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Towards a Comparative Typology of Emphatics

Across Semitic and into Arabic Dialect Phonology

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Thesis submitted to the University of London in partial fulfilment of the requirements for the degree of Doctor of Philosophy

Department of Linguistics, School of Oriental and African Studies

October 2007

To my beautiful Rana...

who has accompanied me on every step of this journey

أتعلمين أيّ حُزنٍ يبعث المطرْ؟
وكيف تنشج المزاريب إذا انهمرْ؟
وكيف يشعر الوحيد فيه بالضياعْ؟
بلا انتهاء – كالدّم المراق، كالجياعْ،
كالحب، كالأطفال، كالموتى – هو المطرْ!
ومقلتاكِ بي تطيفان مع المطرْ
وعبر أمواج الخليج تمسح البروقْ
سواحلَ العراق بالنجوم والمحارْ،
كأنها تهمّ بالشروقْ
فيسحب الليل عليها من دمٍ دثارْ.
أصيح بالخليج: (يا خليجْ
يا واهب اللؤلؤ، والمحار، والرّدى!)
فيرجعُ الصّدى
كأنه النشيجْ:
(يا خليج
يا واهب المحار والردى ..)

❋

بدر شاكر السيّاب – أنشودة المطر

I certify that the work contained within this thesis is entirely my own

.....

Abstract

This thesis investigates the role of emphatics within the Semitic sound system as the basis for a typology of Semitic emphatics.

In seeking to define the term 'emphatic', since emphatics are realised in some Semitic languages as ejectives, and in others as 'pharyngealised', or 'backed', the phonetic aspects of both are investigated. I present acoustic analyses of Tigrinya and Arabic (Peninsula Arabian and Iraqi) emphatics, paying particular attention to perceptual salience. Firstly, the notions of 'noise-lag' and 'stop-lag' are discussed and exemplified in relation to ejectives; secondly, I present and evaluate analyses of VOT in Arabic, showing that there is dialectal variation in the voicing series (i.e. two-way vs three-way). Further to this, I discuss the phonological composition of the various emphatics and gutturals, proposing structural representations broadly within an element-theoretic framework.

I then take a diachronic angle, looking at Proto-Semitic and the development of the sound systems of the Semitic languages, in particular the Semitic triads, and the development of 'backed' emphatics as a product of changing sound systems. I argue that Proto-Semitic laterals were not part of the 'triad' system and that the voiced lateral fricative was 'backed'. The emphatic trajectory hypothesis is evaluated and theoretically contextualised, and I show that dialectal variation in the voicing series of Arabic is relevant to the variant phonological systems of the dialect types discussed.

A preliminary comparative investigation into Arabic dialect sound systems is then presented. I discuss dialect classification and detail a set of key variables for each dialect group. The thesis then discusses the issue of 'emphasis spread', analysing data from four different dialect types. The data is discussed in terms of sound systems, and the traditional analysis of 'emphasis spread' is disputed. I show how the various sound systems of Arabic are characterised by resonance patterns, which are a crucial part of what is normally taken to be 'emphasis spread', and that there is an active process of 'fronting' (*imāla*) which is crucial to an analysis of 'emphasis' (*tafxīm*).

The thesis concludes with an evaluation of the research, stressing the need for systematic and consistent cross-dialectal analyses of both the phonetics and the phonology of Semitic emphatics. I outline how this can be used in future work to develop a comprehensive comparative typology, towards which this thesis is a preliminary contribution.

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Transliteration and Transcription

Phonetic transcription is shown in [square brackets], using the IPA. Semitic language data is given in *italics* and transliterated in accordance with the following scheme (which shows only the potentially non-standard items). The exception to this is the pharyngeals ʕ and ħ, which are shown as such in the data, but which in Semitic studies are more commonly transliterated as ᶜ and *ḥ*, respectively (note that I retain the latter for place names and personal names within the text). 'Inverted commas' indicate orthographic forms. <Slanted brackets> indicate systemic value.

