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Lughat al-Ḍād and the status of [A]: the composition of Arabic gutturals/emphatics

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1. Introduction

Arabic has often been described as a 'harsh' or 'guttural' language, well known for having sounds considered difficult for non-native speakers to articulate. In particular, it has a set of consonants known as 'emphatic', which is usually said to involve secondary pharyngealisation and/or uvularisation. Traditionally, Arabic has the emphatics /ṣ ṭ ḍ ẓ/ or /ṣ ṭ ḍ ð̣/, although the dialects have widely differing inventories, always including these four as a minimum, but also including, most commonly, /l̩ r̩ m̩ b̩/, and sometimes purporting to include the whole range of that dialect's consonantal inventory.

There is some confusion between the emphatics and the gutturals, which include the uvular fricatives /χ/ and /ʁ/, the uvular stop /q/ and the pharyngeals /ʿ/ and /ḥ/. Traditionally, the uvulars are said to be inherently emphatic, and in many respects they do indeed pattern phonologically with the emphatic segments. There is, however, one major difference: the emphatic coronals appear to trigger harmony in which not only vowels but also consonants participate, the harmony domain in many dialects being maximally the word. Uvulars (and pharyngeals), by contrast, appear in the environment of a following pharyngealised vowel.

In a previous study of harmonisation processes in Arabic,[1] I have argued that there are two distinct processes of harmonisation in the language, uvularisation (or [A]-licensing), and headlessness spread (ATR-harmony). This is, however, outside the scope of the current paper, and is an ongoing investigation. Nevertheless, much of the wealth of literature on gutturals in general, and particularly on emphatics,[2] is pertinent to my investigation into the elemental make-up of uvulars, pharyngeals and emphatics in Arabic. Within feature theory, there have been proposals for many different features to represent 'emphaticness', including: [flat] (Jakobson, 1957), [F2 drop] (Card, 1983), [pharyngeal] (Herzallah, 1990, McCarthy, 1991, 1994), [CP] (Hoberman, 1987), [RTR] (Goad, 1991, Davis, 1995, Shahin, 1996, Zawaydeh, 1998). The invocation of the element [A] here provides a more uniform, less arbitrary and more explanatory account of the emphatics in Arabic.

This paper seeks to provide an analysis of the composition of Arabic emphatics and gutturals within the framework of Government Phonology, focusing particularly on the element [A], which I believe is accorded a 'special' status in Arabic, as manifested in the harmonisation processes previously mentioned. It is the presence of this element that makes Arabic sound particularly 'harsh' or 'guttural' to those encountering the language for the first time. Furthermore, I shall make clear in this study the distinction between pharyngeal and uvular, as there has been some confusion over this in the literature. I believe that GP provides the ideal framework for a comprehensive analysis of Arabic which is not only able to explain the phonological processes at work in the different varieties of the language, but also able to predict them on the basis of empirical evidence. Moreover, I believe that a

[1] Bellem (1999).

[2] 'Emphatic' is a convenient label which I use here in an informal sense, just as 'guttural' is a convenient (informal) term for a class of expressions known as uvulars, pharyngeals and laryngeals (cf. McCarthy 1994 for motivation of gutturals as a natural class).

comprehensive study of the processes inherent in Arabic could contribute much to the development of Government Phonology theory.

2. Background

There has been a vast amount written about Arabic gutturals and emphatics, ranging from the descriptions of the medieval Arab grammarians and more recent Western grammars of the various dialects of Arabic, to acoustic and articulatory phonetic investigations and analyses within the frameworks of various linear and autosegmental theories of phonology. Much of the Western literature has been concerned with identifying which features characterise the various guttural classes and the emphatics; proposing underlying representations; putting forward arguments for different formal terms for emphatics (e.g. velarised, pharyngealised, uvularised, backed, and so on); investigating the extent of 'emphasis spread' in some dialects. There has been a recent move towards feature-geometric analyses, following McCarthy (1988, 1989, 1991, 1994), and some of these investigations have attempted to explain the difference between guttural vowel-lowering and the emphatic effect. In this section, I outline some of the analyses which I consider relevant to this paper. First, I look at some of the phonetic evidence, and in section 2.2 I give a summary of some recent feature analyses of gutturals and emphatics.

2.1 Phonetic investigations

Ladefoged (1993) discusses four types of secondary articulation, one of which he describes as the superimposition of a narrowing of the pharynx. He argues that as cardinal vowel 5 – [ɑ] – is the most back possible vowel without producing pharyngeal friction, it is the imposition of this vowel quality as a secondary articulation which causes what he calls pharyngealisation (i.e. uvularisation).

