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Affrication in Qassimi Arabic:

Phonological Conditioning and an Optimality-Theoretic Analysis

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Abstract: Many dialects of Arabic apply affrication to their velar stops. This phenomenon has been the focus of substantial research for over a century now. The focus of this paper is to examine the optional, selective affrication in Qassimi Arabic and attempt to account for the factors that seem to be involved in enabling or preventing the process. Although there has not been research, particularly on affrication in Qassimi Arabic, there is a substantial body of literature on affrication in various Arabic dialects, which is relevant after all. The literature indicates some factors that are examined in the current paper to see their applicability in Qassimi Arabic. I also develop an Optimality-theoretic analysis for this phenomenon to attempt to capture the variation in a principled fashion. While developing the analysis, some unpredicted facts are observed and taken into account. Finally, the analysis introduced in this paper intersects with other phenomena like co-articulation and emphatic spread.

Index Terms - Qassimi Arabic; affrication; velar stops; Optimality Theory; emphasis spread

Introduction

The aim of this paper is to investigate the phenomenon of affrication in Qassimi Arabic. Instances that illustrate the phenomenon in question are provided in (1).¹

- (1) a. /kalb/ → [kalb], [tsalb] 'dog'
b. /gili:b/ → [gili:b], [dzəli:b] 'well (N)'

Note that the velar plosives /k, g/ can surface as they are. This is because affrication is almost always optional, which means that their realization is not conditioned or potentially penalized. For this reason, moving forward, I will focus on the realization of the affricates and will not mention the faithful variant.

The affrication in question here is the affrication of /g, k/ into /dz, ts/, respectively. What makes this phenomenon intriguing, despite the fact that it is optional, is that it is sometimes prohibited. Consider the following examples where affrication is not acceptable.

- (2) a. /fo:k/ → *[fo:ts] 'thorns'
b. /ko:n/ → *[tso:n] 'universe'

The contrast observed in (1) and (2) begs the question of what makes this possible within the same grammar. In other words, what are the conditions that allow or prohibit affrication? The task that is undertaken here is to attempt to provide an account that answers this question.

Before we go further, a brief introduction about the language in question is in order. Qassimi Arabic is a sub-dialect of Najdi Arabic, which is a variety of Arabic (Semitic) spoken in the Najd region in central Saudi Arabia by around ten million speakers. Najdi Arabic is a fusional language, and it normally exhibits the SVO word order. Moreover, Najdi Arabic is a subject-drop language and it can normally have verbless sentences (in sentences that do not have a lexical verb and would have a copular *be* in English, such as

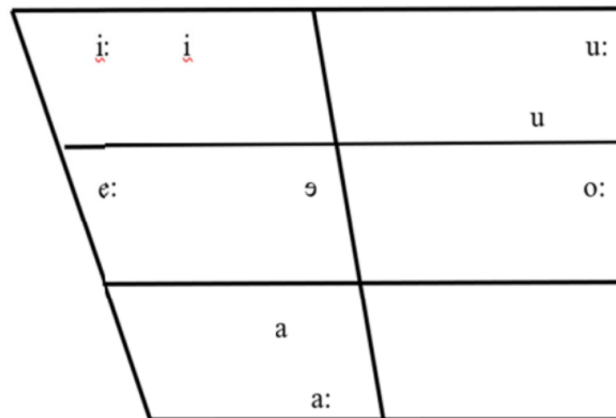
¹Nouns and adjectives in Qassimi Arabic show grammatical gender, number, and person inflection, and verbs agree in all of these features with the subject. However, for our purposes, I will simply translate the essential meaning and leave these grammatical features unglossed, unless they are relevant to the discussion.

John is smart). It also has two grammatical genders: masculine and feminine. (3) below shows the consonantal phonemic inventory in Qassimi Arabic (Alqahtani 2020), while (4) shows the phonemic inventory of vowels (Al-Numair 2021).

