not examined. The analysis was qualitative and descriptive. No acoustic measurements or learner data were collected.

Data analysis

Data analysis followed a qualitative phonological procedure that aimed to describe the production of pharyngeal and pharyngealized phonemes and their phonemic distribution using minimal pairs as well as the pharyngeal allophonic distribution using complementary distribution.

Validity and reliability

The trustworthiness of the study is established through explicitly stated analytical procedures. The analysis followed Arabic phonology conventions as presented in works such as (Watson, 2002; Davis, 1995; and Al-Ani, 2002).

Study questions

- 1- How are pharyngeal and pharyngealized phonemes produced in MSA?



- 2- In which phonological environment pharyngealization is allophonic?
- 3- What are the pedagogical implications of the study?

4. Analysis

4.1 Pharyngeals

The two pharyngeal consonants /h/ and /ħ/ share the pharynx as the primary place of articulation. The tongue root retracts toward the posterior of the pharyngeal wall. However, /h/ and /ħ/ differ in the feature [voice]. Whereas /h/ is voiceless, /ħ/ is voiced. The pharyngeal constriction is rare in world languages, causing a challenge for L2 learners of Arabic. /ħ/ and /h/ are traditionally described in Arabic literature as pharyngeal sounds “*ḥalqiyyah*”, which differ in the voicing feature. Foreign phonological studies add more details such as the feature *friction* and the role of the tongue root retraction RTR as well as their acoustic correlates.

Voiceless pharyngeal fricative /h/

To produce /h/, the root of the tongue is retracted horizontally toward the posterior pharyngeal wall, creating a narrow constriction in the pharynx. The vocal folds remain open, producing no voicing. The sound occurs initially as in *ḥulum* “dream”, medially as in *lahm* “meat”, and word finally as in *balah* “dates”.

Common learner errors

The common learner error occurs when learners substitute /h/ with the glottal fricative /h/ producing words such as *haba* “loved” as *haba* “blow” which are different words. The other common error occurs when learners substitute this sound with the voiceless velar fricative /x/ pronouncing for example: *ḥa:mel* “carrier” as *xa:mel* “lazy”.

Voiced pharyngeal fricative /ħ/

To produce /ħ/, the root of the tongue retracts toward the posterior pharyngeal wall with a tighter constriction than /h/. The vocal folds are narrowed causing vibration and voicing. This sound occurs initially as in *ḥalam* “flag”, medially as in *la ḥib* “play”, and in final positions as in *lama ḥ* “shine”.

Common learner errors

The common error occurs when learners substitute /ħ/ with the glottal stop /ʔ/ e.g. pronouncing the word *ḥamal* “work” as *ʔmal* “hope”.

4.2 Pharyngealized consonants / emphatics

MSA has four primary pharyngealized coronal consonants traditionally known as emphatics. The feature [Coronal] refers to a natural class that groups the sounds that are produced with the tip of the tongue touching dental, alveolar and post-alveolar parts of the



vocal tract. The Arabic pharyngealized coronals are: a voiceless alveolar fricative / s^ʕ /, a voiced dental-alveolar plosive / d^ʕ /, a voiceless dental-alveolar plosive / t^ʕ / and a voiced interdental fricative / ð^ʕ /

The articulation of the Arabic emphatic sounds is achieved with a primary coronal constriction accompanied by a secondary pharyngeal constriction (Ali and Daniloff, 1972; Watson, 2002; Bin Muqbil, 2006). Druel (2006) points out that *emphasis* in traditional Arabic corresponds to the term *Tafkhim* /tafxi:m/ and covers a wide range of articulatory and acoustic effects. It is the retraction of the root of the tongue during their articulation which defines emphatic sounds. The constriction alone is not the only cause of emphasis. The epiglottis tilts backwards and the tongue root is backed and lowered. The feature retracted tongue root is often abbreviated as [RTR] in contrast with the feature advanced tongue root [ATR].

In traditional Arabic research, the sounds /s^ʕ/, /d^ʕ/, /t^ʕ/ and /ð^ʕ/ are typically called *Etbaq sounds* and characterized as *mufakhkhamah* “thickened”. They are differentiated further as plosive and fricative sounds. By contrast, foreign phonological studies classify them as coronal sounds and add the feature of secondary place of articulation and the retraction of the tongue root RTR.