Acoustically, it is well-documented that segments with secondary uvular/pharyngeal articulation exhibit significantly lowered second formant transitions and raised F1 transitions.[3] It is also noted that the pharyngeal segments /ħ/ and /ˤ/ have high F1 and low F2 transitions,[4] and McCarthy (1994) notes that uvular /ʁ/ and /χ/ have low F2 , but whereas the first formant is relatively high, it is not quite as high as for the pharyngeals. As we shall see from the articulatory evidence, shortly, we would then expect the emphatics and the uvular segment /q/ to exhibit the same 'semi-high' F1. Several researchers claim that the upper pharyngeal constriction of emphatics is responsible for the low F2 transitions, whereas the lower pharyngeal constriction of ATR causes raised F1.[5] Goad (1991) claims that 'emphasis' is really backing, which causes lowered F2, whereas ATR-harmony causes lowering, which is evidenced in raised F1 alongside the lowered F2. Obrecht (1968) claims that it is only the lowered frequency of the second formant which causes a segment to be perceived as emphatic. It is important to note that many researchers have established that emphatics have raised F1 transitions in addition to low F2, which is the profile of the vowel /ɑ/, because the vowel with the lowest F2 is that approximating the back (non-low) /ɯ/, but this vowel has a very low first formant. If we are to equate the emphatic

[3]Cf. al-Ani & el-Dalee (1984), Kuriyagawa et al. (1988), Herzallah (1990), Zawaydeh (1998). Also Younes (1993) reports F2 drop in vowels affected by uvularisation, but does not mention the first formant. However, his spectrograms show higher F1 transitions in an emphatic environment, for example in comparing the minimal pair [daallaat] and [daallaat] (pp.143–144).
[4]McCarthy (1994), Ghazeli (1977), Butcher & Ahmad (1987).
[5]Card (1983), Shahin (1996).

phenomenon with the quality of one of the sonorants, then, it is essential to establish the trends of both formant transitions.

The articulation of emphatics involves moving the tongue dorsum back towards the upper pharynx. Ali & Daniloff (1972) observe that the upper pharyngeal wall is not actively involved in the articulation of emphatics, and al-Ani & el-Dalee (1984) also do not show movement of the pharyngeal wall in their x-ray tracings, only of the tongue. Ghazeli's (1977) films show that emphatics have greatest pharyngeal constriction at the upper pharynx, across from the second vertebrae.

In contrast, the pharyngeal segments /ħ/ and /ˤ/ are articulated by an approximation of the posterior wall of the laryngopharynx and tongue root from the epiglottis down to the larynx. Both posterior pharyngeal wall and tongue root are moved inward from their rest positions, and the larynx is raised (Ghazeli (1977), Card (1983), McCarthy (1991, 1994)). The place of articulation with these segments is clearly the lower pharynx, as confirmed by Ghazeli's showing that the greatest constriction is below the epiglottis, at the fourth and fifth vertebrae.

Uvular /ʁ/, /χ/, /q/ are produced with much higher constriction than the pharyngeals,[6] with the constriction occurring through the retraction of the tongue dorsum toward the posterior wall of the oropharynx. This constriction, then, is similar to that of the emphatics. The difference is that while /ʁ/ and /χ/ are uvular fricatives, /q/ is a uvular stop, where the velum lowers to touch the retracted tongue dorsum, and the emphatics are coronal obstruents with secondary upper pharyngeal approximation.

Phonetic evidence, then, shows that pharyngeals have primary lower pharyngeal constriction, and the emphatics and uvulars all have some kind of upper pharyngeal constriction. In order to differentiate between the two, I shall term upper pharyngeal constriction *uvularisation*, so that the so-called uvulars are really uvularised velars, and emphatics are uvularised coronals. I shall argue that pharyngeals are characterised by headed [A], whereas the uvularised segments are characterised by [A] in a dependent role.

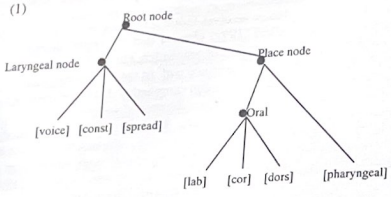
2.2 Feature analyses

2.2.1 Underlying representations

Most of the recent literature on gutturals and emphatics has been feature-geometric, following in particular the McCarthian model (McCarthy 1988, 1989, 1991, 1994). McCarthy (1991, 1994) bases his model on the extensive evidence of various Semitic languages that the gutturals and emphatics form a natural phonological class. He attributes this to the presence of the (place-of-articulation) feature [pharyngeal], as per the following representation (McCarthy, 1994):[7,8]

[6]Ghazeli (1977), McCarthy (1991, 1994).
[7]See also Shahin (1996), Elorrieta (1991), Herzallah (1990), Goad (1991).
[8]As McCarthy himself points out, this model does not account for the behaviour of laryngeals in some languages (e.g. most Semitic languages), where they pattern with gutturals. On this point see Rose (1996), who deals with this in depth.