(3)

	Bilabial	Labio-dental	Inter-dental	Dental	Alveolar	Alveo-palatal	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosives	b			t d t ^ʕ				k g	q		ʔ
Fricatives		f	θ ð ð ^ʕ		s z s ^ʕ	ʃ			χ ʁ	ħ ʕ	h
Affricates						ɟʒ					
Nasals	m				n						
Lateral					l						
Trill					r						
Glide	w						j				

(4)



In the present paper, Section 2 discusses the literature on affrication in Qassimi Arabic. Then, Section 3 presents the dataset. Afterward, Section 4 attempts to provide an analysis that captures the alternation in the dataset. Finally, Section 5 concludes the paper.

Background

There has not been substantial literature on affrication in Najdi Arabic in general, and none on Qassimi Arabic in particular. For this reason, this section reviews the factors that affect affrication in other dialects of Arabic in general.

It is worth noting that the fact that /g, k/ are affricated in some Najdi dialects was discussed for the first time more than two centuries ago by Wallin (1855). However, his discussion is very brief and incomplete. Later studies, such as Cantineau (1936, 1937) and Johnstone (1963), addressed affrication, but they addressed it in the Arabic dialects of the Arabian Peninsula in general, including Syrian, Jordanian, and Arabian Gulf dialects (e.g., Kuwaiti and Qatari). The affrication in the other dialects is qualitatively different. While Qassimi Arabic converts /g/ to [dʒ] and /k/ to [ts] (although this pattern is not exclusive to Qassimi Arabic), other dialects may affricate /g/ to [dʒ] and /k/ to [tʃ]. However, this is not to say they are completely unrelated phenomena. The outcome might look distinct, but this does not imply that the processes are different.

Perhaps the leading factor controlling affrication in Qassimi Arabic is the contiguity to front vowels (Cantineau 1936, 1937; Johnstone 1963, 1967; Matar 1969, 1985; Al-Sweel 1988; Holes 1991; Mustafawi 2007; Alrasheedi 2015; among others). This could be thought of as a form of co-articulation, where the dorsal stops /k, g/ agree in place with front vowels (thus, acquiring the feature 2[+FRONT] or [-BACK]). This is shown in the examples in (5) from Qatari Arabic, where /g/ becomes [dʒ] and /k/ becomes [tʃ].

²Although, as we will see below, it might be more accurate to say non-back vowels, within a framework that assumes a distinction between central and front vowels.

- (5) a. /ri:g/ → [ri:dʒ] 'saliva'
 b. /rju:g/ → *[rju:dʒ] 'breakfast' (Mustafawi 2007: 1)

Moreover, some authors show that the second-person singular feminine clitic pronoun /-k/ (which can appear as the object of verbs in its accusative case or on nouns in its genitive case) is always affricated regardless of its phonological environment (Johnstone 1967; Al-Essa 2009; Al-Rojaie 2013, among others), as shown in the example from Kuwaiti Arabic below.³

- (6) /ʔubu:k/ → [ʔubu:tʃ] 'your father' (Johnstone 1967: 223)

What (6) shows is that affrication of the clitic pronoun is permitted even if it is preceded by a back vowel, which as discussed above should be prohibited. This can imply, among other things, that this process is sensitive to morpheme boundaries (a possibility that will be examined below).

On the other hand, there are some *blockers* that can prevent affrication. One of these blockers is emphatic/pharyngealized sounds (Mustafawi 2007; Al-Rojaie 2013) (which is, henceforth, indicated by the diacritic [kʰ]). Consider the following example from Qatari Arabic (where /g/ becomes [dʒ]).