Transliteration

Consonants

NOTE: emphatics are notated by a subscript dot (e.g. *ṭ ṣ*)

Transliteration	*IPA (broad)*
θ	[θ]
đ	[ð]
š	[ʃ]
ž	[ʒ]
č	[tʃ]
ǰ	[dʒ]
q	[q] (may indicate systemic <ḳ> = [q] ~ [k'])
x	[x] ~ [χ]
γ	[ɣ] ~ [ʁ]
ḥ	[ħ]
ᶜ	[ʕ]

Vowels

Transliteration	*IPA (broad)*
ā	[a:]
ē	[e:]
ī	[i:]
ō	[o:]
ū	[u:]
ä	[æ]

Chapter 1
Introduction and Background

This thesis investigates the role of emphatics within the Semitic sound system, and thus their 'meaning' in the Semitic context, and aims to constitute the initial step towards the eventual setting-up of a complete typology and geography of Semitic emphatics. The thesis is thus intended to make a contribution to the field of comparative Semitic studies, and, more particularly, to Arabic dialectology. Additionally, the intention is to contextualise this theoretically by identifying not just the phonetic correlates of 'emphatic' but also the phonological. I argue strongly that any phonological phenomenon cannot be seen in isolation but is an integral part of its sound system. I therefore also seek to show how phonological theory can enable us to understand an overall sound system. The thesis thus also makes a contribution to theoretical phonology. In particular, I show why the traditional view of subsegmental representations in Government Phonology is problematic when consonants such as ejectives enter the equation, and I propose an alternative view of subsegmental structure. I also show, contra the usual generative analyses, how Arabic has not only 'emphasis spread', but a general 'front'–'back' contrast involving resonance patterns, and that this is an integral part of the varying sound systems of Arabic dialects.

In this introductory chapter I provide a background to what follows in the remainder of the thesis. Firstly, §1.1 introduces the theoretical assumptions of this thesis, namely the framework of Government Phonology (GP). I discuss phonological primes, evaluating the use of elements rather than distinctive features, and also introduce the GP view of syllable structure. In §1.2 I then move on to a discussion of the root-consonantal system for which Semitic languages are well known, exemplifying this with the case of Arabic, and I discuss Arabic syllable structure. §1.3 is an outline of the literature on Arabic emphatics, looking first at the relevant points arising from the discussions of the medieval Arab grammarians, and then at the post-SPE generative phonology literature. Lastly, in §1.4 I provide an overview of the structure of the thesis.

1.1 Theoretical assumptions

In the post-SPE[1] generative tradition, it was generally assumed that phonological segments ('phonemes') consist of unordered bundles of feature specifications (positive or negative), and these features are defined in articulatory terms. In this section, I discuss why I refute this assumption, and I introduce the subsegmental units of phonology assumed in this thesis.

As noted, distinctive features are usually assumed to be articulatory in nature.[2] What exactly is the evidence, though, that natural classes are formed on an articulatory basis? This SPE tradition abandoned the earlier insight that phonological expressions are stored in terms of primarily acoustic–auditory characteristics. This auditory approach could be said to be encapsulated in the Jakobsonian observation that 'Any distinctive feature is normally recognized by the receiver if it belongs to the code common to him and the sender...'[3] In other words, since the common code is the speech signal (produced by the speaker, received by the listener), phonological primes have auditory–acoustic characteristics. It is these which then map onto the articulatory targets (and not vice versa).

In terms of language acquisition, it is the manipulations of the acoustic signal that represent the words that the child is acquiring; articulation is manipulation of the vocal tract configuration in the attempt to reproduce certain speech signal patterns. That this may take more than one attempt is evidenced by the speech of small children, or by that of adult foreign-language learners. For instance, a child who says [jɒji] for 'lorry', or a lisper who produces [θɒθɪd͡ʒ] for 'sausage', will still have the same mental representations as other speakers; what differs is the manipulation of the tools available (the vocal tract) to reproduce the signal. Moreover, if corrected, the lisper may insist that s/he has produced the word correctly: 'I *said* 'sausage'!': [aɪ θɛd θɒθɪd͡ʒ]. Similarly, and perhaps more obviously, a ventriloquist uttering the word 'bottle' without moving his/her lips will be understood (if s/he is reasonably good!) to have uttered this word, even though the vocal tract manipulations are significantly

[1] Chomsky & Halle's (1968) *The Sound Pattern of English*, generally thought of as the founding work of generative phonology.

[2] The first auditory approach to phonological subsegments in modern times was, of course, Jakobson (see Jakobson *et al.*, 1951). More recently, however, there are researchers who have worked on an acoustic approach to features, e.g. Flemming (2002), Kirchner (1997), Lindblom (1986).