(1)



Some researchers argue for the branching of the Place node into Upper and Lower vocal tract, with the lower VT node then branching into Pharyngeal and Laryngeal. Pharyngeal then branches into the features *[RTR]* and *[CP]*, for retracted tongue root and constricted pharynx, to differentiate between the upper pharynx (uvular region) and lower pharynx.[9]

3. Government Phonology

Government Phonology[10] (henceforth GP) provides a theory in which the relationship between phonological segments is formalised by licensing and government. An essential component of GP is the assumption of the privativeness of the melodic primes which make up phonological expressions, alongside the hypothesis that primitives have independent phonetic interpretation. These two fundamental premises, which set GP firmly apart from feature theories, allow for a finite set of elements, which may be represented in simplex or complex expressions. Language-specific phonotactic constraints can be accounted for in terms of licensing and government (the latter being a specific kind of the former), with harmony (or spreading) processes being controlled by licensing constraints.

3.1 The elements

The melodic primes which make up expressions are formally called elements in GP. Kaye, Lowenstamm and Vergnaud[11] (1985, 1990) and Harris (1990) proposed an inventory of ten elements, including the ATR element *[ɪ]*. The operation by which elements combine to form complex expressions was originally constrained by 'charm', which allowed only certain elements to combine, thereby attempting to prevent over-generation of the fusion operation. Two major developments in GP have been the introduction of licensing constraints in place of charm and a reduction in the number of elements. It has been proposed[12] that all elements should be present in vocalic and consonantal expressions alike, and for this, and other, reasons, the ATR element *[ɪ]* was made redundant,[13] and there have been attempts to limit the elements to an inventory of five, under what Jensen (1994) terms non-segmentalism. This is,

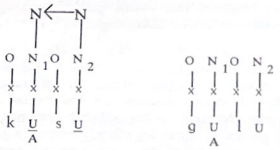
[9]Davis (1995), Zawaydeh (1998).
[10]Kaye, Lowenstamm & Vergnaud (1985, 1990), Charette (1991), Harris (1990, 1994a), Harris & Lindsey (1995) Brockhaus (1995).
[11]Henceforth KLV.
[12]Kaye (1993) – postgraduate phonology seminar, as summarised in Charette & Göksel (1998) and Walker (1995).
[13]Cf. Charette & Kaye (1993).

however, controversial and outwith the scope of this paper, and I thus assume the nine elements [A], [U], [I], [R], [L], [H], [N], [h], [ʔ], with the elements [A], [I], [U] and *[R]* being essential to my analysis.

2.2 Licensing

In a phonological expression, one element takes the role of head, while other elements of the compound assume operator (dependent) status. Within any phonological domain, any non-head must be licensed by the head of that domain in order to have expression. This means that heads of lower-level domains (which are not heads in the higher-level domain) must also be licensed, a process known as h(ead)-licensing, whereby all heads must be (prosodically) licensed by the head of the higher prosodic domain. H-licensing is primarily employed to explain tense/lax vowel distinctions, where the nucleus which is head of the harmonic span is headless and therefore cannot h-license the dependent nuclei in that span. They are thus headless:[14]

(2) a. b.



[kosu] 'fire' [gɔlu] 'dugout'

In this way, if the domain-head is an unheaded expression, h-government does not obtain between the head and other nuclei, which means that these positions are then not h-licensed and thus dominate unheaded expressions.

The query with this analysis, however, is the problem of how to account for a headless nucleus licensing the head of the expression in onset position which it governs. We therefore have to allow for licensing through a headless expression, so that either the head nucleus on the nuclear level h-licenses onset heads, or the rhymal projection 'specially' licenses the onset-head, acting as head of the headless nuclear position. This would then allow for a situation where some ATR harmony appears to exist, such as in Arabic where we see spans containing only lax vowels, but these spans may or may not encompass the entire phonological word. Also, to assume that the rhymal projection 'specially' licenses the onset-head allows us to account for some sort of harmony which takes place at this syllabic level. In Arabic, for example, [A]-spread (more specifically, [A]-licensing), aka uvularisation, takes place at both nuclear and syllabic levels. Moreover, some sort of 'special' licensing is triggered by *[R]*, since it is coronal emphatics which trigger [A]-licensing.[15]

[14]Source: Denwood (1997).
[15]Cf. Bellem (1999).

4. Segmental representation

In this section I aim to motivate my analyses of the elemental representation of gutturals[16] and emphatics and I argue that all these segments have the element [A] in common. §4.1 looks at the representation of uvulars, while §4.2 is concerned with pharyngeals and §4.3 deals with the emphatics.

4.1 Uvulars

Arabic traditionally has three postvelar (consonantal) segments: the voiced and voiceless fricatives /ʁ/ and /χ/ and the voiceless stop /q/. Historically, the latter was a voiced stop /ɢ/, and some dialects, e.g. standard Iraqi, retain this in many contexts. Other dialects such as Levantine, however, reduce the /q/ to /ʔ/, or occasionally /dʒ/ obtains, for example in southern Iraqi rural dialects. In Khuzistan (Arabic-speaking area of south-west Iran) it becomes the voiced fricative /ʁ/.