- (7) /farʰag/ → *[farʰadʒ] 'he got off (V)' (Mustafawi 2007: 17)

Although, [rʰ] is just an allophone of /r/, it still carries the pharyngealization/emphasis feature. The fact that pharyngealization (as a form of emphasis) can prevent affrication might be due to the fact that emphasis in Arabic can spread across the syllable boundaries to other segments (Watson 1999; Jaber et al. 2019; Almuhaimeed 2021, among many others). So, it is very possible that the velar consonant gets pharyngealized and then can no longer be affricated. This makes sense phonetically. Since emphasis spread is essentially the spread of a Retracted Tongue Root [RTR] feature, affrication would take the point of articulation to the front while [RTR] takes it to the back. The discussion of emphasis spread (per se) is beyond the scope of this paper, but relevant remarks will be made where necessary.

Furthermore, loan words and geminates resist affrication (Alrasheedi 2015), as illustrated in the following examples, where (8) is a loan word from German and (9) has a geminate.

- (8) /miki:nah/ → *[mitsi:nah] 'machine' (Alrasheedi 2015: 34)
 (9) /fakkak/ → *[fatstsak] 'deciphered (V)' (Alrasheedi 2015: 33)

For different reasons, these factors seem to block affrication. Additionally, (broken) plurals are reported to resist affrication as well (Mustafawi 2007), as shown in the minimal pair below from Qatari Arabic.

- (10) a. /giri:b/ → [dʒiri:b] 'close.SG (Adj)'
 b. /gra:b/ → *[dʒra:b] 'close.PL (Adj)' (Mustafawi 2007: 8)

The brief survey above is informative regarding the factors that allow or prevent affrication in Arabic (in general). We know now that: i) the frontness of the adjacent vowels facilitate affrication; ii) the feminine clitic pronoun /-k/ can always be affricated; iii) emphatic sounds can spread and block affrication; and iv) geminates, loan words, and plurals cannot be affricated. With this knowledge in mind, we move on to the next section to explore the Qassimi data accordingly.

Data

Although of the many similarities between affrication in Qassimi Arabic and the aforementioned dialects, there are some differences that makes the Qassimi Arabic data interesting. This section presents the Qassimi Arabic data based on the factors mentioned in the last section and set the stage for the analysis in the next section.

A. Adjacent Vowels

As noted above, the factor that is associated the most with affrication in Arabic is the quality of the adjacent vowel(s). For example, back vowels tend to prevent affrication. Let us test the validity of this claim against the Qassimi Arabic facts. It is noteworthy that the following examples take into account the position of the segment with respect to the vowel (before or after it), its position within the syllable (onset or coda), and the existence of geminates, loanwords, emphatic sounds, and the second-person feminine clitic pronoun, and provide all the relevant data where possible and accessible.⁴

³Note that they are identical in both cases.

⁴The parts of speech will be glossed where needed: N: Noun; V: Verb; Adj: Adjective; Adv: Adverb.

- (11) a. /fo:g/ → *[fo:dz] 'nostalgia'
 b. /fo:k/ → *[fo:ts] 'thorns' (=2a)
 c. /go:l/ → *[dzo:l] 'goal/saying (N)'
 d. /ko:n/ → *[tso:n] 'universe'
 e. /bu:k/ → *[bu:ts] 'wallet'
 f. /su:g/ → *[su:dz] 'marketplace/mall'
 e. /ku:ʕ/ → *[tsu:ʕ] 'elbow'
 f. /guwwah/ → *[dzuwwah] 'power'

Now we need to see what happens with front vowels, so we can make a generalization.

- (12) a. /ke:f/ → [tse:f] 'how'
 b. /beket/ → [betse:t] 'I cired (V)'
 c. /gili:b/ → [dzili:b] 'well (N)'
 d. /kiðb/ → [tsiðb] 'lie (N)'
 c. /di:k/ → [di:ts] 'rooster'
 d. /ri:g/ → [ri:dz] 'saliva'

(11) and (12) support the back and established association between front vowels and affrication.