[3] Jakobson *et al.* (1951:8).

different, and we could surely not argue that the ventriloquist has a different representation of this word when performing than when speaking in a normal social situation, or a different representation from a non-ventriloquist in the audience – otherwise how would the non-ventriloquist perceive the lexical item intended by the ventriloquist?

In sum, the position taken here is that articulatory labels (whether passive or active) [4] are not accurate characterisations of the mental representations of subsegmental primes.

The second point is that of binarity. Although there have been moves away from equipollent values within feature theory, the assumption of binarity is often not really questioned at a fundamental level. That is, the question of *why* phonological oppositions must be due to either positive or negative specifications for a particular feature. It is certainly a more abstract view to say that something is specified for values of a universal set of possibilities than to say that this thing is made up of a subset of the set of possibilities. To give a more concrete example, I shall use an analogy. If I want to include a recipe for omelette in a cookbook, I would list the following ingredients (i.e. its components, or subsegments): eggs, butter, milk, parsley, red peppers, cheese, salt, etc. It is inconsistent to assume that the language faculty deals with binary oppositions while the human cognitive system in general does not operate in this way. That is, my omelette is not defined in terms of a universal set of possible ingredients (e.g. all the foodstuffs that I may have in my larder), so my recipe is not: [+eggs], [+butter], [-chocolate], [+parsley], [-beetroot], [-honey], and so on.

In other words, in the real world, objects are made up of certain subsegments, which have a degree of independence (e.g. water contains hydrogen and oxygen, each of which may exist independently). Since phonological representations are part of the human cognitive system, and since this system must surely reflect our knowledge of the real world, we can assume that phonological primes, too, are represented in terms of their component parts. To put it another way, if I ask 'What is a banana?', I would not expect the answer 'It's not an apple,' or 'It's not an elephant.' That is, we don't define things in terms of what they are not: the most salient characteristics of a thing

[4] This is regardless of the 'Articulator' vs 'Place of Articulation' models; see McCarthy (1988) for a good summary.

are its positive attributes, whereas any negative attributes (what the thing is not) are extra information we give in order to compare something unfamiliar with something of which we have real knowledge.

Moreover, under the traditional generative view, the phoneme is the smallest independent unit of the phonology, i.e. sounds are discrete entities. However, phonological processes indicate that this is not really the case. For instance, lenition trajectories, where a particular sound can be seen to go through various stages of weakening, to the point of deletion, are not easily accounted for within feature-based frameworks, since the various stages of lenition are seen simply as changes for various feature specifications from - to +, or + to -. The final stage, deletion, is then the removal of the segment and all its featural specifications. However, if segments are comprised of component independent parts, then we can see weakening as some sort of loss, so that it is inevitable that the final stage of lenition is deletion.[5]

1.1.1 Elements in GP

Government Phonology (GP)[6] may be thought of more as a school than a theory since it comprises several strands of sub-theories, around each of which has arisen various research programmes. Those working within the framework of GP, and related frameworks,[7] have fundamentally challenged the post-SPE view of syllabic structure, the relations that hold between syllabic positions (and segments), and subsegmental composition. What concerns us predominantly in this thesis is subsegmental composition, so it is this angle that I concentrate on here.

One essential component of GP is the assumption of the privativeness of the melodic primes which make up phonological expressions, which also provides for the independent phonetic interpretability of the primitives. These two fundamental premises, which set GP firmly apart from feature theories, allow for a finite set of

[5] See Harris (1994) on the lenition trajectory, Harris (2005) (among others) on reduction as loss of information, Kaye (1989) for the refutation that the phoneme is the smallest independent phonological unit.

[6] Kaye, Lowenstamm & Vergnaud (1985, 1990), Charette (1991), Harris (1990, 1994), Harris & Lindsey (1995), Brockhaus (1995).

[7] Such as Dependency Phonology, following the work of John Anderson and others, see Anderson & Ewen (1987), or Strict-CV, following the work of Jean Lowenstamm, see Lowenstamm (1996), Scheer (2004).

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 all phonological processes essentially boiling down to either one of two operations: linking or de-linking (of elements). These two operations are regulated by licensing.

