

# Flaps and Trills in Najdi and Hijazi Arabic

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## Abstract

This study is an investigation of flaps and trills in Najdi and Hijazi Arabic, which are the most spoken Arabic varieties in Saudi Arabia. It focuses on how flaps and trills behave in relation to vowels and consonants in the two varieties of Arabic. The data in this study were collected from four Hijazi and five Najdi participants. A total number of 730 sentences were read by the participants. It was found that /r/, which is the underlying phoneme, surfaces as [r] when it occurs word-initially or after a [-coronal] consonant, a [+voiced] consonant, or a [-coronal, +voiced] consonant, otherwise /r/ surfaces as [r̥]. In Najdi Arabic, /r/, which is the underlying phoneme, surfaces as [r] after a [-coronal, +voiced] consonant; otherwise /r/ surfaces as [r̥] elsewhere. Also, it was found that Najdi Arabic violates the sonority hierarchy, as in [rtaʕ] and [batr], in which the segments in the onset of [rtaʕ] and the coda of [batr] do not maintain the universal sonority hierarchy: glides>liquids>nasals>obstruents, which is maintained in Hijazi Arabic. This paper argues that rhotics in both varieties of Arabic may be sensitive to the preceding adjacent consonants, but not to vowels.

**Keywords:** Flaps and trills, Najdi Arabic, Hijazi Arabic, Rhotics

## 1. Introduction

Arabic is a member of the Semitic family and is considered to be a Central Semitic language (Gordon 2005). In fact, it is the largest member of the Semitic family in terms of speakers with total more than 206 million people around the world (Watson 2002; Gordon 2005; Afkir *et al.* 2022). The homeland of Arabic speakers was the central and northern part of the Arabian Peninsula, but due to the rise of Islam in the sixth century CE and its spread in the following centuries, Arabic became the official language of the Islamicized countries in the Middle East. According to classical Arab grammarians, current Arabic has developed from the old dialects of central and northern areas of the Arabian Peninsula, which are grouped into three: Hijazi, Najdi and 'the language of the tribes in adjoining areas' (Watson 2002: 7).

Nowadays, Hijazi Arabic is spoken by around seven million inhabitants in the north western and western regions of the Kingdom of Saudi Arabia, including Mecca; whereas, Najdi Arabic is spoken by around eight million people in the central and northern regions of the Kingdom and includes the capital city, Riyadh (see Ingham 2005: 5; Lewis 2013; Alrasheedi 2019: 2, among others). In fact, there has been a great deal of contact between the speakers of both dialects in the last eighty years, due to: a) immigration between Najdi and Hijazi cities, and b) encounters in schools, universities and markets (Alessa 2006; Anishchenkova 2020).

Najdi and Hijazi Arabic are quite similar to each other in terms of lexis and syntax (Alghmudi 1998); however, they are slightly different with regard to phonology and the number of consonants, vowels and affrication (cf. Ingham 1971; Alrasheedi 2015; Alhazmi & Alfaifi 2022). (Note 1) In fact, each dialect has a number of sounds which are absent from the other one. Najdi Arabic has /θ/, /ð/, /z/, /ts/ and /dʒ/, whereas Hijazi Arabic has /d/ and /z/. Also, both have a simple vowel system that is one of three vowels /a, i, u/ and three long counterparts /a:, i:, u:/, with the addition of two diphthongs /eɪ, əʊ/ (see Alhazmi & Alfaifi 2022). (Note 2)

This paper reviews how Hijazi and Najdi rhotics are realized in different environments. Since both dialects have a large number of consonants and a small number of vowels, and because both dialects' rhotics do not seem to be sensitive to vowels, this paper concentrates on the relationship between consonants and rhotics.

### *1.1 Rhotics*

Here are some typical rhotic sounds found in some languages:

1. The alveolar tap or flap [ɾ] is described as 'a single contraction of the muscles so that one articulator is thrown against another. It is often just a very rapid articulation of a stop' (found in Scottish, Spanish and Arabic) (Gordon and Ladefoged 2001: 150).
2. The alveolar trill [r] is made when 'the tongue blade vibrates repeatedly against the alveolar ridge' (found in Spanish and Portuguese) (Davenport and Hannahs 2013: 32; Willis and Bradley 2008).
3. The alveolar continuant [ɹ] is produced when the tongue blade is raised to the alveolar ridge and the sides of the tongue are in contact with the molars, making a narrow channel in the middle of the tongue (found in American English) (Davenport and Hannahs 2013).
4. The retroflex [ɻ] is similar to the [ɹ] but it differs in that 'the tongue blade [is] curled back to a post-alveolar position' (Davenport and Hannahs 2013: 33) (found in some varieties of English, including RP).
5. The uvular roll [R] is produced when the back of the tongue is placed against or near the uvula (Davenport and Hannahs 2013; Willis and Bradley 2008) (found in some languages including German, French and Hebrew).