However, within a theoretical framework that makes the distinction between front vowels [+FRONT, -BACK], back vowels [-FRONT, +BACK], and central vowels [-FRONT, -BACK], we need to make a decision about the weather it is only front vowels that allow affrication or just any non-back vowels. Most of the authors mentioned in our discussion of affrication's sensitivity to the adjacent vowel's frontness mention "front vowels" (Johnstone 1963, 1967; Holes 1991; Mustafawi 2007; among others) but nothing about central vowels such as /a/ (assuming that [a] is a central low vowel, following Lowenstamm 1991; Alqahtani 2014; and Salameh & Abu-Melhim 2014). The examples below from Qassimi Arabic target the /a/ vowel to provide evidence for either possibilities.

- (13) a. /ga:ʕid/ → [dza:ʕid] 'sitting (Adj)'
 b. /kalb/ → [tsalb] 'dog'
 c. /hanak/ → [hanats] 'jaw'
 d. /jakðib/ → [jatsðib] 'he lies'
 c. /ða:g/ → [ða:dz] 'he tasted (V)'

(13) supports the idea that it's the case that back vowels block affrication, and not that front vowels enable it. They do so in a similar fashion to the [RTR] feature, which makes sense phonetically since both result in a cco-articulatory effect that makes the tongue go further back, hence further from the affricate allophones.

A consequential question arises when discussing the phonological environment of seemingly (presumed) enablers and blockers, namely: what happens to the intervocalic segments that appear between back and front vowels? The examples in (14, 15) concern this issue, where (14) shows the case of the environment /[-BACK]____[+BACK]/ and (15) shows /[+BACK]____[-BACK]/.

- (14) a. /jigu:l/ → *[jidzu:l] 'he says'
 b. /ja:ku:f/ → *[fa:tsu:f] 'dog'

- (15) a. /mu:gif/ → [mu:dzif] 'astonishing (Adj)'

So, in such environments, we get conflicting results based on whether or not the back vowel precedes the segment in question. Only under such circumstances, if a back vowel follows the velar stop, it blocks its affrication. It's only under such environments because as we saw in (11e, 11f) the back vowel comes before the velar stop but still blocks its affrication.

B. The clitic /-k/

The feminine singular second-person clitic pronoun /-k/ (accusative and genitive) is reported to always allow affrication irrespective to phonological environment. This is expected to be applicable in Qassimi Arabic as well. This prediction is supported by the examples in (16).

- (16) a. /abu:k/ → [abu:ts] 'your (feminine) father'
 b. /að^ʕahhik-k/ → [að^ʕahhik-ts] 'I make you laugh'

So, even in the environment of a back vowel (16a) and what looks like a geminate (16b), affrication manages to occur. This might suggest sensitivity to morpheme boundaries, as mentioned above. If this generalization is true, we predict the environment of affixes to not affect the affrication of a stem-peripheral segment. The minimal pairs in (17) attempt to test this hypothesis by introducing the clitic /-i/ 'my' to words with final velar stops preceded by a back vowel. We saw above in the contrast in (14) and

(15) that if the velar stop happens to be in the environment $/[+BACK] ___ [-BACK]/$ affrication succeeds. So, if morpheme boundaries block this interaction with adjacent vowels, then the affrication will remain ungrammatical, and vice versa.

- (17) a. /bu:k/ → *[bu:ts] 'wallet' (=11e)
 b. /bu:k-i/ → *[bu:ts-i] 'my wallet'
 c. /su:g/ → *[su:dz] 'marketplace/mall' (=11f)
 d. /su:g-i/ → *[su:dz-i] 'my marketplace/mall'

We can conclude here that the interaction between the velar stop and the adjacent vowels must remain within the morpheme boundary, and vowels in other morphemes (even if adjacent) cannot affect the process.

