Phonological Analysis of /l/ in Different Environments in Najdi Arabic

Reham Alhammad

Department of English, College of Science and Humanities, Majmaah University, Al-Majmaah, 11952, Saudi Arabia

r.alhammad@mu.edu.sa

Received: 23/9/2020; Revised: 17/2/2021; Accepted: 5/3/2021

The study examines the phonological differences of the sound /l/ in different environments in Najdi Arabic. It analyzes two types of this sound: one is labiodental [lˤ] and the other is labial [l̴]. The study aims to investigate the characteristics of the /l/ sound that is preceded or followed by Arabic vowels, and the labiodental sound. The study compares the results obtained in the study with those discussed by Ferguson (1956) concerning the contexts that can predict the sound /lˤ/ in the Arabic language, which comes before or after the vowel sound, and after the labiodental sound. The results of the study show that both the labial and labiodental sounds spread their phonological features to affect the /l/ sound in Najdi Arabic. Moreover, the labiodental sound affects the sound /lˤ/ only when it is in contact with the labiodental sound, while the labial sound does not affect the /lˤ/ sound, despite the spreading of its phonological features in the right or left to affect the /l/ sound, which leads to its spreading /lˤ/, but in this case, this spreading is selective.
Abstract

This study investigates the phonetic variations of lateral /l/ in Najdi Arabic. Two lateral varieties are considered: pharyngealized [lˤ] and velarized [l]. Data of /l/ following and/or preceding uvulars [χ,ʁ,q], and pharyngealized consonants [tˤ, sˤ, ðˤ] are observed. Results are then compared to what has been discussed in Ferguson (1956) regarding the predictable environments for emphatic [ʕ] in Arabic: before or after emphatic consonants, and after uvulars. Results show that: 1) uvulars, velar [g], and pharyngealized consonants spread their features to affect lateral /l/ in Najdi. 2) Uvulars and velars are in free variation, and 3) only fricative uvulars spread uvularization to /l/ resulting in [l]. Uvular stop /q/, on the other hand, does not spread uvularization to laterals, instead its velar counterpart /g/ does. Pharyngealized consonants are found to spread pharyngealization both rightward and leftward to /l/ resulting in [lˤ]. Interestingly, this spread is optional.

Keywords: Najdi Arabic, pharyngealization, phonetic variation, phonology, uvularization
The effect of spreading of two important phonological processes; namely pharyngealization and uvularization, on the alveolar lateral approximant /l/ in Najdi Arabic is the main focus of this paper. No study, at least to my knowledge, has been conducted on the effect of pharyngealization and uvularization spread on adjacent consonants, particularly laterals in Najdi. This study aims to fill a gap within the study of Arabic Phonology by presenting an analysis of possible environments that can cause such spread in Najdi. The purpose is to document some new and specific features of Najdi Arabic by observing words that include pharyngealized and uvular consonants in their roots.

There has been a heated debate about the distinction between the two phonological processes: pharyngealization and uvularization. As a result, it is important to present a side of the argument and show the agreed upon distinction between the two phonological processes before addressing the main issue of this study.

Some linguists group these processes along with others, such as velarization and glottalization, under the term Emphasis. There are many different definitions for emphasis in the literature. A detailed one is found in Lehn (1963):

Emphasis is the co-occurrence of the first and one or more others of the following articulatory features: (1) slight retraction, lateral spreading, and concavity of the tongue and raising of its back (more or less similar to what has been called velarization), (2) faucal and pharyngeal constriction (pharyngealization), (3) slight lip protrusion or rounding (labialization), and (4) increased tension of the entire oral and pharyngeal musculature resulting in the emphatics being noticeably more fortis than the plain segment. (pp. 30–31)

Moreover, Hoberman (1995) explains that emphasis is found in most Semitic languages including Arabic. He defines emphasis as a phonological feature that is realized sometimes as pharyngealization, glottalization, uvularization, or velarization.