Voiceless pharyngealized dental stop /t^ʕ/

The articulation of /t^ʕ/ involves raising the tip of the tongue to make contact with the upper teeth making a complete closure. At the same time, the root of the tongue retracts towards the pharyngeal wall narrowing the pharyngeal cavity. The vocal folds remain open, producing no voicing. Pharyngealization often spreads into the neighboring sounds. The production of its counterpart /t/ involves no pharyngeal constriction and the surrounding sounds remain fronted or neutral. This sound occurs initially as in *t^ʕami* “mud”, medially as in *la t^ʕm* “slab” and in final positions as in *ba t^ʕ* “duck”. Pharyngealization is phonemic. This is shown in the minimal pairs below. Note how pharyngealization spreads to the adjacent vowel sound /a:/. The symbol “^ʕ” is used to mark a pharyngealized vowel affected by a neighboring emphatic sound.

t ^ʕ a: ^ʕ ma “disaster”	ta:ma “completed”
t ^ʕ a ^ʕ la “paint”	tala “recite”
ma ^ʕ t ^ʕ a “ride”	mata “when”

Common learner errors

This sound is often replaced with its non-pharyngealized counterpart /t/ causing misunderstanding as the replacement results in producing another word as in *t^ʕa:^ʕ ma* “disaster” replaced with the word *ta:ma* “completed”.

Voiced pharyngealized dental stop /d^ʕ/

The sound /d^ʕ/ is produced by the movement of the tip of the tongue towards the upper teeth creating a complete closure. Simultaneously, the tongue root retracts towards the

pharyngeal wall. The vocal folds are narrowed creating vibration and producing voicing. Its counterpart /d/ involves no pharyngeal constriction. The sound appears word initially as in *dʕa hl* “shallow”, medially as in *fadʕl* “favor”, and in final positions as in *ʕa dʕ* “biting”

The phonemic feature of pharyngealization appears in the following minimal pairs:

dʕaʕm “join”	dam “blood”
ma dʕaʕ “went”	mada “range”
dʕaʕrb “hitting”	darb “way”

Common learner errors

This sound is commonly substituted with its non-pharyngealized counterpart /d/ as in *dʕaʕrb* “hitting” replaced with another word *darb* “way”.

Voiceless pharyngealized dental-alveolar fricative /sʕ/

To produce /sʕ/, the tongue blade is raised toward the alveolar ridge, creating a narrow passage through which the air passes producing high-frequency fricative sound. Simultaneously, the tongue root retracts toward the pharyngeal wall, creating the emphatic quality. The vocal folds remain open, making the sound voiceless. The pharyngeal constriction is maintained during the frication and typically spreads to the neighboring sounds which become backed and lowered. Its non-pharyngealized counterpart /s/ keeps adjacent sounds neutral. We find this sound word initially as in *sʕiʕdq* “truth”, word medially as in *mi sʕr* “Egypt” and in final positions as in *li sʕ* “thief”.

The phonemic feature of pharyngealization appears in the following minimal pairs:

sʕaʕ hib “companion”	sa hib “pulling”
sʕaʕra “become”	sara “march”
sʕaʕbarʕa “be patient”	sabara “enquired”

Common learner errors

This sound is commonly replaced by its non-pharyngealized counterpart /s/ producing words such as *sa hib* “pulling” instead of *sʕaʕ hib* “companion”.

Voiced pharyngealized dental fricative /ðʕ/

To produce /ðʕ/, the tongue tip is placed against the upper teeth, creating a narrow passage for a fricative sound. The vocal folds are narrowed causing vibration and voicing. Simultaneously, the tongue root retracts toward the pharyngeal wall, adding the emphatic quality. This sound is the pharyngealized counterpart of the plain voiced dental fricative /ð/. The combination of voicing, dental frication, and pharyngeal constriction makes /ðʕ/ one of the most complex consonants in MSA. We find this sound in *ðʕiʕl* “shade”, *haʕðʕr* “ban”, *jaʕqiðʕ* “awake”.

The phonemic feature of pharyngealization appears in the following minimal pairs:

ð ^ʕ a'li:l “shady”	ðali:l “humiliated”
ð ^ʕ a'ha'ɾ'a “appeared”	ðakara “mentioned”
ð ^ʕ a'la “remained”	ðala “humiliate”

Common learner errors.

Learners of Arabic typically substitute this sound with its plain counterpart /ð/, producing for example the word ð^ʕa'li:l “shady” as ðali:l “humiliated”.