C. Emphatic Sounds

As established above, emphatic sounds can spread emphasis onto other segments across the syllable boundary. However, the spread is not always applicable and its direction is not clear (for more about this, see Watson 1999). But, when it spread, the quality of the consonants is audibly altered (in a way similar to the allophonic case of dark and light /l/ and /m/ in English). According to the literature (above), affrication is not applicable within the context of emphatic sounds. This is probably because the velar stop receives the [RTR] feature as a result of emphasis spread and hence is pronounced (when not affricated) with some emphasis/pharyngealization. Emphasis is analogous to co-articulation with back vowels, in the sense that they both cause the tongue (root) to go further back toward the pharynx. Also, pharyngealization in Arabic can become phonemic, but not always since there are allophones that get pharyngealized (e.g., [r^h]) and still spread emphasis. The data in (18) show that affrication in Qassimi Arabic, too, is blocked when the velar is emphasized. Since it is unclear which segment carries the emphasis in the underlying representation and it is irrelevant to our purposes to determine which one it is, I will assume that all consonants that appear on the surface emphasized are emphasized underlyingly as well. However, if there is a pharyngealized phoneme (e.g., /ð^h/, the emphasis spread will be attributed to it alone.

- (18) a. /ga:ʕid/ → [ga:ʕid], [dza:ʕid] 'sitting (Adj)' (=13a)
 b. /ga:ð^hi/ → [g^ha:ð^hi], *[dza:ð^hi] 'judge'
 c. /kalb/ → [tsalb] 'dog' (=13b)
 d. /k^har^hf^h/ → [k^har^hf^h], *[tsar^hf^h] 'a lot of work (N)'
 e. /ʕarg/ → [rardz] 'drown (Adj)'
 f. /b^har^hg^h/ → [b^har^hg^h], *[b^har^hdz] 'lightning (N)'

(18) provides evidence of how emphatic spread affects affrication in Qassimi Arabic. We can generalize that when emphasis spreads over to velar stops in Qassimi Arabic, it blocks its affrication.

D. Plurals, Geminatation, and Loanwords

Plurals in Arabic can be: i) regular, in which a variant (depending on gender and person) of a plural suffix is attached to the stem; or ii) *broken*, in which the internal structure of the stem is modified (McCarthy & Prince 1990: 211). Regular plurals are irrelevant since they were not mentioned in the literature and it has been established that other morphemes do not affect the affrication process. Broken plurals, on the other hand, need to be tested in Qassimi Arabic. The following examples attempt to confirm this claim.

- (19) a. /kalb/ → [tsalb] 'dog' (=13b)
 b. /klab/ → [tslab] 'dogs'
 c. /di:k/ → [di:ts] 'rooster' (=12c)
 d. /djikah/ → [djitsah] 'roosters'
 e. /kiθi:r/ → [tsiθi:r] 'many (Adj)'
 f. /kθa:r/ → [tsθa:r] 'many (pl.) (Adj)'

The set of examples above contain adjectives and nouns in the broken plural form. However, they show that broken plurals, too, can be affricated and they do not block affrication, as shown in other varieties of Arabic in the previous section.

We now turn to the case of geminate velar stops. According to the literature, geminates cannot possibly be affricated. We need to confirm or deny the possibility that this constraint is active in Qassimi Arabic.

- (20) a. /hikkah/ → [hittsah] 'scratch it'
 b. /rakkib/ → [rattsib] 'compose (V)'
 c. /jenaggim/ → [jenaddzim] 'eats seeds (V)'

Contrary to what is predicted, affrication succeeds despite geminates. However, it happens in a strange way where the affrication happens partly to the first segment of the adjacent velar stops and completely to the other, i.e., the two adjacent /kk/ become: /k_1/ → [ts], while /k_2/ → [ts], so the /kk/ becomes [tts] (and the same for the voiced /g/). This is not what we expect if we try to do the same operation to two segments, but it seems that there is some kind of adjacency effect here. We revisit this issue in the next section.

Finally, we now turn to the case of loanwords. In the previous section, we established that loanwords resist affrication, and here we need to test this claim against the Qassimi Arabic facts to see if the same holds in this dialect, too.