4.1.1 Evidence from other languages

It has been noted in many languages that uvulars pattern phonologically with pharyngeals. We see, for example, in Interior Salish languages[17] that vowel-lowering is caused by the uvulars and pharyngeals /q/, /qʷ/, /qˤ/, /qˤʷ/, /χ/, /χʷ/, /ᶜˤ/, /ᶜˤʷ/, /ᶜˤ/, /ᶜˤʷ/, both progressively and regressively. However, in Chilcotin, uvulars pattern with emphatic coronals.[18] Chilcotin has two sets of coronal sibilants – plain and 'flattened'. There are also two sets of dorsals, which correspond with Arabic velars and uvulars. What is particularly interesting, however, is that although flattening spreads to vowels, emphatic dorsals (uvulars) have a lowering effect (acoustically – lowered F2) only on immediately adjacent vowels, whereas the emphatic coronals have a lowering effect on all vowels in the word. Clearly, then, this is very similar to Arabic, except that emphatic coronals in Arabic also seem to be able to affect other consonants.

It is also interesting to look at how languages with no uvulars interpret borrowings from, say, Arabic. In Turkish, for example, Arabic uvulars are borrowed as velars, but the following vowel is always non-palatal:

(3)	Source Language		Turkish	Gloss
	qiyma(t)	(Arabic)	kıymet	'value'
	qalb	(A)	kalp	'heart'
	kalaam	(A)	kʲelam	'speech'
	kibr	(A)	kʲibir	'grandeur'
	ʁariib	(A)	garip	'strange'
	ʁudde	(A)	gudde	'gland'
	gul	(Farsi)	gʲül	'rose'
	χaatuun	(A)	hatun	'lady'
	χayr	(A)	hayır	'goodness'

From this data, it is clear that Turkish does not have [A]-spread, and does not have [A] in non-nuclear positions. Therefore, a vowel adjacent to an original uvular is interpreted as being non-palatal, but the same (Turkish) segment as an interpretation of an original velar will be palatalised, as will its adjacent vowel.

This, then, shows that velars and uvulars have the same minimal-pair relationship that is exhibited in many other languages for palatalised/non-palatalised consonants.

[16] As previously noted, laryngeals (in Arabic /h/ and /ʔ/) require in-depth treatment which I am unable to provide in this study. However, I intend to include this in a future investigation.
[17] Cf. Elorrieta (1991), Rose (1996).
[18] Cf. Goad (1991), Rose (1996).

4.1.2 The status of [A]

We have already seen in §4.1.1 that the Arabic uvulars seem to be some sort of counterpart to the velars. We have also seen that they are a counterpart to the coronal emphatics, but that only adjacent nuclei are affected, whereas the coronal emphatics seem to spread to non-nuclear segments. It is also evident that the relationship between a uvular and its governing nucleus is similar to that of the coronal emphatics.[19]

For these reasons, alongside the phonetic evidence, I suggest that the Arabic uvulars are actually uvularised velars. In terms of their elemental representation then, they must resemble velar segments, but there is some difference which accounts for the uvularisation, which I assume to be the presence of [A], which would cause some pharyngeal effect. In §2.1 & 2.2 we saw that the uvulars have articulation in the upper pharynx, and possibly a slightly (as opposed to significantly) raised F1 with the lowered F2. This indicates then that [A] cannot be present as a head, because it would otherwise manifest its characteristics fully. [A] is thus present as a non-head, so that the representation of the velars and uvulars is as follows:

(4)	Velar	Elements	Uvular	Elements
	k	[h.ʔ]	q	[h.ʔ.A]
	g	[h.ʔ.L]	ɢ	[h.ʔ.L.A]
	x	[h]	χ	[h.A]
	ɣ[20]	[h.L]	ʁ	[h.L.A]

Harris (1994a, 1998) represents the velars as headed by neutrality [@], which is underlyingly present in all segments but only affects the realisation of an expression when head. My idea of the representation is that these segments are headless, which one could argue is the manifestation of a neutral (unseen) head. In this sense, then, it is merely a matter of convention as to whether or not one portrays the neutral [@]-head, or headlessness. However, it seems that headlessness of nuclei is a different matter, and it would be interesting to investigate the interaction further.

According to the representations in (4), it is conceivable that there are dialects which might have velars other than /k/, so that these dialects could contrast /g/ with /ɢ/, /ɣ/ with /ʁ/ and /x/ with /χ/. Indeed, such dialects are reported (for example, some Palestinian dialects), but these extra velars will not be relevant to this study.