4.3 Allophonic pharyngealization / emphasis spread

Pharyngealization is also a term that refers to a phonological process where the feature [RTR] spreads from the underlying pharyngealized sounds to the neighboring sounds including consonants and vowels (Norlin, 1985; Mitchell, 1993). This phenomenon is also called emphasis spread. The allophonic variation is not an isolated effect on individual segments. Rather, it is a single phonological process whereby the secondary pharyngeal articulation spreads from the emphatic consonant to adjacent segments within a defined prosodic domain. Pharyngealization in this instance is not a contrastive feature, but it is one type of complementary distribution similar to other phonological processes such as nasalization and palatalization of sounds. Pharyngealization or emphasis spread may affect the entire word (Davis, 1995) or only adjacent vowels (Younes, 1991; Al-Masri 2009). Emphasis is bi-directional which means it spreads regressively and progressively (Ali and Daniloff, 1972). As a result, a vowel adjacent to an emphatic consonant is realized as its back allophone, represented with a diacritic “^ʕ” following the analysis of foundational phonological works (e.g., McCarthy, 1994; Watson, 2002). For example, /a/ becomes [a^ʕ], and /r/ becomes [r^ʕ]. Emphasis spread could be blocked by some front sounds that interrupt the pharyngealized environment such as (/i/, /j/), or, in some cases applying primarily within the syllable (Watson, 2002). Table (2) illustrates the emphatic spread phenomenon.

Table (2) Emphasis Spread

Phonemic representation	Phonetic representation	Domain of spread
/qint ^ʕ a:r/ “quintal”	[qin ^ʕ t ^ʕ a:r ^ʕ]	The spread of pharyngealization from /t ^ʕ / affects the preceding nasal /n/ and the following vowel /a:/ and trill /r/ within the word.
/baʕd ^ʕ / “some”	[b ^ʕ aʕd ^ʕ]	The spread of pharyngealization from the emphatic /d ^ʕ / affecting the preceding vowel /a/ and the bilabial stop /b/
/s ^ʕ aħara/ “deserts”	[s ^ʕ a ^ʕ ħa ^ʕ r ^ʕ a ^ʕ]	The emphatic consonant /s ^ʕ / triggers the spread of pharyngealization to affect all segments within the word.

Allophonic effects on vowels

Arabic has three short vowels (/a/, /i/, /u/), which have corresponding three long vowels (/a:/, /i:/, /u:/). Following Watson's analysis, these underlying phonemes have distinct fronted allophones in plain contexts, which contrast with backed allophones when adjacent to emphatic consonants. Table (3) shows this allophonic vowel variation.

Table (3)
Vowel Allophones in pharyngealized / non-pharyngealized environments

Phoneme	Non-pharyngealized	Pharyngealized (emphatic) allophone
/a/	[a] as in [bab] "door"	[a ^ɣ] as in [s ^ɣ a ^ɣ f] "row"
/a:/	[a:] as in [kæ:tib] "writer"	[a: ^ɣ] as in [t ^ɣ a: ^ɣ lib] "student"
/i/	[i] as in [bint] "girl"	[i ^ɣ] as in [t ^ɣ i ^ɣ b] "medicine"
/i:/	[i:] as in [ti:n] "figs"	[i: ^ɣ] as in [t ^ɣ i: ^ɣ n] "mud"
/u/	[u] as in [sum] "poison"	[u ^ɣ] as in [s ^ɣ u ^ɣ m] "fast"
/u:/	[u:] as in [tu:b] "repent"	[u: ^ɣ] [t ^ɣ u: ^ɣ b ^ɣ] "bricks"

The table above shows that pharyngealization affects all vowels in MSA by retracting the tongue root and lowering the vowel quality. However, the degree and nature of the effect differ depending on the vowel's inherent articulatory features. The vowel /a/, which is a front vowel, undergoes the most dramatic shift, becoming the fully back vowel [a^ɣ] when adjacent to an emphatic consonant. Similarly, the front vowel /i/ is retracted and lowered to [i^ɣ]. The vowel /u/, which is already back, moves further back and lowered to the vowel [u^ɣ].

Allophonic effects on consonants

The secondary pharyngeal articulation can spread from a primary emphatic consonant to other consonants within its domain. The consonants most commonly affected by this allophonic spread are sonorants, particularly /r/, /l/, /m/, and /n/, and non-sonorant consonants such as /b/ which can be realized as their pharyngealized allophones [r^ɣ, l^ɣ, m^ɣ, n^ɣ, b^ɣ].