- (21) a. /miki:nah/ → [miki:nah], *[mitsi:nah] 'machine'
 b. /birgar/ → [birgar], *[birdzar] 'burger'

Moreover, even borrowed words from other varieties of Arabic are subject to the same condition. The following are (originally) loanwords from Modern Standard Arabic.

- (22) a. /dikka:n/ → [dikka:n], *[dittsa:n] 'store (N)'
 b. /gahwah/ → [gahwah], *[dzahwah] 'coffee'

This supports the prediction that it is not possible to affricate loanwords in Qassimi Arabic.

What we learned here is that, in Qassimi Arabic, geminates and broken plural can be affricated but loanwords cannot. The next section develops an account for the facts listed in this section.

Discussion

This section attempts to capture the aforementioned variation in Qassimi Arabic regarding the affrication of the velar stops /k, g/. The analysis proposed below is cast within the Optimality-Theoretic framework (Prince & Smolensky 2004). Moreover, since affrication is optional, we need to adopt the *Reversible Ranking* approach proposed by Lee (2001), which gives analyses that look like (23) below.

(23)

/UR/	X	Y	Z
⇒A			*
⇒B		*	
C		*!	*
D	*!		

This approach works because it can predict two outputs. In what follows, we develop our analysis by taking the factors into consideration one at a time, to conclude the overall ranking at the end. It's important to restate that although affrication is optional, it's not always permitted. The task of the current section is to develop an account for why it is prohibited sometimes.

The possibility of affricating the velar stops is attributed to several factors, one of which is the existence of a back vowel. I propose that using constraints in (24) can account for this.

- (24) a. [K]/[G] <-> [+BACK]_{MORPH}: [k] and [g] must be the surface realization of /k/ and /g/, respectively, when they occur adjacent to [+back] vowels within a given morpheme (modified version of Mustafawi 2006, to be revised).
 b. **IDEN-IO (DOR)**: All dorsal segments in the input must remain dorsal in the output.
 c. [+ANT, +AFF]: Any consonant must be [+anterior] AND [+affricate].
 d. **IDEN-IO(VOI)**: The value of the [Voice] feature in the output must be identical to that in the input.

The utility of these constraints is evident in the tableaux below where the minimal pair [ri:g]/[ri:dz] 'saliva' and [su:g]/*[ri:dz] are subjected to these constraints.

(25)

/ri:g/	IDEN-IO(VOI)	[K]/[G] <-> [+BACK] _{MORPH}	[+ANT, +AFF]	IDEN-IO(DOR)
a. ⇒ri:g			**	
b. ⇒ri:dz			*	*
c. ri:ts	*!		*	*
d. ri:z			**!	*

(26)

/su:g/	IDEN-IO(VOI)	[K]/[G] <-> [+BACK] _{MORPH}	[+ANT, +AFF]	IDEN-IO (DOR)
a. ⇒su:g			**	
b. su:dz		*!	*	*
c. su:ts	*!	*		*
d. su:d		*!	**	*

It successfully accounts for the effect of [+/- Back] vowels. However, we still need to account for cases such as (14) and (15), repeated below.

- (27) a. /jigu:l/ → *[jidzu:l] 'he says'
 b. /fa:ku:f/ → *[fa:tsu:f] 'dog' (=14)
- (28) a. /mu:gif/ → [mu:dzif] 'astonishing (Adj)' (=15)

In this case, the issue is more than mere adjacency, since the back vowel is adjacent to the velar stop in both cases. It is critical to note, again, that this case is only observed in intervocalic environments where the consonant is adjacent to back and non-back vowels. This may be resolved in terms of syllable boundaries. We can syllabify these words according to the Maximal Onset Principle (Kahn 1980), which informally explained as follows: put all consonants in the onset position unless it violates the phonotactics of the language in question. We can, then, make a generalization about where the consonant is in each case.