McCarthy (1994), on the other hand, argues that there is a difference between emphatics and pharyngealized consonants. He shows that both emphatics and pharyngealized consonants require a constriction in the upper pharynx, but unlike emphatics, pharyngealized consonants are affected by some back segments (uvulars, such as [q], [χ], and [ʕ]), and thus should be called uvularized.

Similarly, Zawaydeh (1997), in her study of uvularization spread in Ammani-Jordanian Arabic, uses the term uvularized consonants to refer to pharyngealized consonants like [sˤ,tˤ,ðˤ] and uvulars to refer to uvular consonants such as [ɾ,χ, q]

One thing that is definite, however, is that both processes; pharyngealization and uvularization, involve a constriction in the pharynx. It is the part where constriction occurs that highlites the difference between the two processes.

Some linguists differenciate between the two categories (namely pharyngealized consonants and uvulars) by observing their effect on adjacent vowels and segments. Specifically, they look at the values of the first and second formants; F1 and F2, of the following vowels and sonorants. They found that pharyngealized consonants cause a drop in the value of F2 in vowels and sonorants in general, and a raise in the value of F1 in the segments that are affected by the spread. Uvulars, on the other hand, were also found to cause a drop in the F2 values of the affected segments, but the drop was weaker compared to the pharyngealization spread effect (Ghazeli, 1977; Herzallah, 1990; Younes, 1983).

Other linguists, show the difference between the two phonological processes by observing the co-occurrence of primary and secondary articulators involved in their
production. Davis (1993,1995) introduces the feature Retracted Tongue Root [RTR] that is only found in pharyngealized and uvular consonants. He claims that in pharyngealized consonants, this feature is realized as a secondary feature while in uvulars it is the primary feature.

Al-Ani (2014), Ghazeli (1977), and Herzallah (1990), also address the issue of primary and secondary articulations where they claim that pharyngealized consonants undergo a retraction of the tongue back as a secondary feature accompanying primary articulation somewhere in the vocal tract. Contrary to pharyngealized consonants, uvulars experience a retraction of the tongue root. They also agree that both categories have something in common which is the articulator ‘uvula’. This articulator is the secondary articulator for pharyngealized consonants, and the primary one for uvulars.

Due to the involvement of two articulators in the production of pharyngealization and uvularization: the dorsum and the pharynx, various features are proposed to account for the difference. Herzallah (1990) suggests the features [DORSAL] and [PHARYNGEAL] to refer to pharyngealization. Other features include [+LOW, +BACK] (Chomsky & Halle, 1968), [+CONSTRICTED PHARYNX] (McCarthy,1986), and [RTR] (Retracted Tongue Root) (Davis, 1993,1995).

For the purpose of this study, the feature pharyngealization spread is used to describe the allophonic pharyngealized [lˤ] after pharyngealized consonants [tˤ], [sˤ], and [ðˤ], and the feature uvularization spread is used to describe the allophonic velarized [l̴] following or preceding uvular consonants such as [χ], [ʁ], and [q].

**Literature Review**

Pharyngealized and velarized lateral, [lˤ] and [l̴], respectively, have been described as allophonic varieties of the phoneme /l/ in the phonology of Classical Arabic and most dialects (Ferguson, 1956). Although, some arguments arose regarding the possibility of treating the pharyngealized lateral as a separate phoneme, the fact that there are expected environments where the pharyngealized sound occurs along with the absence of real minimal pairs, all indicate that [lˤ] is just an allophone of the phoneme /l/ in Najdi. Ferguson (1956) sheds light on three possible environments where the pharyngealized [lˤ] appears: The first environment is when Arabic pharyngealized consonants [sˤ], [dˤ], [tˤ], and [ðˤ] exist in a word. The second environment is associated with the different forms of the word ‘God’ [ʔalˤalˤah]. The last environment in Ferguson’s study is what he describes as an unexpected environment such as with the uvulars [χ], [ʁ], [q], or in borrowed words. The same environments have been reported in other studies such as in Elshafei (1991) where he observes Modern Standard Arabic and Classical Arabic, as well as in Shar and Ingram (2010) in their study of Asiri, a Saudi dialect.