Table (4)
Consonant Allophones in pharyngealized / non-pharyngealized environments

Phoneme	Non-pharyngealized	Pharyngealized (emphatic) allophone
/l/	[l] as in [saʔal] "asked"	[l ^ɣ] as in [s ^ɣ a ^ɣ qa ^ɣ l ^ɣ] "polish"
/b/	[b] as in [bint] "girl"	[b ^ɣ] as in [s ^ɣ a ^ɣ b ^ɣ r ^ɣ] "patience"
/n/	[n] as in [sanam] "hump"	[n ^ɣ] as in [s ^ɣ a ^ɣ n ^ɣ a ^ɣ m ^ɣ] "idol"
/r/	[r:] as in [dahr] (eternity)	[r ^ɣ] as in [ð ^ɣ a ^ɣ h r ^ɣ] "back"
/m/	[m] as in [maʃa] (walked)	[m ^ɣ] as in [m ^ɣ a ^ɣ t ^ɣ a ^ɣ r ^ɣ] "rain"

The table above illustrates how Arabic emphatic consonants spread the feature pharyngealization to the neighboring consonants. This coarticulatory effect is particularly



evident in sonorants such as /r, l, m, n/ and in labials like /b/, which undergo secondary backing when adjacent to emphatics. For example, the /l/ sound in [s^ɛa^ɛqa^ɛl^ɛ] “polish” is realized with a backed, pharyngealized quality due to the influence of the emphatic /s^ɛ/. Similarly, /r/ in [ð^ɛ a^ɛh r^ɛ] “back” is produced with lowered articulation values reflecting the spread of pharyngealization. This phenomenon demonstrates that emphatic consonants are not isolated articulatory phenomenon, but have a systemic impact on the phonetic environment.

4.4 Pedagogical Implications for Teaching Arabic as a Foreign Language

Learning and teaching Arabic pharyngeals (/ʕ/, /ħ/) as well as emphatic consonants (/s^ɛ/, /d^ɛ/, /t^ɛ/ and /ð^ɛ/) to learners of Arabic as a foreign language present serious challenge. Learners often substitute them with a variety of other nearer sounds that lead to incomprehension. Recent research such as (Al Huthail, 2008) and (Binasfour, 2019) emphasizes the importance of using explicit phonological lessons that raise the awareness of the learner of the unique features of these consonants. Therefore, the effective method should incorporate a number of stages. Alqassas (2025) and Duris (2025) point out that explicit instruction combined with sustained practice could develop learners’ ability to acquire these difficult consonantal sounds. Thus, a multi-layered method is highly required.

The multi-layered method

Teaching Arabic pharyngeals and emphatics should include a multi-layered method. This method follows different stages.

Stage 1

This stage begins with raising awareness of the uniqueness of these sounds through presenting minimal pairs, diagrams and explicit explanations of the retraction of the tongue root feature (RTR).

Stage 2

This stage depends on listening activities. Learners are exposed to these sounds using minimal pairs to sharpen their auditory discrimination.

Stage 3

This stage focuses on practicing production of these consonants through repetition drills and corrective feedback.

Stage 4

This stage provides opportunities of communicative practice integrating these sounds into meaningful contexts where learners move from mechanical drills to authentic language usage.

4.5 Discussion

This section discusses the findings of the phonological analysis conducted in response to the three research questions that enquire about the production of pharyngeal and pharyngealized consonants highlighting common pronunciation errors, the phonemic vs. allophonic status of pharyngealization, and the pedagogical implications for teaching Arabic as a foreign language.

Production of Pharyngeal and Pharyngealized Consonants

The analysis of articulatory production reveals that pharyngeal and pharyngealized consonants in MSA involve distinct but related physiological mechanisms. While pharyngeal consonants /h/ and /ʕ/ share the pharynx as place of articulation, they differ in voicing. This distinction is phonemic in MSA, as shown in the minimal pairs presented above. Both sounds require tongue root retraction toward the posterior pharyngeal wall, a gesture absent in most European languages. This explains the difficulty Arabic L2 learners face in producing these sounds. Common errors occur when learners substitute /h/ with the glottal fricative /ħ/ and substitute /ʕ/ with the glottal stop /ʔ/

Pharyngealized consonants also known as emphatics (/tˤ/, /dˤ/, /sˤ/, /ðˤ/) are produced with a primary oral articulation and a secondary pharyngeal constriction accompanied by the retraction of the tongue root (RTR). This articulation mechanism creates complex pronunciation target that is not common across world languages. These emphatics have plain counterparts (/t, d, s, ð/) that differ primarily by the absence of pharyngealization. The most frequent learner error is the substitution with the plain counterpart (e.g., /tˤ/ → [t], /sˤ/ → [s]), which can lead to intelligibility issues.