4.2 Pharyngeals

All dialects of Arabic, to my knowledge, have the voiceless pharyngeal fricative /ħ/ and the voiced pharyngeal approximant /ᶜ/, which in some dialects is a stop, as I believe it was historically, although the medieval grammarian Sibawayhi[21] says that it

[19] Bellem (1999).
[20] Voiced velar fricative (not approximant).
[21] Cf. Semaan (1968), Bakalla (1981).

is 'between' a continuant and a stop, indicating some confusion. I shall account for this in 4.2.2.

4.2.1 Evidence from other languages

Semitic languages are renowned for their pharyngeal sounds, but these are not peculiar to Semitic, and we have already seen that Interior Salish languages have a wide range of pharyngeals, including: /ʕ/, /ʕʷ/, /ʕˤ/, /ʕˤʷ/, /ħ/, /ħʷ/,[22] which trigger vowel-lowering, along with the uvulars.

Another language group known for its gutturals is Caucasian. In the East Circassian language Besleney,[23] /e/ is lowered to /a/ in front of the uvular and pharyngeal segments /qʼ/, /qˤʼ/, /ɢ/, /ʁ/, /qʷ/, /ɢʷ/, /χʷ/, /ʁʷ/. Also these segments cause what Rose terms 'epenthetic' schwa to be realised as /a/ (it is realised as /i/ in the environment of palatals and /u/ in the environment of labials).[24]

Interestingly, McCarthy (1994) (quoting Catford 1983: 347) mentions another Caucasian language (a Dagestanian language called Agul) which has a contrast between continuant /ʕ/ and stop /ʡ/. We have already seen Salish glottalised /ʡ/, and it appears that Ethiopian languages frequently glottalise /ʕ/.[25] The Ethio-Semitic language Tigre has the pharyngeals /ħ/ and /ʕ/, which lower a following /ə/ to /a/.

Arabic /ʕ/, according to Butcher & Ahmad (1987), is a voiced approximant, often with stop articulation and accompanied by creaky voice. Notably, Kurmanji Kurdish (Kahn, 1976), although it does have /ħ/, seems to reanalyse Arabic /ħ/ as /ʕ/. Thus:

(5)	Arabic	Kurmanji	Gloss
	[bahr]	[baˤr] *[bahr]	'sea'

In Farsi, however, Arabic /ʕ/ becomes /ʔ/ (usually in free variation with compensatory lengthening of the vowel). This is clearly lenition, where an element of Arabic /ʕ/ (presumably phonologically uninterpretable in Farsi) is delinked. We see, for example:[26]

(6)	Arabic	Farsi	Gloss
	[šɪˤr]	[še?r]	'poetry'
	[rʊˤb]	[ro?b]	'terror'
	[baˤd]	[bæ?d]	'after'
	[šʊˤle]	[šo?le]	'flame'

McCarthy (1994) notes that in Ghazeli's (1977) spectrograms, the /ʕ/ looks like an intervocalic glide. It is my observation that /ʕ/ in Syria (sedentary dialects) is articulated intervocalically as a 'soft' pharyngeal approximant, although initially it is easily confused with /ʔ/.[27] In contrast I have found that Iraqi Arabic speakers tend to articulate /ʕ/ with far greater constriction, usually a stop. Al-Ani (1970) had four Iraqi informants who produced /ʕ/ as a stop, and the Iraqi informants of Butcher & Ahmad (1987) were more likely to produce it as a stop than a continuant. We have seen the

[22] Rose (1996).
[23] Rose (1996).
[24] Rose does not make clear whether the labialised uvulars such as /qʷ/ trigger /a/, /u/ or /o/.
[25] McCarthy (1994), Rose (1996).
[26] Data from Harris (1998).
[27] Also noted by Cowell (1964).

debuccalisation process where Farsi produces /ʕ/ as /ʔ/ (loss of pharyngeal place). However, Syrian seems to be an example of a lenition process known as vocalisation, where a non-continuant becomes a resonant, which is the last stage before deletion.[28] This is also confirmed by borrowings into languages like Turkish, where /ʕ/ is traditionally an inter- or pre-vocalic /ʔ/, but in modern Turkey it is produced as a sonorant, with perhaps vowel-lengthening to compensate:

(7)	Arabic	Turkish	Gloss
	[ʕayb]	[ayıp]	'shameful'
	[sa:ʕa(t)]	[saat]	'time/hour'
	[ʔiʕa:de(t)]	[iade]	'return'
	[šiʕr]	[şiir]	'poetry'

4.2.2 The status of [A]

Given that /ħ/ is widely assumed to be a pharyngeal fricative, its elemental make-up would therefore consist of [A], which indicates pharyngeal place, and [h] which indicates the aperiodic energy typical of fricatives. Spectrographic evidence in Butcher & Ahmad (1987:162) clearly shows intense aperiodic energy in the production of /ħ/, in approximately the same frequency range as /h/ (in a comparison of [hi:f] with [ħi:f]), but the second formant transition for /ħ/ is significantly lower, with raised F1 also. As we have already shown that there is marked constriction in the laryngopharynx, it follows that the representation of /ħ/ is [A.L], with [A] as the head of the expression. The presence of [A] is backed up by the evidence discussed of vowel-lowering caused by pharyngeals in many different languages, which is analysable as [A]-spread.