The trill [r] in Hijazi and Najdi is quite similar to that in Spanish and the flap [ɾ] is similar to that in Scottish, except that it is voiceless.

## **2. Methodology**

The data was collected in Saudi Arabia from four Hijazi speakers (from Mecca), three

females (aged 22, 26 and 38) one male (aged 36), and five Najdi speakers (from Hail and Riyadh), including two males (aged 25 and 32) and three females (aged 20, 23, and 29). Participants were asked to read a number of sentences (80 sentences for Hijazi participants and 82 for Najdi participants). Every sentence has 1 to 3 words that contain rhotics and all individuals speaking were recorded. A clear approval was obtained from all participants, and they were informed that their names would remain confidential.

### 3. The Results

Before analysing the data, (Note 3) it may be necessary to provide a brief overview on the syllable structure in both dialects. In fact, most Arabic dialects do not have a wide range of syllable structures (Watson 2002), as both dialects share the basic CV, CVC, and CVCC syllable structures. (Note 4) Najdi Arabic, in addition to Iraqi Arabic, is unique among the majority of Arabic dialects as it allows a biconsonantal cluster in the onset CCVC (Abboud 1979; Watson 2007). In Classical Arabic, the biconsonantal cluster is not allowed; however, it seems that Najdi (in the onset and coda) and Hijazi (in the coda) apply syncope. In fact, it is different from the syncope found in Iraqi Arabic which is applied only in some types of verbs (Rose 2000), as it is found regardless of the part of speech of the word. (Note 5) In the following, the data will be analysed on the basis of how the trill and flap rhotics behave in word-initial, word-medial and word-final positions in relation to all the consonants in both varieties of Arabic.

#### 3.1 Hijazi Arabic

Table 1 below offers a description of rhotic that surfaces after all the consonants of Hijazi, regardless of the presence or absence of a vowel before the rhotic. The consonants, after which only the trill occurs, will be presented first and followed by the consonants, after which the flap and trill are found (see Table 2).

Table 1. Hijazi trill

Phoneme	Definition	Word-initially	Word-medially	Word-finally
1. /b/	It is a voiced bilabial stop phoneme.	[rab] ‘lord’	[ʃabrak] ‘be patient’	[ʃabur] ‘patience’
2. /d/	It is a voiced alveolar stop phoneme.	[rud] ‘answer’	[ʃadrak] ‘chest’	[badur] ‘moon’
3. /k/	It is a voiceless velar stop phoneme.	[rikbat] ‘got on’	[bukrah] ‘tomorrow’	[bikir] ‘firstborn’
4. /g/	It is a voiced velar stop phoneme.	[ragum] ‘number’	[ʃagrab] ‘scorpion’	[ʃagur] ‘falcon’
5. /ʔ/ (Note 6)	It is a voiceless glottal stop phoneme.	-----	[ʔarmi:h] ‘through’	-----