- (29) a. *[ji.dzu:l]
 b. *[fa:tsu:f]
 c. [mu:dzif]

Unsurprisingly, (29) shows that it is prohibited to affricate the velar stop when it is within the same syllable that contains a back vowel. Therefore, the following modification to (24a) can be used to account for this fact.

- (30) [K]/[G] <-> [+BACK]_{MORPH&SYLL}: [k] and [g] must be the surface realization of /k/ and /g/, respectively, when they are adjacent to [+back] vowels within syllable and morpheme boundaries.

What (30) means is that the obligatory allophones [g, k] occur when adjacent to back vowels within the morpheme boundaries AND (at the same time) within the syllable boundaries. This is crucial because we want our analysis to account for words with the feminine clitic /-k/, as in the example below.

- (31) a. /abu:-k/ → [abu:-ts] 'your father'

Moving forward, I will show the revised ranking and show only the relevant (violated) constraints in each tableau for limited-space reasons. Before each tableau, I will list the complete ranking, and include only the relevant ones in the tableau.

The following tableaux illustrate the utility of the modification in (30) where it is tested against (29a, 29c, 31), which are the relevant examples to this constraint.

- (32) IDEN-IO (VOI), [K]/[G] <-> [+BACK]_{MORPH&SYLL} >> [+ANT, +AFF], IDEN-IO (DOR)

(33) /mu:gif/	[K]/[G] <-> [+BACK] _{MORPH&SYLL}	[+ANT, +AFF]	IDEN-IO (DOR)
a. ⇒ mu:gif		***	
b. ⇒ mu:dzif		**	*
/jigu:l/			
c. ⇒ ji.gu:l		***	
d. ji.dzu:l	*!	**	*
/abu:-k/			
e. ⇒ a.bu:-k		**	
f. ⇒ a.bu:-ts		*	*

The modified constraint has proven useful against these contrastive cases. It manages to predict the affrication of /mu:gif/ and ruled out the affrication of /jigu:l/, without penalizing /abu:-k/, which is backed up by the facts.

At this point, our grammar successfully accounts for the facts pertaining to adjacent vowels. Now we turn to the cases of emphatic spread. The effect of emphatic spread on affrication is illustrated in (18), and repeated below.

- (34) a. /ga:ʕid/ → [ga:ʕid], [dza:ʕid] 'sitting (Adj)' (=13a)
 b. /ga:ð^ʕi/ → [g^ʕa:ð^ʕi], *[dza:ð^ʕi] 'judge'
 c. /kalb/ → [tsalb] 'dog' (=13b)
 d. /k^ʕar^ʕf^ʕ/ → [k^ʕar^ʕf^ʕ], *[tsar^ʕf^ʕ] 'a lot of work (N)'
 e. /ʕarg/ → [rardz] 'drown (Adj)'
 f. /b^ʕar^ʕg^ʕ/ → [b^ʕar^ʕg^ʕ], *[b^ʕar^ʕdz] 'lightning (N)'

These are minimal pairs regarding emphasis, where almost identical phonological environments differ only in emphasis/pharyngealization, which directly affects affrication. To account for this contrast, the following constraints are introduced.

- (35) a. *[RTR]: Any consonant must not be emphasized.
 b. *[+ANT, +AFF]&*[RTR]: Any consonant must not be emphasized AND an anterior affricate at the same time.
 The ranking of constraints will look like (36) below.
 (36) IDEN-IO(VOI), [K]/[G]<->[+BACK]_{MORPH&SYLL}, *[+ANT, +AFF]&*[RTR] ≫ [+ANT, +AFF], IDEN-IO (DOR), *[RTR]

This ranking is tested against the minimal pair (34a) and (34b) in the following tableau.