Interestingly, McCarthy (1994) explains that some segments have a similar emphasis effect, and he describes them as guttural phonemes. These include: pharyngealized consonants [sˤ], [dˤ], [tˤ], [ðˤ], the uvulars [χ], [ʁ], [q], and the velar [g]. This might explain the unexpected environment described by Ferguson (1956) in which pharyngealized [lˤ] occurs after uvulars.

In a description of such phenomenon, Norlin (1985) explains that when pharyngealization occurs, it can spread to adjacent sounds or syllables. He refers to such process as the feature-spread effect and concludes that this effect is mostly noticed on following and preceding vowels that are adjacent to the pharyngealized consonant. Moreover, Davis (1993) discusses pharyngealization spread and notes that when a word includes a
pharyngealized phoneme, neighbouring sounds get affected and become pharyngealized too. He further elaborates that dialects differ regarding the extent to which these neighbouring sounds are affected. In his study, he examines Cairene Arabic, a dialect spoken in Egypt, and concludes that when a pharyngealized segment occurs, the entire phonological word is produced as completely pharyngealized.

Moreover, Almasri and Jongman (2004) study the effect of pharyngealization on Arabic vowels and they conclude that such effect cannot be spread to all vowels; instead, it is mostly associated with the central vowel [a] not the other two vowels, [i] and [u], of Arabic. This is compatible with what has been found in Najdi when the three vowels [a], [i], and [u] occurring after pharyngealized consonants were examined and acoustically measured. Results are presented in Figure 1, Figure 2, and Figure 3 in the following section.

The pharyngealization effect reported in Ferguson (1956) and McCarthy (1994) not only involves the effect of pharyngealization on the central vowel [a], but also on /l/ resulting in [ɬ]. Ferguson (1956) also suggests that the effect of pharyngealization that results in changing the low central vowel [a] to the low back vowel [ɑ] could account for the distinction of [l] and [ɬ] since [a] always precedes the pharyngealized [ɬ]. McCarthy (1994) also includes, in his study, that there is a back variant of [a] when immediately following or preceding the pharyngealized consonants [sʰ], [dʰ], [tʰ], and [ðʰ], the uvulars [χ], [ʁ] and [q], and the velar [ɡ]. Interestingly, these same environments are what have been found to change the lateral /l/ to be emphatic in Najdi.

The Effect of Pharyngealization Spread on Following Vowels [a], [i], and [u]

In an attempt to test the validity of Almasri and Jongman (2004) findings regarding their conclusion that emphasis in Arabic is mostly associated with the central vowel [a], not the other two vowels [i] and [u], I recorded myself producing all three vowels of Najdi [a], [i], and [u] following pharyngealized consonants. A discussion of each vowel is presented below:

**Figure 1**
The Effect of Plain and Pharyngealized Consonants [s] vs. [sʰ] on the Low Central Vowel [a] on Monosyllabic CʼVC Words: [sal] ‘tuberculosis’ vs. [sʰal] ‘pray’
The effect of voiceless pharyngealized alveolar fricative [sˤ] on this particular vowel is very much noticeable on the lowering of its F2 values as shown in the second part of Figure 1. Results show a clear lowering of F2 values when the pharyngealized consonant [sˤ] precedes the vowel [a] in CʼaC. The exact values of all vowels involved are listed in Table 1 below.

### Table 1
*(F1) and (F2) Values of Monosyllabic Words of Najdi Arabic*

<table>
<thead>
<tr>
<th>Monosyllabic words</th>
<th>F1(Hz)</th>
<th>F2(Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[sal]</td>
<td>607</td>
<td>2041</td>
</tr>
<tr>
<td>[sˤal]</td>
<td>715</td>
<td>1448</td>
</tr>
<tr>
<td>[tːiːn]</td>
<td>436</td>
<td>2651</td>
</tr>
<tr>
<td>[tuː:b]</td>
<td>496</td>
<td>1130</td>
</tr>
<tr>
<td>[tˤuː:b]</td>
<td>504</td>
<td>1070</td>
</tr>
</tbody>
</table>

Results support what other linguists conclude in their studies about the effect that emphatic consonants have on adjacent vowels, syllables or sometime the entire word (Almasri & Jongman, 2004; Alosh, 1987; Davis, 1993; Watson, 1999).