<b>6. /f/</b>	It is a voiceless labio-dental fricative phoneme.	[raf] ‘shelf’	[sufrah] ‘tablecloth’	[ʃifir] ‘zero’
<b>7. /z/</b>	It is a voiced alveolar fricative phoneme.	[ruz] ‘rice’	[hazeri:] ‘guess’	[bizir] ‘seeds’
<b>8. /x/</b>	It is a voiceless velar fricative phoneme.	[raxi:ʃ] ‘cheap’	[xarban] ‘rotten’	[faxur] ‘pride’
<b>9. /h/</b>	It is a voiceless glottal fricative phoneme.	[rehi:b] ‘amazing’	[hurəob] ‘escaped’	[mahur] ‘dowry’
<b>10. /ħ/</b>	It is a voiceless pharyngeal fricative phoneme.	[riħlati:] ‘journey’	[bahrem] ‘Bahrain’	[bahar] ‘sea’
<b>11. /ʒ/</b>	It is a voiced alveo-palatal fricative phoneme.	[riʒal] ‘man’	[ʒari:mah] ‘crime’	[faʒur] ‘dawn’
<b>12. /ɣ/</b>	It is a voiced velar fricative phoneme.	[ruɣum] ‘although’	[ɣari:b] ‘strange’	[ʃuɣur] ‘as small’
<b>13. /ʕ/</b>	It is a voiced pharyngeal fricative phoneme.	[ruʕub] ‘fear’	[ʕari:s] ‘groom’	[ʃiʕir] ‘poetry’
<b>14. /m/</b>	It is a voiced bilabial nasal phoneme.	[rami:t] ‘threw’	[mari:t] ‘passed’	[tamur] ‘dates’
<b>15. /n/</b>	It is a voiced alveolar nasal phoneme.	[rani:t] ‘rang’	[nirmi] ‘throw’	[banar] ‘flag’
<b>16. /w/</b>	It is a voiced labio-velar glide phoneme.	[rawah] ‘go’	[ʃawirna] ‘took a photo’	[sawr] ‘wall’
<b>17. /j/</b>	It is a voiced palatal glide phoneme.	[rijish] ‘ribs’	[musajirat] ‘controlled’	[sijr] ‘visit’
<b>18. /l/</b>	It is a voiced alveolar clear lateral phoneme	[rali] ‘race’	[li:rah] ‘Leirah’	[dli:r] ‘Dlear’
<b>19. /r/</b>	It is a voiced alveolar trill rhotic phoneme.	[ri:ri] ‘redness’	[mararah] ‘gallbladder’	[garar] ‘decided’

Table 2. Hijazi flaps and trills

Phoneme	Definition	Word-initially (trill)	Word-medially (flap)	Word-finally (flap)
1. /t̤/	It is a voiceless dental emphatic stop phoneme.	[ruṭab] ‘dates’	[bat̤ri:g] ‘penguin’	[saṭur] ‘line’
2. /d̤/	It is a voiceless alveolar emphatic stop phoneme.	[raḍaṣah] ‘bottle’	[juḍrubuh] ‘hits’	[juḍur] ‘harms’
3. /t/	It is a voiceless alveolar stop phoneme.	[rutbatuh] ‘rank’	[mitri:n] ‘two meters’	[seter] ‘cover’
4. /s/	It is a voiceless alveolar fricative phoneme.	[rasmak] ‘drawing’	[sarhan] ‘absent-minded’	[nasur] ‘eagle’
5. /ʃ/	It is a voiceless alveolar emphatic fricative phoneme.	[raʃi:di:] ‘account balance’	[ʃari:h] ‘frank’	[gaʃur] ‘palace’
6. /f/	It is a voiceless plato-alveolar fricative phoneme.	[riḥwah] ‘bribery’	[ʃaru:rah] ‘Sharoorah’	[giḥir] ‘skin’
7. [r] (Note 7)	-----	-----	[ʃararah] ‘sparkle’	[ḍarar] ‘damage’

### 3.2 Najdi Arabic

Table 3 below offers a description of Najdi Arabic flaps. The consonants after which the flap occurs will be presented first, regardless of the presence of the vowels after the consonants. Then the consonants after which both types of rhotic are found will follow (cf. Table 4).

Table 3. Najdi flaps

Phoneme	Definition (Note 8)	Word-initially	Word-medially	Word-finally
1. /t̤/	-----	[rṭibah] ‘date’	[ṭrafah] ‘edge’	[saṭr] ‘line’
2. /d̤/	-----	[rdim] ‘fill’	[dridzah] ‘step’	[gidr] ‘pot’
3. /t/	-----	[rtaʃ] ‘frightened’	[tra:b] ‘dust’	[batr] ‘amputation’
4. /k/	-----	[rkab] ‘got’	[krab] ‘tighten’	[ʃikr] ‘thanking’
5. /f/	-----	[rfaʃ] ‘left’	[frasi:] ‘head’	[ʃifr] ‘zero’
6. /θ/	It is a voiceless interdental fricative phoneme.	[rθam] ‘broke’	[θreih] ‘chandelier’	[kiθr] ‘much’
7. /ð/	It is a voiced interdental fricative phoneme.	[rðað] ‘drizzle’	[ðraʃ] ‘arm’	[baðr] ‘seed’
8. /s/	-----	[rsam] ‘drew’	[srag] ‘steal’	[dʒisr] ‘bridge’