Phonemic vs. Allophonic Pharyngealization

The analysis confirms that pharyngealization is phonemic on the four emphatic consonants (/tˤ, dˤ, sˤ, ðˤ/). Evidence includes minimal pairs as presented above. Emphatic consonants are not predictable from environment. They occur lexically. The analysis also reveals that pharyngealization also occurs predictably in specific environments, primarily as emphasis spread from an adjacent emphatic consonant. The impact of emphatic consonants affects vowel sounds as well as other consonants such as (/r/, /l/, /m/, /n/, /b/). Allophonic pharyngealization does not create meaning contrasts. For example, pronouncing the vowel in *tˤaːlib* “student” as [aː] instead of [aˤ] does not change the word identity; it merely produces a foreign accent. Similarly, producing plain [r] instead of pharyngealized [rˤ] in *qintˤaˤr* “quintal” does not affect comprehension.

Pedagogical Implications for Teaching Arabic as a Foreign Language

Based on the phonemic vs. allophonic distinction established above, specific pedagogical recommendations can be made. Teaching pharyngeals and pharyngealized consonants is of high priority. The four emphatic consonants (/tˤ, dˤ, sˤ, ðˤ/) must be taught explicitly because they are contrastive with their plain counterparts (/t, d, s, ð/). Pronunciation errors can lead to meaning confusion. Rather than viewing explicit



phonological training as an old method, this research calls for a reintegration explicit feature-based instruction alongside functional communicative practice.

Vowel and consonant backing that occurs when adjacent to emphatics should be taught for recognition and more natural pronunciation. The learner must understand that these variations are non-contrastive. Learners who produce plain [a] instead of [ɑ] are still understood exactly as English speakers can understand aspirated and unaspirated /p/, /t/, and /k/. Care must be taken not to overload learners in their early stages of learning Arabic with these allophonic variations leaving them to later advanced stages. It is recommended that learners are exposed to natural speech containing vowel and consonant backing pointing out that these patterns do not affect intelligibility.

Recommended teaching strategies

The phonemic feature of pharyngeals and pharyngealized consonants must be made clear to the learner of Arabic. This can be achieved through a multi-layered method that follows different learning stages that focus on the use of explicit phonological lessons through visual aids and diagrams showing the specifics of the pharyngeal and emphatic Arabic consonants supported by minimal pairs and listening materials. This is followed by production drills and communicative activities that bridge theory with meaningful use.

5. Conclusion

This study set out to provide a phonological analysis of pharyngealization in Modern Standard Arabic (MSA), focusing on the distinction between phonemic and allophonic variations and the implications of this distinction for teaching Arabic as a foreign language. It specifically aimed to enquire about how pharyngeal and pharyngealized consonants are produced, which phonological environments provide the base for phonemic vs allophonic pharyngealization, and the pedagogical implications for these variations. The analysis yielded three main findings.

First, the production of pharyngeal consonants (/ħ/, /ʕ/) involves tongue root retraction toward the posterior pharyngeal wall, with the primary distinction being voicing. The four pharyngealized consonants (/tˤ/, /dˤ/, /sˤ/, /ðˤ/) involve a primary oral articulation combined with a secondary pharyngeal constriction and retraction of the tongue root. These articulatory features are not common cross-linguistically and cause challenges for L2 learners. Second, pharyngealization in MSA manifests in two distinct ways: phonemic in the case of the four emphatic consonants (/tˤ, dˤ, sˤ, ðˤ/) and allophonic on vowels and some consonants adjacent to emphatic sounds. The phonemic feature was presented by using minimal pairs meaning contrast. The allophonic feature was presented by using predictable complementary distribution. Third, the pedagogical implications follow directly from this distinction. Only phonemic pharyngealization requires explicit instruction, as it affects word meaning. Allophonic pharyngealization, while characteristic of native-like pronunciation, does not affect intelligibility and can be deprioritized in early stages of Arabic language acquisition.



Limitations

A number of limitations should be acknowledged. First, the analysis is qualitative and descriptive; no acoustic measurements were conducted to verify vowel backing or consonant pharyngealization. Second, no empirical learner data were collected; error patterns are predicted from contrastive analysis rather than observed. Third, the study focuses exclusively on MSA and does not address colloquial Arabic varieties, where pharyngealization patterns may differ.

Recommendations for Future Research

Future research should address acoustic studies that target Arabic language learners by measuring F1 and F2 frequencies of vowels adjacent to emphatic consonants, testing whether L2 learners can distinguish plain vs. emphatic minimal pairs and production studies that document learner errors across different L1 backgrounds.

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