Figure 2 and Figure 3 below present minimal pairs of the forms CaC and CuC that are recorded and acoustically measured to examine the effect of emphatic consonants on the adjacent high front and high back vowels, [i] and [u] respectively. Results show that emphasis has no effect on these two vowels as both values of F2 reported are minimally affected.

**Figure 2**
*The Effect of Plain and Pharyngealized Consonants [t] vs. [tˤ] on the High Front Vowel [i] in Monosyllabic CʼiC Words: [tiːn] ‘figs’ vs. [tˤiːn] ‘mud’*
The Effect of Plain and Pharyngealized Consonants \([t]\) vs. \([tˤ]\) on the High Back Vowel \([u]\) in Monosyllabic \(C\,u\,C\) Words: \([tu:b]\) ‘repent’ vs. \([tˤu:b]\) ‘brick’

Although pharyngealization does not spread to affect the adjacent vowels \([i]\) and \([u]\) completely, it is worth noting that the onset of these vowels is minimally affected by this possible spread. In the second part of Figure 2, a drop of F2 values is noticed at the beginning of the vowel onset. Due to the absence of such drop in the first half of the spectrogram where the plain \([t]\) is involved, it is highly suggested that such drop exists as a result of a pharyngealization effect when the pharyngealized \([tˤ]\) precedes the vowel \([i]\). Note though that such effect does not last long as the F2 resumes its steady status afterwards reflecting no strong effect on this vowel compared to \([a]\).

Similarly, the second part in Figure 3 also shows a pharyngealization effect at the beginning of the vowel onset where a drop of F2 values occurs. However, this drop is relatively weaker compared to the first part of the spectrogram where the plain \([t]\) precedes the high back vowel \([u]\).

Acoustic analysis of these three spectrograms shows that pharyngealization is highly associated with the production of the low back vowel \([a]\), which is similar to what other linguists found. Furthermore, such pharyngealization spread is also noticed on other vowels, but unlike the vowel \([a]\), the effect of pharyngealization on adjacent \([i]\) and \([u]\) is only noticed at the beginning of the vowel onset as a minor lowering of its F2 values, then the F2 resumes its steady status.

**Language Inventory**

Najdi dialect is one of many other dialects that are spoken in Riyadh, Saudi Arabia, and there are different varieties of Najdi depending on the region where it is spoken. These varieties are Northern Najdi, Central Najdi, and Southern Najdi. Central Najdi spoken by Najdi people residing in Riyadh is the focus of this paper. Najdi consists of twenty-seven consonants whose place and manner of articulation are indicated in the table below:
**Table 2**

*Najdi Consonant Inventory chart [based on Najdi Dialect]*

<table>
<thead>
<tr>
<th></th>
<th>Bilabial</th>
<th>Labiodental</th>
<th>Dental</th>
<th>Alveolar</th>
<th>Post-alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Uvular</th>
<th>Pharyngeal</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosives</td>
<td>b</td>
<td>t</td>
<td>d</td>
<td>k</td>
<td>g</td>
<td>q</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharyngealized</td>
<td></td>
<td>tˤ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td></td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td>f</td>
<td>θ</td>
<td>δ</td>
<td>s</td>
<td>z</td>
<td>j</td>
<td>χ</td>
<td>k</td>
<td>h</td>
<td>ξ h</td>
</tr>
<tr>
<td>Pharyngealized</td>
<td></td>
<td>δˤ</td>
<td></td>
<td>sˤ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tap</td>
<td></td>
<td></td>
<td>j</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td></td>
<td></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximant</td>
<td>w</td>
<td></td>
<td>j</td>
<td>w</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Three emphatic consonants [tˤ] [sˤ], and [δˤ] along with their plain counterparts [t], [s], and [δ] are found in the inventory of Najdi.