9. /s/	-----	[rʃaʃ] ‘lead’	[ʃram] ‘cut’	[gaʃr] ‘palace’
10. /z/	-----	[rzaʃah] ‘shut’	[zraʃ] ‘button’	[fazr] ‘open’
11. /x/	-----	[rxamah] ‘eagle’	[xraʃ] ‘broke’	[naxr] ‘decayed’
12. /h/	-----	[rhajef] ‘fragile’	[hras] ‘mash’	[mahr] ‘dowry’
13. /ħ/	-----	[rhamah] ‘forgave’	[ħragah] ‘burned’	[siħr] ‘magic’
14. /ʃ/	-----	[rʃaʃ] ‘sprinkle’	[ʃrab] ‘drank’	[giʃr] ‘skin’
15. /z/	It is a voiced interdental emphatic fricative phoneme.	[rzaʃ] ‘nursed’	[zrabat] ‘hits’	[mizr] ‘Mothr’
16. /dʒ/	It is a voiced palato-alveolar affricate phoneme.	[rdʒaʃ] ‘came’	[dʒrah] ‘cut’	[fadʒr] ‘dawn’
17. /n/	-----	[rnaʃ] ‘hit’	[nrəoħ] ‘go’	[manr] ‘Manr’
18. /l/	-----	[rali] ‘race’	[li:rah] ‘Leirah’	[dli:r] ‘Dlear’
19. /r/	It is a voiceless alveolar flap rhotic phoneme.	[riri] ‘running’	[ħararah] ‘heat’	[ʃrar] ‘bag’

Table 4. Najdi flaps and trills

Phoneme	Definition	Word-initially (flap)	Word-medially (trill)	Word-finally (trill)
1. /b/	-----	[rbi:ʃna] ‘friends’	[brasik] ‘agree’	[gabr] ‘grave’
2. /g/	-----	[rgad] ‘slept’	[grəoŋ] ‘horns’	[fagr] ‘poverty’
3. /ʔ/	-----	-----	[ʔrim] ‘through’	-----
4. /y/	-----	[ryab] ‘satisfied’	[yraf] ‘rooms’	[ʃiyr] ‘small’
5. /ʃ/	-----	[rʃaf] ‘bled’	[ʃraf] ‘knew’	[siʃr] ‘price’
6. /m/	-----	[rmizan] ‘Ramadan’	[mrakaz] ‘concentrated’	[damr] ‘worn out’
7. /w/	-----	[rwa:g] ‘hall’	[wragah] ‘sheet’	[ʃawr] ‘take a photo’
8. /j/	-----	[rjal] ‘Riyal’	[jraʒiʃ] ‘revise’	[dijr] ‘homes’

### 3.3 Phonological Rules

The occurrence of the trill and the flap are conditioned by the environment in which they are found. To capture this, linear phonological rules in terms of the Distinctive Feature Theory (henceforth DFT) will be used. DFT grew out of the work by Nikolaj Trubetsky, Roman Jakobson and the Prague School; then it was developed by Chomsky and Halle (1968). This theory proposes that to characterise a phoneme effectively, there is a need for a bundle of features or a feature matrix.

An example of a phonological rule is:

A → B / X\_\_Y

It represents that A becomes ( → ) B when B ( \_\_ ) is preceded by X and followed by Y (Davenport and Hannahs 2013).

The phonological rules for the Hijazi trill and flap are as follows:

1. /r/ → [r] / # \_\_

Rule 1 represents that /r/ surfaces as [r] when it occurs word-initially.

2. /r/ → [r] /  $\left. \begin{array}{l} -\text{corona} \\ +\text{voiced} \end{array} \right\} (\text{v}) \_$

Rule 2 captures the process by which /r/ becomes [r] after, a [-coronal] consonant, or a [+voiced] consonant, or a [-coronal, +voiced] consonant, with or without a vowel following these types of consonants.

3. /r/ →  $\left( \begin{array}{l} [r] / \\ -\text{voiced} \end{array} \right) +\text{coronal} (\text{v}) \_$

Rule 3 shows that /r/ surfaces as [r] when it is preceded by either a [+coronal, -voiced] consonant or both a [+coronal, -voiced] consonant and a vowel.

The phonological rules for the Najdi trill and flap are as follows:

1. /r/ →  $\left( \begin{array}{l} [r] / \\ +\text{voiced} \end{array} \right) -\text{coronal} (\text{v}) \_$

Rule 1 represents that /r/ becomes [r] when it is preceded by either a [-coronal, +voiced] consonant or both a [-coronal, +voiced] consonant and a vowel.

2. /r/ → [r] / elsewhere

Rule 2 shows that /r/ becomes [r] elsewhere.