The primes which make up phonological expressions, and which are formally called elements, are defined by Harris (1994:138) as 'cognitive categories which serve the grammatical function of coding lexical contrasts'. Kaye, Lowenstamm and Vergnaud (1985, 1990) originally proposed an inventory of ten elements:

Figure 1.1 The original 10 elements of KLV (1985, 1990)

element	*consonants*	*vowels*
A		*a*-colour
I	palatality	*i*-colour
U	labiality	*u*-colour
ɨ		ATR
R	coronality	
H	aspiration	high tone
L	voicing	low tone
N	nasality	nasalisation
h	frication	
?	stop-ness	

However, the observation that the combinatory total of a maximum ten elements leads to vast over-generation (i.e. that it predicts far more segments than languages employ), as well as the observation that the distribution of the above elements is skewed (i.e. all elements should be interpretable in vocalic and consonantal expressions alike), led to attempts to reduce this inventory of elements. This programme was particularly active in the 1990s, and is often known as Revised Element Theory (RET).[8]

[8] See Ploch (1999) for a summary.

In the meantime, Harris (1994)[9] and Harris & Lindsey (1995) adapted the original inventory somewhat, proposing ten elements, and defining them acoustically as follows:

Figure 1.2 The properties of the Harris–Lindsey elements

element	*salient acoustic property*	*articulatory target consonants*	*articulatory target vowels*
A	F_1 & F_2: convergence	pharyngeality	*a*
I	F_1 & F_2: wide divergence	palatality	*i*
U	F_1 & F_2: downwards shift	(velar-)labiality	*u*
@	none (acoustic baseline)	velarity	*ə*
R	[10]	coronality	?rhotacisation
N	low broad-band intensity	nasality	nasalisation
h	aperiodic energy	noise	?breathiness
?	abrupt energy drop (edge)	stop	?creakiness
L	F_0: fall	slack vocal cords	voicing
H	F_0: rise	stiff vocal cords	aspiration

Under this scheme, all expressions by default contain the element @, which can be seen effectively as an acoustic baseline, and which is said to manifest its characteristics only when head of an expression.[11] A consonantal expression headed by @ is said to be a velar, while a vocalic expression headed by @ is somewhat centralised (since none of the other resonance elements can manifest their full characteristics in such an expression), so in a simplex expression it is schwa, while in

[9] See Harris (1994:Chap.3) for discussion of lenition trajectories and their relevance to the identification of individual elements.

[10] The status of R is not especially clear. Harris & Lindsey (1995) point out that it is hard to pin down a clear speech signal pattern for this element, or, indeed, for the class of coronal articulations. Some researchers have proposed that the element A is responsible for coronals, which I refute, for reasons that will be seen throughout this thesis. The reader is referred to Paradis & Prunet (1991), Rennison (2002), Williams (1998), Ploch (1999), Backley (1993), Ingleby & Brockhaus (2002).

[11] 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.

a complex expression it is responsible for laxness (in contrast to tenseness). Additionally, all obstruents are said to contain the element h.

There thus arose two main schools within Element Theory, at least as used within GP:[12] RET, the main proposals of which are often attributed to Jonathan Kaye, and the system employed by John Harris.

Under RET, one of the first main revisions was to eliminate the ATR element ɪ, deriving the tense–lax distinction through headedness.[13] Further, Jonathan Kaye proposed that since the elements A and R appeared to be in complementary distribution, R was obsolete and coronality should be derived through A.[14] Work conducted at SOAS in the 1990s argued that L and N should be merged, i.e. that both voicing and nasality are derived through the same element, usually taken to be L.[15] Additionally, H and h are merged, so that both aspiration and fricative-ness are derived through the element H. Effectively, this means that the elements H and L are manner elements, as well as 'laryngeal' elements.[16]

The approach followed in this thesis is somewhat a hybrid of RET and the Harrisian view. I adopt the following elements: A I U H L ?. In Chapter 2 I discuss the characteristic acoustic patterns of the resonance elements A, I and U, and in Chapter 3 I discuss the elements involved in manner contrasts and in 'laryngeal' contrasts (voicing, aspiration and glottalisation). Chapter 3 also discusses the issue of headedness and shows consonantal representations under the systems of both Harris (1994) and Jonathan Kaye. In Chapter 3, I also present the view of subsegmental structure argued for by Nasukawa & Backley (2005), and I adapt their model to fit the system of elements for which I argue.

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[12] Researchers working in Dependency Phonology derive vocalic and consonantal expressions through elements and have a slightly different view of subsegmental structure, see Anderson & Ewen (1987), Botma (2004). Adherents of Strict-CV use elements in a similar way to RET.