Having already seen that [A] is the pharyngeal element, I propose that the manifestation of [A] in a non-nuclear position is the pharyngeal approximant /ʕ/, as in some dialects of Arabic (as well as in languages which have a contrast between plain /ʕ/ and glottalised /ʡ/, such as Interior Salish, Ethiopian languages and Agul). However, as discussed in the previous section, there is evidence that /ʕ/ may differ from one dialect to another in Arabic. Taking into account the evidence already discussed, I therefore assume that where /ʕ/ in Damascene Arabic is represented as [A], in Iraqi Arabic it is [A.ʔ.L].[29,30] This accounts for Arabic /ʕ/ being interpreted as either sonorant /a/ or glottal stop /ʔ/.

4.3 Emphatics

We have already seen that emphatic coronals pattern with both uvular and pharyngeal segments. However, the domain of spread is larger than in the case of uvulars. In looking at the representation of emphatics, then, we need to be able to account for both of these facts.

[28] Harris (1994a: 122) does not include [A] as a 'primitive' segment which can be the last stage in a lenition process, although the above constitutes evidence that it is indeed a 'primitive'.
[29] Van der Hulst (1995: 106) notes that creaky voice is commonly represented as a combination of glottalisation plus oral voice (i.e. [ʔ.L]). Butcher & Ahmad's (1987) spectrograms show /ð/ as voiced, as is mostly claimed in the traditional 'grammar' literature.
[30] Although [A] as a simplex expression is voiced, it is not active voicing, as is present in stops and obstruents. Rather, the phonetic voicing is a secondary non-spontaneous effect of sonorants. (Cf. Harris, 1994a: 135–6).

Traditionally, Classical Arabic had four emphatics (in addition to the uvulars of §4.1): ṣ ṭ ḍ ðˤ (or ṣ ṭ ḍ ẓ).[31] Arabic dialects today vary in the number of emphatics they exhibit, but the following have variously been reported as emphatic in different dialects: n m b̤ f w̤ z̤ l̤ r ʃ̤ č̤ ǰ̤ ʤ̤ k̤ ʰ h ʔ.

I shall propose that the non-coronals are like the uvulars in having secondary uvularisation which does not spread beyond adjacent vowels. The only segments which I have observed to trigger uvularisation in other non-nuclear positions are the coronals ṣ ð̤ ṭ ḍ l̤ r̤. Uvulars may occur in a word as the only emphatic segments, but emphatic segments which are non-uvular, non-coronal may not occur in isolation – they always co-occur with a coronal emphatic. Moreover, uvulars do not co-occur with non-coronal emphatic segments, hence the conclusion that while coronal emphatics cause a process of harmony (uvularisation) maximally across a morpheme or a phonological word (depending on the dialect), uvulars affect only an adjacent vowel (which is what I term pharyngealisation).

This leaves us with only the problem of accounting for uvularised /ˤ/ and /ḥ/. An example is given in Card (1983) of the minimal pair /baˤd/ and /b̤aˤd/, where [ˤ] has F2 700 Hz. lower than [ˤ]. I suggest that in this dialect (Palestinian) /ˤ/ is normally an approximant, but that it is 'fortified' in the environment of an emphatic from [A] to [A.ʔ.L]. Card notes that there is no cinefluorographic evidence of /ˤ/, and I have not seen any phonetic evidence other than Card's note of F2 drop in this one example. Lehn (1963:31-32) provides minimal pairs from Cairene Arabic:

(8) [ḥamma] 'he bathed' [ḥ̤amma] 'a boil'
[ˤunʔ] 'neck' [ˤṳnʔ] 'depth'

However, with no evidence of the exact nature of the vowels, I am sceptical that /ˤ/ and /ḥ/ in these examples are actually emphatic. I suggest that the vowels are conditioned, but that as /ˤ/ and /ḥ/ are anyway headed by [A], there is unlikely to be any difference in the nature of the pharyngeal segment itself. Rather, the adjacent lowered (or retracted) vowels are what condition the perception of the segment as emphatic. There is unfortunately no acoustic or articulatory evidence (in the form of spectrograms or x-rays) that I have been able to find to test this point. However, this conclusion was reached after testing the perceptions of an informant,[32] who initially said that /ḥ/ was emphatic in certain environments, but was then unable to hear any difference between the supposedly emphatic /ḥ/ and 'plain' /ḥ/. Crucially, the difference was in the adjacent vowels:

(9) [ˤunʔ] 'neck' [b̤aːˤuːd̤a] 'mosquito'
[ˤumʔ] 'depth' [ḥ̤umṣ] 'Homs' (city)
[bæˤd] 'after' [ḥ̤umm̤uṣ] 'chickpeas'
[zaḥ̤ta] 'hopskotch' [ṣaḥ̤ḥ̤a] 'health'

In this section, then, I shall treat primarily the traditional (coronal) emphatics, and the non-coronals as far as is relevant. This is because I believe that Arabic uvularised segments include coronal and non-coronal emphatics as well as uvulars. In fact, the uvulars pattern phonologically with the non-coronal emphatics in having retracted

[31]There is a dispute over the transliteration of what today in Standard Arabic are considered to be /ḍ/ and /ẓ/. In Classical Arabic these emphatics were considered to be equal to /d/ and /ð/.
[32]A native speaker of northern rural Palestinian Arabic, brought up in Damascus.

(lax) vowels following, whereas it is the coronal emphatics which seem to have a harmonising domain. The confusion is in traditional analyses where uvulars have been called gutturals (along with pharyngeals and laryngeals), and most uvularised coronals have been called emphatics, with any acknowledgement of the other non-guttural uvularised segments (i.e. r̤ l̤ m̤ b̤ and so on) writing them off as 'secondary' emphatics.

4.3.1 Evidence from other languages

A look at the behaviour of emphatics in other languages is very revealing. I shall look firstly at how emphatics change historically across languages, as well as at languages with their own emphatics.

Within Semitic, we see lenition processes involving loss of place (debuccalisation), such as:[33]

(10) a. [nzr] (Arabic) [nʁr] (Ugaritic) 'guard'
b. [ʔarḍ] (Arabic) [ʔåraˤ] (Aramaic) 'earth'

(10a) shows an example of the original /z/ of Arabic becoming /ʁ/ in Ugaritic. It is clear that the coronality [R] of the Arabic has been lost, and that the Ugaritic reduced expression remains headless (or assumes [@] as head of the expression). Compare this with (10b), where it is seen how Aramaic /ˤ/ was originally Arabic /ḍ/. Here it is evident that the coronality has again been lost (delinking of [R]), but instead of the expression remaining headless (or [@]-headed), [A] now takes the role of head (we have already seen that /ˤ/ is headed by [A], and also contains stopness [ʔ] and voicing [L]). This constitutes further evidence that [A] is present secondarily in emphatics.

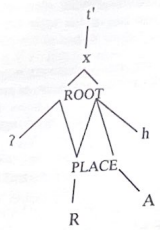
There is much evidence of emphatics in other languages which reveals that these languages either do not have uvularisation, or do not have uvularisation alone. Firstly, it is noted by Kaye & Rosenhouse (1997:276) that emphatics are often interpreted as labials, for example in the Bantu language Swahili. Jakobson (1957) also notes that Bantus and Uzbeks (two completely separate geographical areas and language families) substitute /tᵂ/ for /t/ and /sᵂ/ for /s/, and so on, which is, as he points out, a contraction of the front orifice instead of the back.[34] In other words, the relevant segment has [U] present, presumably because the language has a constraint preventing [A] being licensed in such a position. Turkic languages (including Uzbek) are well known for vowel harmony systems involving [U] and [I], so we could say that these languages accord a special status to [U] and [I], hence labialisation but not uvularisation.

Emphatics are also commonly realised as ejectives in Ethiopic languages. Rose (1996) discusses Tigre, a North Ethiosemitic language which has the pharyngeals /ḥ/ and /ˤ/ and the ejectives /t'/, /s'/, /c'/, /k'/, which are considered to be the Ethiosemitic reflex of emphatics. These segments lower a following /ə/ to /a/, although according to Rose, Tigre is one of very few languages known to have vowel-lowering ejectives. Given that these ejectives are judged to be perceptually almost indistinguishable from emphatics,[35] it would be reasonable to suggest that in these languages the so-called ejectives are also emphatic, i.e. uvularised and glottalised. An ejective /t'/ would

[33]Source: McCarthy (1994).
[34]See also Jakobson et al. (1951).
[35]Rose (1996) citing Fre Woldu (1986).

therefore be made up as follows [h.R. ʔ.A], with the following representation (as a contour segment):

(11)



Without phonetic evidence to support anything to the contrary, I have proposed the representation in (11), although it is not inconceivable that there is only one Place node, linked to both [R] and [A]. However, in either case, the representation would explain the ejectives of this language patterning with the gutturals in a vowel-lowering process, as it would mean that there is only one process: [A]-spread. If the ejectives did not have [A] in their representation, then there would not be one uniform process of vowel-lowering.