The researcher believes that the linear rules number 2 in Hijazi Arabic (part of it) and number 1 in Najdi Arabic, require further explanation. Therefore, the autosegmental analysis is adopted to gain more insight into these rules. Autosegmental phonology was developed by Goldsmith in his PhD thesis in 1976. It is a non-linear phonology, which claims that the one-to-one relationship between features and segments is not enough to capture some essential aspects of the human languages' phonology (Goldsmith *et al.* 1999; Davenport and Hannahs 2013). Instead, the features should be separated and then associated to specific segments as needed by using 'association lines'. In fact, each feature belongs to an autonomous tier.

### 3.3.1 Hijazi Arabic

Below is the relationship among the [+coronal, +voiced] consonants, rhotics and vowels in Hijazi Arabic.

1. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \ C \quad \text{rhotic} \ V \ C \\ | \\ [+coronal] \end{array}$$
2. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \quad \text{rhotic} \\ | \\ [+coronal] \end{array}$$
3. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \ C \quad \text{rhotic} \\ | \\ [+coronal] \end{array}$$
4. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \ C \ \$ \quad \text{rhotic} \ V \ C \\ | \\ [+coronal] \end{array}$$

### 3.3.2 Najdi Arabic

The relationship among the [-coronal, +voiced] consonants, rhotics and vowels in Najdi Arabic are presented below.

5. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ \text{rhotic} \ V \ C \\ | \\ [-coronal] \end{array}$$
6. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \ C \quad \text{rhotic} \\ | \\ [-coronal] \end{array}$$
7. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \ C \ C \quad \text{rhotic} \ V \ C \ C \\ | \\ [-coronal] \end{array}$$
8. 
$$\begin{array}{c} [+voiced] \\ \diagup \quad \diagdown \\ C \ V \ C \ C \ \$ \quad \text{rhotic} \ V \ C \ C \\ | \\ [-coronal] \end{array}$$

The rules above predict that the [+voiced] feature may spread from the [+coronal] consonant in Hijazi into the following adjacent rhotic in the next syllable of the same word (regardless of the type of the syllable) (as in 1) or between two syllables in different words (as in 4), or in the same syllable (as in 2 and 3). In Najdi Arabic, the rules predict that the feature [+voiced] may be spread from the [-coronal] consonants into the following adjacent rhotic in the same syllable (regardless of the type of the syllable) (as in 5 and 6), or between two syllables in the same word (as in 7) or between two syllables in different words (as in 8).

## 4. Discussion

The results show that Hijazi Arabic /r/ surfaces as [r] word-initially or when it is preceded by



a [-coronal] consonant or a [+voiced] consonant, regardless of the presence or absence of a vowel between those types of consonants and [r] phoneme. In the case that [r] occurs after a [-coronal, +voiced] consonant, regardless of whether it is followed by a vowel, it resembles that of Najdi Arabic. On the other hand, Hijazi Arabic /r/ surfaces as [r] when it is preceded by a [+coronal, -voiced] consonant, regardless of whether it is followed by a vowel. Whereas in Najdi Arabic, /r/ surfaces as [r] in all positions except after a [-coronal, +voiced] consonant where the trill occurs. These phonological rules and other issues, such as the underlying rhotic phoneme in each dialect and the relationship between these findings, and that of other dialects and languages, will be discussed next.

The reason why /r/ is suggested to be the underlying rhotic phoneme for Hijazi Arabic and /r/ for Najdi Arabic is that they occur in the widest distribution in both dialects. The ‘widest distribution’ criterion is a general approach to choosing the underlying form (Davenport and Hannahs 2013). On the other hand, it could be suggested that the rhotics in both dialects may be sensitive to the consonants they follow and not to the consonants they precede, or even the vowels they follow or precede. Thus, if we assume this is always true then it may be logical to propose that the occurrence of the trill /r/ in Hijazi Arabic and the flap /r/ in Najdi Arabic in word-initial position may support the assumption that their characteristics are only sensitive to the preceding adjacent consonants.

An explanation of why the researcher found that the trill in Hijazi Arabic is always found word-initially, or after a [-coronal] consonant regardless of whether it is voiced or voiceless, may lie in the state of the tongue. That is, it may be plausible to suggest that, since the tip of the tongue is not involved in articulating other sounds directly before the production of the trill and due to the trill requiring the tip of the tongue to vibrate repeatedly against the alveolar ridge, the tongue is free to perform a repeated vibration for the trill phoneme. However, even if the trill occurs in the word-initial position, it becomes a flap if it is preceded by a [+coronal, -voiced] consonant that belongs to a previous word, unless the speaker pauses after the [+coronal, -voiced] segment, and this further supports the assumption that the preceding consonants have an effect on the characteristics of the rhotics.