Traditionally, Arabic has been known as *Lughat Al-dˤaad* (the language of dˤaad), which stands for the letter dˤaad, the voiced pharyngealized dento-alveolar stop [dˤ]. The significance of this term is because Arabs believe that pharyngealization is a unique characteristic that marks their language and is rarely found across other languages (Alosh, 1987). However, this unique voiced pharyngealized dento-alveolar stop [dˤ] is absent in the Najdi inventory. As a result, words that contain this sound in Standard Arabic are produced with the voiced dental pharyngealized fricative [ðˤ] instead. For example, the word ‘lost’ is [dˤaʕ] in Standard Arabic but [ðˤaʕ] in Najdi (Ingham, 1994).

**The Study**

Two allophonic variations of lateral /l/ are examined in Najdi; velarized and pharyngealized /l/ and /lˤ/, respectively. Environments that might trigger their existence are examined in this paper. Uvular consonants are expected to cause uvularization spread that affects the lateral /l/ and add the feature [+VELAR] to it. Similarly, pharyngealized consonants are expected to spread pharyngealization to adjacent segments including /l/ and add the feature [+PHARYNGEAL] to it. This can be better shown using Autosegmental Theory. In the following example, the lateral /l/ acquires the feature [+PHARYNGEAL] through feature spreading of the preceding pharyngealized consonant [sˤ].
Similarly, in (2), the feature [+VELAR] spreads from the uvular [ʁ] to affect the lateral /l/ causing it to be velarized: [l̴]

(2) C V C V
\[ /sˤ a l a/ \]
\[ /sˤ a l̴ a/ \]
\[ ‘Appreciation’ \]

Data and Discussion

Data are divided into two major groups: uvulars and pharyngealized consonants. Minimal pairs and pronunciation variants are provided to better show the effect of these consonants on the lateral /l/ in comparison to other consonants of the dialect. The organization of the data starts with uvulars first, followed by pharyngealized consonants of Najdi.

Uvulars

There are three uvular consonants in Najdi: /ʁ/, /χ/, and /q/.

(3) The voiced uvular fricative /ʁ/:  
(a) Pronunciation variants:
   ʁala ‘appreciation’
   yala ‘appreciation’

(b) Examples:
   ya:li ‘expensive’
   yallajah ‘water boiler’
   aylab ‘most’
   maljyi ‘cancelled’
   ʁala ‘increased the prices’
   yalla ‘increased the prices’
   ʁalatˤ ‘wrong’
   yalatˤ ‘wrong’
(c) But:

*ɣa:l̴i
*ɣal̴ajah
*ɣlab
*ɣlaðˤ
*ɣalɑtˤ

(d) No spread:

bu:l \quad \text{‘monster’}

Data in 3(a) show that the voiced uvular fricative /ʁ/ and the voiced velar fricative /ɣ/ are in free variation in Najdi provided that both phonemes occur in the same environment: word initially and before a low central vowel /a/. Najdi is not the only dialect where the two categories: velars and uvulars, interfere. Herzallah (1990) reports that in certain dialects of Arabic, namely Cairene Arabic and Northern Palestinian Arabic, the two uvulars /χ/ and /ʁ/ are recognized as velars [x] and [ɣ] rather than uvulars.

Examples in 3(b) show that plain lateral /l/ is only allowed to occur before or after the velar fricative /ɣ/, but never before or after the uvular /ʁ/. A violation to these two environments leads to unpronounceable forms as in 3(c).

Data also show a feature-spread effect introduced by Norlin (1985) where the coronal uvular fricative /ʁ/ spreads the feature of uvularization to the adjacent vowel and lateral adding the feature [+VELAR] to the lateral /l/ changing it from being a plain /l/ to a velarized [ɬ]. This is what Ferguson (1956) describes as the unexpected environment where uvulars trigger the environment of a velarized [ɬ].

Note that the last two examples of 3(b): [ɣalaðˤ] and [ɣalɑtˤ], show that the uvular fricative /ʁ/ is what causes /l/ to be velarized by spreading uvularization rightward, not the pharyngealized alveolar stop /tˤ/ considering that plain [l] occurs before [tˤ] in [ɣalɑtˤ].