(37)

/ga:ʕid/	*[+ANT, +AFF]&*[RTR]	[+ANT, +AFF]	IDEN-IO (DOR)	*[RTR]
a. ⇒ga:ʕid		***		
b. ⇒dza:ʕid		**	*	
/ga:ð ^ʕ i/				
c. ⇒ga:ð ^ʕ i		**		*
d. dza:ð ^ʕ i	*!	*	*	

As demonstrated in (37), the current set of constraints successfully accounts for the effect of emphatic sounds on affrication.

Having accounted for the variation above, now we move on to account for loanwords' inability to be affricated, as demonstrated in the examples below, where (38a) is a loanword and (38b) is a native word.

- (38) a. /miki:nah/ → [miki:nah], *[mitsi:nah] 'machine' (=21a)
 b. /kiðb/ → [tsiðb] 'lie (N)' (=12d)

You can see that affrication is blocked in the loanword, even though its phonological environment is similar to that of (38b). We can account for this fact by constraints conjunction, as we did with emphatic sounds above. The following constraints should be included in our ranking.

- (39) a. NATIVE: The stem must be native to the language.
 b. NATIVE&*[+ANT, +AFF]: Simultaneously, the stem must be native, and any consonant must not be an anterior affricate.

The ranking, thus far, should be as shown in (40).

- (40) IDEN-IO(VOI), [K]/[G]<->[+BACK]_{MORPH&SYLL}, *[+ANT, +AFF]&*[RTR], NATIVE&*[+ANT, +AFF] ≫ [+ANT, +AFF], IDEN-IO (DOR), *[RTR], NATIVE

The following tableau illustrates how these constraints are useful (according to the current ranking) by applying them to the pair (38).

(41)

/miki:nah/	NATIVE&*[+ANT, +AFF]	[+ANT, +AFF]	IDEN-IO (DOR)	NATIVE
a. ⇒miki:nah		****		*
b. mitsi:nah	*!	***	*	*
/kiðb/				
c. ⇒kiðb		***		
d. ⇒tsiðb		**	*	

We can see clearly now that the conjunction approach successfully captures the variation.

What remains unaccounted for is the gemination effect, where a geminated /kk/ (for example) surfaces as [tts], rather than [tsts]. I will only comment briefly on this and then will set it aside because it might be more of a gemination phenomenon rather than an affrication phenomenon. The prediction that it should surface as [tsts] presumes that these are distinct phonemes. The effect observed with affrication hints toward a possibility that the doubling does not occur to the whole phoneme but it is rather a duration doubling/gemination. With non-affricate, it is one specific type of articulation that gets lengthened, which might give the impression that it is the pronunciation of two phonemes. However, with affricates, it is a [-continuant] consonant followed by a [+cont.] consonant. My claim that the gemination happens to the duration of the phoneme (rather than resulting in a distinct one) is backed up by the fact that /kk/ results in [tts] not [tsts] (this might be a case of delaying release). This issue is set aside since it is not a core problem to the topic at hand.

Conclusion

This paper presented some novel data pertaining to the selective, optional affrication of velar stops in Qassimi Arabic, and attempted to examine the cases in which affrication is prevented. After exploring the literature we found several factors that seem to be involved in the conditioning of affrication, namely: adjacent vowels; morpheme boundaries; emphatic sounds; loanwords; broken plurals; and gemination. We saw that gemination and broken plurals do not seem to be prevented in Qassimi Arabic, and confirmed

that the rest do so as predicted. I proposed a set of constraints ranked in a way that captures the variation seen in the Qassimi Arabic data. The set of ranked constraints is demonstrated in (42) below.

(42)	IDEN-IO (VOI)	>>	[+ANT, +AFF]
	[K]/[G]<->[+BACK] _{MORPH&SYLL}		IDEN-IO (DOR)
	[+ANT, +AFF]&[RTR]		*[RTR]
	NATIVE&*[+ANT, +AFF]		NATIVE

We also tested the validity of this ranking and it successfully accounts for the facts.

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