In §4.1 & 4.2, I gave examples of emphatics patterning phonologically with uvulars and/or pharyngeals, particularly in vowel-lowering (i.e. [A]-spread) in Salish, Chilcotin and Kurdish. The same happens also in two varieties of Tamazight Berber (Rose, 1996:86):

(12) Ayt Ndhir Tamazight Berber

a.	/bdu/	→	[əbḍo]	'to divide'
b.	/izil/	→	[eẓel]	'it is good'
c.	/iqqaz/	→	[iqqɑz][36]	'he digs'

(13) Ayt Segrouchen Tamazight Berber

a.	[izi]	'fly'	d.	/iẓi/ →	[eẓe] 'bladder'
b.	[llef]	'to divorce'	e.	/tṯef/ →	[tṯef] 'to hold'
c.	[nðu]	'to be shaken'	f.	/nḏu/ →	[nḏo] 'to cross'

The examples in (12) and (13) show typical [A]-spread into adjacent vowels, with the exception of (13e), which demonstrates an isomeric process where underlying /e/ is [A.I], but the presence of the emphatic triggers a switch to [A.I], hence /ɛ/.

4.3.2 The status of [A]

Having seen the phonetic evidence in §2, and the evidence in §4 of the manifestation and behaviour of uvulars, pharyngeals and (coronal) emphatics, it is reasonable to

[36]Not enough data have been provided to constitute any sort of evidence, but it is interesting that in this example (12c) shows /i/ before/q/ not lowering, yet in (12b) /i/ lowers to /e/ before emphatic /ẓ/.

assume that, like the uvulars, the coronal emphatics along with the other emphatics mentioned in §4.3 are all characterised by the presence of [A] as dependent. I suggest that what sets the coronal emphatics apart from the other emphatic segments and the uvulars is the presence of [R], although this is outside the scope of this paper.

The relevant segments are, therefore, to be represented structurally as follows (I have not listed all possible emphatics as the idea is obvious from the following):

(14)

s	[ḥ.R]	ṣ	[ḥ.R.A]
z	[ḥ.R.L]	ẓ	[ḥ.R.L.A]
t	[ḥ.R.ʔ]	ṭ	[ḥ.R.ʔ.A]
d	[ḥ.R.ʔ.L]	ḍ	[ḥ.R.ʔ.L.A]
n	[N.R]	ṇ	[N.R.A]
m	[ʔ.N.U]	ṃ	[ʔ.N.U.A]
b	[ḥ.ʔ.U.L]	ḅ	[ḥ.ʔ.U.L.A]
f	[ḥ.U]	f̣	[ḥ.U.A]
l	[R.ʔ]	ḷ	[R.ʔ.A]
r	[R]	ṛ	[R.A]

5. Conclusion

In this paper, I have given phonetic and phonological evidence for the representation of consonantal segments (i.e. those occupying an onset position) containing the element [A].

I have argued that [A] is present as a head in /ḥ/ and /ˤ/, and that it assumes a dependent position in the uvulars /q/, /ɢ/, /χ/ and /ʁ/, which are uvularised velars and thus headless. Emphatics (uvularised coronals) are also characterised by the presence of [A] in a dependent position, but the segment is, firstly, headed and, secondly, also contains [R], which is what I believe to license the spread of [A] to other positions, the process that I call uvularisation. This is distinct from pharyngealisation (aka ATR-harmony), which is a process of headlessness spread, and is active in Arabic alongside uvularisation.[37]

It is pertinent here to mention that this paper constitutes a small but fundamental part of a working investigation into the status of [A] with regard to onset positions, and my investigation is currently being broadened to include a more in-depth analysis of the status of [A] in languages besides Arabic, as well as a comprehensive overview of the various dialects of Arabic. In addition, looking at the processes of [A]-licensing and headlessness spread (pharyngealisation), in order to distinguish between the two, necessitates a careful and thorough investigation of Arabic syllable structure, since this is what holds the key to an analysis of the two processes. Previous analyses of 'emphasis spread' in Arabic have claimed either that 'emphasis' is a property of the syllable, or that emphasis is a property of vowels, or that a word containing emphatics has one consonant as the source, underlyingly specified as 'emphatic'. It seems, however, that the syllabic analysis has fallen out of favour, with most recent theories rejecting it. Nevertheless, all of these analyses base their argument on the assumption that Arabic has a CV / CVV / CVC and sometimes even CVCC syllable structure. However, not only do most of these analyses fail to account adequately and non-arbitrarily for unbounded leftward spread yet blockable rightward spread of 'emphasis', but, moreover, their assumptions of Arabic syllabification are rarely backed up, and where an explicit attempt is made to justify the assumption of CVV /

[37]Bellem (1999).

CVC syllables in Arabic, I believe that much fundamental evidence is actually overlooked. Furthermore, the arguments of most recent theories against a syllabic analysis of 'emphasis spread' are in fact invalidated by the hypothesis that Arabic has a CV-only syllable structure. It is thus essential to my overall work to conduct a comprehensive investigation into syllable structure, much of which is already underway.

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