It was suggested above that the [+voiced] feature may be spread from the [+coronal, +voiced] consonant to the following adjacent rhotic and thus makes it a trill in Hijazi Arabic. However, why did the spreading not make the rhotic surface as a voiced flap instead of making it a trill? In fact, it may not be easy to identify the relationship between the repeated vibration of the tongue and the [+voiced] feature. However, if we consider Wiese’s (2001) claim that flaps are realized as trills when they are strengthened or emphasized, then it may be plausible to propose that the [+voiced] feature could provide the strength needed for the trill to occur. Nevertheless, it is acknowledged by the researcher that the term ‘strength’ is somewhat vague and could refer to other characteristics, such as the level of sonority; yet, even if it refers to sonority, the [+voiced] feature can make a consonant more sonorous than their voiceless counterparts of the same type of consonants, for example, voiced stops are more sonorous than voiceless stops.

A question is thus raised over whether there is a spreading of the [+voiced] feature from the

[-consonant, +voiced] consonant in Hijazi Arabic, and this is not an easy question to answer. The difficulty lies in instances when the [+voiced] feature or the [-coronal] feature is present in the preceded adjacent consonant, the trill surfaces. Thus, it may be difficult to suggest which feature is more important for the trill to occur. Yet, when the Hijazi rhotic occurs word-initially, it surfaces as a trill, which may help to support that the state of the tongue plays a larger role in determining the type of rhotic. Moreover, the researcher tends to suggest that there may not be an obvious trace of the [+voiced] feature spreading as the trill is not extra-voiced after the [-consonant, +voiced] consonant.

On the other hand, Najdi Arabic has a different story as flaps are the underlying phoneme (as proposed earlier) and the trill is only found after the [-coronal, +voiced] consonants. In fact, this could be considered a difference from, and a similarity to, Hijazi. The difference is that Hijazi does not require the preceding adjacent [-coronal] consonant to be voiced in order to have the trill. However, it is similar to Hijazi Arabic in that the [+voiced] feature has a role in the occurrence of the trill. But what about the role of the [-coronal] feature alone? In fact, this feature alone may not assist the surfacing of the trill in Najdi Arabic and this could be seen where Najdi Arabic does not have the trill word-initially when the tongue is not busy articulating other sounds. Moreover, the [+voiced] feature alone does not make the Najdi's flap surface as a trill and this can be seen when the flap is preceded by a [+coronal, +voiced] consonant. That is, both the [-coronal] feature and the [+voiced] feature should be present in the preceding adjacent consonant. Regarding the spreading of [+voiced] feature, the researcher proposes that there might be a spreading from the previous adjacent consonant when it is [-coronal], otherwise there may not be any spreading; therefore, it can be noted that after the [+coronal, +voiced] consonant, the Najdi Arabic flap does not surface as a trill or even as a voiced flap; meaning the [+coronal] feature may prevent the spreading.

In fact, these two features, [-coronal] and [+voiced], (Note 9) exist in vowels. So, why do Hijazi Arabic or Najdi Arabic not always have the trill after vowels? This could be attributed to the spreading from the previous adjacent consonant, as explained previously. However, it is not clear whether the vowels alone affect both dialects' rhotics because: a) both dialects do not allow the VC cluster (Ingham 1971; Aleztes 2007); and, b) when the rhotic is preceded by a vowel, which occurs word-finally of the previous word, the vowel is always preceded by a consonant.

Now, the distribution of rhotics in both dialects will be compared with that of Spanish, as this language has a similar rhotic system to that of both dialects. (Note 10) Spanish trill is found after a heterosyllabic consonant, as in [alrededor] 'around'. Whereas the flap is found after a tautosyllabic consonant in onset cluster, as in [broma] 'joke', or word-finally before a vowel, as in [ser amigos] 'to be friends'. Moreover, the flap and trill are in phonemic contrast in word-internal intervocalic position, as in [karo] 'expensive' versus [karo] 'cart; car' (Hualde 2005: 138). Other than those positions, variable rhotics can be found. It can be seen that Spanish rhotics are sensitive to vowels and that the trill and flap contrast in the intervocalic position, whereas Najdi and Hijazi Arabic trill and flap are not sensitive to vowels and are always in complementary distribution. Spanish rhotics may not be affected by the characteristics of the consonants but will be affected if the consonant is heterosyllabic or