Finally, data in 3(d) prove that the uvularization spread is blocked by the two vowels [i] and [u] as plain /l/ occurs following /ʁ/.

(4) The voiceless uvular fricative /χ/:

(a) Pronunciation variants:

χali \quad \text{‘uncle’}
χal \quad \text{‘uncle’}

(b) Examples:

xal \quad \text{‘vinegar’}
xa:li \quad \text{‘empty’}
χal̴l̴a:sˤ \quad \text{‘finished’}
χalla:sˤ \quad \text{‘finished’}
χalaf \quad \text{‘came after’}
χal̴a:sˤ \quad \text{‘finished’}
Similar to the uvular /ʁ/, data in 4(a) show that the voiceless uvular fricative /χ/ and the voiceless velar fricative [x] are in free variation in Najdi as their environments are overlapping; both occur word initially and before a central vowel [a]. Note that for the word ‘uncle’ in 4(a), [χali] and [xali], both the velar [x] and uvular [χ] are used to indicate the same meaning, however, the use of one over the other requires spreading of the uvularization feature to affect the lateral /l/ resulting in [l̴].

Examples in 4(b) show that plain lateral /l/ is only allowed to occur before or after the velar fricative /x/, but never before or after the uvular /χ/. A violation of these two environments leads to unpronounceable forms as in 4(c). Examples in 4(d) again show no uvularization spread to /l/ when the two vowels [i] and [u] are involved.

Generally, the velarized variety of the lateral [l] is associated with the uvular consonants /ʁ/ and /χ/ while the plain variety is associated with the velars /ɣ/ and /x/. Besides the difference in the place of articulation of these two consonants, uvulars have the feature [+RTR] as the primary articulator while velars do not (Davis, 1993, 1995). This could explain why only uvulars trigger such emphasis spread.

(5) The voiceless uvular fricative /q/:

(a) Pronunciation variants:

qa:lib ‘module’
ga:lib ‘module’

(b) Examples:

qalʕah ‘castle’
glu:b ‘hearts’
galam ‘pen’
ga:š ‘he said’
qalil ‘few’
(c) But:
*qaːb
*qulːb
(d) No spread:
  giːl  ‘it has been said’
  guːl  ‘say- imperative’

Similar to the other uvulars, examples in 5(a) show that uvular /q/ and velar [g] are in free variation due to environment overlapping. Interestingly, unlike the uvular fricatives /ʁ/ and /χ/, the uvular stop /q/ does not spread uvularization to laterals at all as shown in 5(b). Instead, it is the velar [g] that triggers such spread. The only feature that could account for the difference here is the manner of articulation of the uvular /q/ where it is a stop while /χ/ and /ʁ/ are both fricatives. Voicing is eliminated since both /q/ and /χ/ are voiceless, but only /χ/ spreads uvularization to the lateral /l/.

Furthermore, Ghazeli (1977) tackles an interesting issue regarding the production of the uvular stop /q/. He explains that the uvular /q/ is articulated by pressing the superior-posterior back of the tongue against the uvula, and he argues that some Arabic dialects differ in the way this uvular stop is produced. Some dialects, especially the Bedouin dialects, produce the uvular /q/ as a voiced velar /g/ while other change it to either a voiceless glottal stop, or to a voiced uvular trill [R]. Najdi is one of the dialects that produce the voiceless uvular /q/ as a voiced velar [g] in almost all words where the uvular /q/ appears in Standard Arabic. Thus, all words in 5(b) have two ways of reading them without causing a change in the meaning: with a uvular /q/ (Standard Arabic), or with a velar /g/ (Najdi). It is worth mentioning though that there are very few Najdi words that are always produced with the uvular /q/, at all times and all of these words are borrowed from the Standard variety of Arabic.

Moreover, it has been reported, in different Arabic studies, that uvulars differ in the way they affect adjacent segments. In his study, Sayyed (1981; as cited in Zawaydeh, 1997, p. 195) observes the effect of /q/ on adjacent segments in Moroccan Arabic and concludes that unlike other uvulars and pharyngealized consonants, the effect of /q/ is only noticed on the adjacent vowel, and that it does not spread uvularization to the whole word. This is similar to what has been found in Najdi.

**Pharyngealized Consonants**

Only three pharyngealized consonants exist in Najdi: [sˤ],[ðˤ] and [tˤ].

(6) The voiceless pharyngealized alveolar fricative /sˤ/

(a) Minimal Pairs:
  sˤαlːɑ ‘prayed’
  salla ‘made someone happy’
  sˤαlːb ‘solid’
  salb ‘stealing’

(b) Examples:
  sˤαlːiːb ‘cross’
The existence of a minimal pair as in 6(a) clearly shows that the pharyngealized alveolar fricative [sˤ] is a distinct phoneme in Najdi. The effect of pharyngealization spreads from the pharyngealized consonant to affect other adjacent consonants by adding the feature [+PHARYNGEAL] to them. Examples in 6(b) show that pharyngealized [sˤ] spreads its pharyngealization effect both rightward and leftward resulting in [lˤ], which is described as [+PHARYNGEAL, LATERAL, APPROXIMANT, SONORANT].

Furthermore, some Najdi speakers would produce plain laterals after the pharyngealized fricative [sˤ]. Although this is acceptable in Najdi, it is not preferred and this is why some examples in 6(c) are marked with an exclamation mark. The last two examples in 6(c) show that the two vowels [i] and [u] block the pharyngealization spread, thus we have plain /l/ instead of [lˤ].

None of the previous studies, at least to my knowledge, tackle the issue of optional pharyngealization spread after pharyngealized consonants. Other pharyngealized consonants need to be observed to see if this optionality in spreading is generalized over all pharyngealized segments in Najdi or unique to the voiceless pharyngealized alveolar fricative [sˤ]. This might also justify why a plain /l/ is allowed to precede the pharyngealized [sˤ] in the word [xallasˤ] ‘finished’ in the data of the voiceless uvular fricative /χ/.

(7) The voiced pharyngealized dental fricative /ðˤ/

(a) Minimal Pairs:

\[
\begin{align*}
\text{ðˤal} & \quad \text{‘got lost’} \\
\text{ðˤal} & \quad \text{‘humiliated’} \\
\text{ðˤal} & \quad \text{‘got lost’}
\end{align*}
\]
\(\delta\alpha\phi\)  ‘became popular’
\(\delta\alpha\mu\)  ‘hugged’
\(\delta\alpha\mu\)  ‘vilified’

(b) Examples:
\(\delta\alpha:\phi\mu\cdot\nu\)  ‘unfair’
\(\delta\alpha\nu\)  ‘lost’
\(\delta\alpha\mu\)  ‘ribs’
\(\delta\alpha\alpha:\mu\cdot\nu\)  ‘darkness’

(c) No spread
\(\nu\delta\alpha:\phi\mu\cdot\nu\)  ‘unfair’
\(\nu\delta\alpha\nu\)  ‘lost’
\(\nu\delta\alpha\mu\)  ‘ribs’
\(\nu\delta\alpha\alpha:\mu\cdot\nu\)  ‘darkness’
\(\nu\delta\nu\cdot\mu\cdot\nu\)  ‘envious’
\(\delta\nu\cdot\nu\cdot\mu\cdot\nu\)  ‘a rib’

The minimal pairs in 7(a) show that the voiced pharyngealized dental fricative \([\delta\nu]\) is a distinct phoneme in Najdi. The effect of pharyngealization spreads from the pharyngealized consonant to affect other adjacent consonants including /l/ by adding the feature \([+PHARYNGEAL]\) to it. Examples in 7(b) clearly show that pharyngealized /\(\delta\nu/\) spreads pharyngealization effect to /\(l/\) resulting in \([l\nu]\).

Similar to \([s\nu]\), production of plain /\(l/\) after pharyngealized /\(\delta\nu/\) is allowed, but not preferred as shown in 7(c). The last two examples in 7(c) prove that pharyngealization spread is blocked by the two high vowels [i] and [u].