tautosyllabic. On the other hand, Spanish is similar to Hijazi Arabic in that the trill always occurs word-initially. This could be attributed to the position of the tongue because in the word-initial position the tongue may not be busy articulating other sounds, except in connected speech. Regarding the occurrence of Spanish trill after the heterosyllabic consonant and the flap after the tautosyllabic consonant, the researcher expects there might be a link between the syllable boundary and the position of the tongue. The tongue may thus be relatively free after the boundary to produce the trill which may thus provide the tongue a chance to produce the trill, as it requires a repeated vibration of the tongue against the alveolar ridge.

Although this paper reviews the rhotics of Najdi and Hijazi Arabic, the researcher would like to shed some light on the sonority hierarchy found in Najdi Arabic. In fact, a quick review of the results identifies that Najdi Arabic violates the sonority hierarchy, as in [rtaʕ] and [batr] (Note 11), in which the segments in the onset of [rtaʕ] and the coda of [batr] do not maintain the universal sonority hierarchy: glides>liquids>nasals>obstruents, which is maintained in Hijazi Arabic. Not only does Najdi Arabic, but some other languages violate this hierarchy in few words, including English and German (Davenport and Hannahs 2013). Also, San'ani Arabic, spoken in Yemen, sometimes flouts the sonority hierarchy in the onsets, but for other varieties of Arabic such as Egyptian, they maintain the sonority hierarchy (Jany *et al.* 2007). However, Najdi Arabic may be considered different from other dialects and languages in that although it seems there is a falling sonority in the onset of [rtaʕ] since [r] is more sonorous than [t], when one hears this utterance, they may note that it is not. That is, it was noted by the researcher that sonority increases within the onset [rt] until it reaches the highest point in the nucleus [a] and then decreases within the coda [ʕ]. Regarding the coda [tr], there is a falling sonority and not a raising sonority as might be expected. In fact, this does not mean that the flap becomes less sonorant than /t/, as much as /t/ becomes more sonorant than it is usually. This may be a unique phenomenon for the majority of languages, as they may have a falling sonority in the onset and a raising sonority in the coda if they have the same word.

## 5. Conclusion

This paper identified how flaps and trills behave in relation to the vowels and consonants in Hijazi and Najdi Arabic. Both dialects have a large number of consonants and a small number of vowels, and both dialects' rhotics do not seem to be sensitive to vowels. Najdi and Hijazi trills and flaps are not sensitive to vowels and are always in complementary distribution. Najdi's flaps are the underlying phoneme, and the trill is only found after the [-coronal, +voiced] consonants. This is regarded as a difference from, and a similarity to, Hijazi Arabic. The difference is that Hijazi Arabic does not require the preceding adjacent [-coronal] consonant to be voiced in order to have the trill. However, it is similar to Hijazi Arabic in that the [+voiced] feature has a role in the occurrence of the trill. Unlike Hijazi Arabic, Najdi Arabic violates the universal sonority hierarchy: glides>liquids>nasals>obstruents. The paper concludes that rhotics in both Arabic varieties may be sensitive to the preceding adjacent consonants, but not to the vowels.

Despite the enormous efforts that were put into this research, the word limit and lack of references for both dialects could have played a negative effect on the depth of the study. For

future research, it is suggested that the issue of the sonority hierarchy in Najdi Arabic should be addressed in further work. In addition, there are some issues which need to be tackled regarding Hijazi and Najdi Arabic, such as: a) if the vowels (in other contexts) could have an effect on the surfacing of the rhotics; and, b) if the [-coronal] feature plays a similar role to that of rhotics with other sounds, such as /l/.

## References

- Abboud, P. (1979). The verb in northern Najdi Arabic. *Bulletin of the School of Oriental and African Studies*, 42(3), 467-499.
- Afkir, M., Al-Essa, A., Moshe, B., Behnstedt, P., Castagna, G., Cerqueglini, L., & Zack, L. (2022). *Semitic Dialects and Dialectology: Fieldwork—Community—Change*.
- Alahmadi, S. (2015). Loanwords in the Urban Meccan Hijazi Dialect: An Analysis of Lexical Variation according to Speakers' Sex, Age and Education. *International Journal of English Linguistics*, 5(6), 34-58. <https://doi.org/10.5539/ijel.v5n6p3>
- Alessa, A. (2008). When Najd Meets Hijaz: Dialect Contact in Jeddah. In *Between the Atlantic and Indian Oceans: studies on contemporary Arabic dialects: proceedings of the 7th AIDA conference*, held in Vienna from 5-9 September 2006 (Vol. 4, p. 51). LIT Verlag Münster.
- Alezetes, E. (2007). *A Markedness Approach to Epenthesis in Arabic Speakers' L2 English*.
- Alghamdi, M. (2020). *Saudi Dialect Map*. Retrieved August 11, 2022, from <http://www.mghamdi.me/>
- Alhazmi, L., & Alfaifi, A. (2022). Dialect identification in Saudi dialects: A socio-phonetic approach. *Journal of Language and Linguistic Studies*, 18(1), 820-835. <https://doi.org/10.52462/jlls.222>
- Alrasheedi E. (2015). Affrication in Ha'ili Arabic: A Rule-Based Approach. *International Journal of Linguistics*, 7(4), 27-41.
- Alrasheedi, E. (2019). *Possessive constructions in Najdi Arabic*. Unpublished PhD dissertation, Newcastle University.
- Anishchenkova, V. (2020). *Modern Saudi Arabia*. ABC-CLIO.
- Chomsky, N., & Halle, M. (1968). *The sound patterns of English*. New York: Harper & Row.
- Davenport, M., & Hannahs, S. J. (2013). *Introducing phonetics and phonology*. Routledge.
- Goldsmith, J., Riggle, J., & Alan, C. (Eds.). *The handbook of phonological theory*. John Wiley & Sons.
- Gordon, R. (2005). *Ethnologue: Languages of the world*. Dallas, TX: SIL International.
- Gordon, M., & Ladefoged, P. (2001). Phonation types: a cross-linguistic overview. *Journal of phonetics*. 29(4), 383-406.
- Hualde, J. (2005). *The sounds of Spanish with audio CD*. Cambridge University Press.

Ingham, B. (1971). Some characteristics of Meccan speech. *Bulletin of the School of Oriental and African Studies*, 34(2), 273-297.

Ingham, B. (1994). *Najdi Arabic: Central Arabian*. Amsterdam: John Benjamins.

Jany, C., Gordon, M., Nash, C., & Takara, N. (2007). How universal is the sonority hierarchy?: a cross-linguistic acoustic study. In *Proceedings of the ICPHS*, 1401-1404.

Lewis, R. (2013). *Complementizer agreement in Najdi Arabic*. Unpublished Master's thesis, University of Kansas.

Rose, S. (2000). Doubled verbs and syncope resistance in Iraqi Arabic: not antigemination. In *Proceedings of the 14th Arabic Linguistic Symposium*, UC Berkeley.

Watson, J. (2002). *The phonology and morphology of Arabic*. Oxford: Oxford University Press.

Watson, J. (2007). Syllabification patterns in Arabic dialects: Long segments and mora sharing. *Phonology*, 24(2), 335-356.

Wiese, R. (2001). The phonology of M. *Phonology and Phonetics*, 335.

Willis, E., & Bradley, T. (2008). Contrast maintenance of taps and trills in Dominican Spanish: Data and analysis. In *Proceedings of the 3rd Conference on Laboratory Approaches to Spanish Phonology*. Somerville, MA: Cascadilla Proceedings Project. 87-100.

## Notes

Note 1. Modern Arabic dialects have an 'impoverished vocalic system' and 'a very rich consonantal system' (Watson 2002: 21).

Note 2. Different symbols in the literature are used to represent these, but /eɪ, əʊ/ are used to maintain simplicity.

Note 3. Not all of the data are presented due to word limitations, but the data presented can be generalized over unmentioned examples.

Note 4. It is not within the scope of this paper to deal with the vast array of possible syllable structures.

Note 5. Discussing this issue is beyond the scope of this paper.

Note 6. /ʔ/ only occurs word-initially in Hijazi and Najdi Arabic.

Note 7. We will see later why it is considered an allophone.

Note 8. Only the phonemes that are not found in Hijazi Arabic will be defined.

Note 9. The researcher knows that the [-coronal] feature belongs to consonants and that some vowels require some movement of the tongue. However, this movement is not as obvious as that found in the [+coronal] consonants; therefore, it is assumed that the vowels have the

[-coronal] feature.

Note 10. This could be attributed to the influence from the Arabic language due to the presence of Arabs between 711AD and 1492AD in the Iberian Peninsula.

Note 11. The violation is not only found in the words that contain rhotics.

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