(8) The voiceless pharyngealized alveolar stop \([\nu\nu]\)

(a) Minimal Pairs:
\(\nu\alpha\nu\cdot\nu\)  ‘he took a glance’
\(\nu\nu\)  ‘hill’
\(\nu\nu\cdot\nu\)  ‘take a glance’
\(\nu\nu\)  ‘pull up someone very quick’

(b) Examples:
\(\nu\alpha\nu\cdot\nu\cdot\nu\)  ‘request’
\(\nu\nu\nu\cdot\nu\)  ‘glance’
\(\nu\nu\cdot\nu\cdot\nu\)  ‘nice’
\(\nu\nu\cdot\nu\cdot\nu\)  ‘student’
\(\nu\nu\cdot\nu\cdot\nu\)  ‘divorce term’
\(\nu\nu\cdot\nu\cdot\nu\)  ‘aimed’
\(\nu\nu\cdot\nu\cdot\nu\)  ‘went outside’
Similar to the other two pharyngealized consonants, pharyngealization is spreading both rightward and leftward to /l/ resulting in [lˤ]. Examples in 8(c) show that just like the other pharyngealized consonants, plain /l/ after pharyngealized [tˤ] is allowed, but not preferred. The last two examples in 8(c) show that no spreading takes place when the high front vowel [i] and the high back vowel [u] follow the pharyngealized consonant and precede the lateral /l/; i.e., these two vowels block such spread.

**General Discussion**

Ferguson (1956) discusses three possible environments where the emphatic /l/ appears in Arabic: The first environment is when Arabic emphatic consonants [sˤ], [dˤ], [tˤ], and [ðˤ] exist in a word. The second environment is what he describes as an unexpected environment such as with the uvulars [χ, ʁ, q], or in borrowed words. The last environment is associated with the different forms of the word God [ʔalˤlˤah]. Only the first two environments are compared to the results of this study. Due to the absence of the voiced dento-alveolar stop [dˤ] in Najdi, this consonant is eliminated.

Findings of this study show that similar to what Ferguson (1956) suggested, pharyngealized consonants and uvulars affect the lateral /l/ in Najdi. Results show that only uvular fricatives [χ] and [ʁ] are found to spread uvularization to /l/ resulting in [l̴], but never the uvular stop /q/. Instead, the velar [g] does the spreading. A remarkable finding in this study is that uvulars and velars are in free variation in Najdi as their environments overlap with one another. Furthermore, the voiceless uvular stop /q/ is replaced by [g] in almost all instances where /q/ should appear in the language, with few exceptions.

Pharyngealized consonants [ðˤ], [sˤ], and [tˤ] are found to spread pharyngealization to laterals resulting in [lˤ] with a feature of [+PHARYNGEAL]. This is compatible with what Ferguson indicated in his study. However, the spreading is noticed to be optional in Najdi.

**Conclusion**

In summary, this study investigated the possible phonetic variations of the lateral /l/ in Najdi. Two varieties of /l/ were observed: the pharyngealized [lˤ] and velarized [l̴]. Results show that uvulars and velars are in free variation in Najdi and that only fricative uvulars spread emphasis to laterals resulting in [l̴]. The remaining uvular stop /q/ does not. Instead, its velar variant [g] causes such spread. Results also show that all Najdi pharyngealized consonants spread pharyngealization both rightward and leftward to lateral /l/ resulting in [lˤ]. Interestingly, this spread is optional in the dialect.
Bio

Reham Alhammad is an Assistant Professor of Linguistics at Almajmaah University. She received her PhD in Linguistics from the University of Wisconsin-Milwaukee, USA. Her research interests include Linguistics, Phonology, and Phonetics. Besides Linguistics, she is equally interested in Translation Studies.

References


McCarthy, J. J. (1986). OCP effects: Gemination and antigemination. *Linguistics Inquiry*, 17(2), 207–263. [https://scholarworks.umass.edu/linguist_faculty_pubs/51](https://scholarworks.umass.edu/linguist_faculty_pubs/51)