[13] Tense vowels are headed, while lax vowels have no head (i.e. the expression is headless). See Charette & Kaye (1993).

[14] His arguments are passed on anecdotally, but relate to the phenomenon of *r*-intrusion in English and observations concerning the lowering effect of *r* on vowels. Other researchers who have argued for the elimination of the R element are Backley (1993, 1998), who argues that coronals have no resonance element, and Rubin (2004), who argues that coronals have the palatal element I. See Chapters 3 and 6 of this thesis, where I argue (following Nasukawa & Backley, 2005) that coronality is derived structurally, and also that in Arabic coronals have an I element.

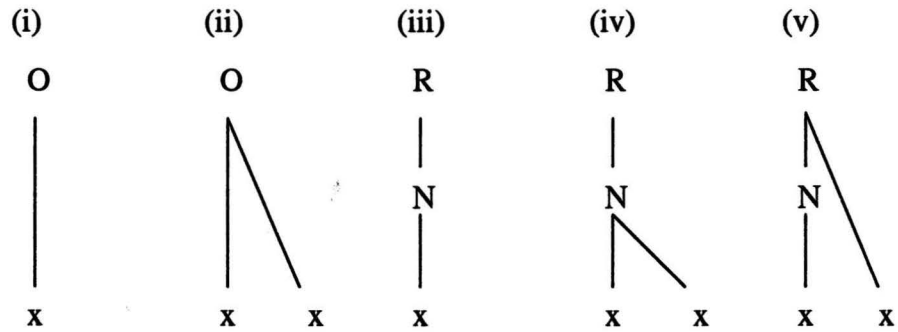
[15] See in particular Ploch (1999), also Nasukawa (2000, 2005), who uses N for both nasality and voicing.

[16] In Chapter 3, I argue that the third manner element, ? ('edge'), is also a 'laryngeal' element.

1.1.2 Syllabic structure in GP

This leads us to the next issue of relevance here, which is syllabic structure.[17] One aspect of GP which sets it so firmly apart from other generative theories is the view of the syllable. The most notable argument here is that there is no formal constituent corresponding to the syllable.[18] In GP, only three 'syllable-level' constituents are recognised: the onset (O), the nucleus (N) and the rhyme (R).[19] This also means that the coda is not recognised as a formal constituent within GP; the traditional coda consonant is generally seen as being in either a rhymal position, or, in the case of word-final consonants, an onset.[20] Moreover, these constituents are maximally binary-branching,[21] so that the following structures are allowed:

Figure 1.3 'Syllabic' structures in GP



In Figure 1.3, (i–ii) represent a simplex and a branching onset (respectively), while (iii) represents a short vowel. (iv) is a long vowel or heavy diphthong, and (v) is typically a (short)-vowel – consonant sequence (word-internal 'coda').[22]

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[17] This is not a major part of this thesis, since the focus here is on segmental structure. However, this issue is relevant to the templatic morphology of Semitic languages, as I discuss shortly.

[18] Throughout this thesis, the term 'syllable' is used informally, since it has no formal status within the theory.

[19] See Kaye *et al.* (1990). For useful discussion, see Brockhaus (1995), Honeybone (1999).

[20] See Kaye (1990, 1996), Harris & Gussmann (1998).

[21] There are two principles (to do with governing relations) which allow only binary branching: strict adjacency ('no position must intervene between governor and governee') and strict directionality ('directionality of government at the skeletal level is universal') (Kaye, 1990:306). I do not discuss government further here due to space constraints, but see Kaye (1990), Charette (1991).

[22] This scheme does not allow for the *n* of *sound* to be syllabified into a rhyme, due to the governing relations (onset *d* would have to govern rhymal *n*, yet the nuclear head position (N) governs its rhymal complement, thereby violating the principle of strict adjacency). Harris (1994:83) explicitly allows for super-heavy rhymes, however, showing a representation with a branching rhyme dominating a branching nucleus. It is an acknowledged problem.

Another important notion in GP relevant here is formalised as the Projection Principle, which holds that 'Governing relations are defined at the level of lexical representation and remain constant throughout a phonological derivation'.[23] The Projection Principle means that in GP there is no resyllabification: a word has the same prosodic structure in the lexicon as it does at output. Moreover, the mechanisms of licensing[24] in GP allow for empty positions in the string which may or may not have phonetic interpretation. This is formalised in the Empty Category Principle,[25] and means that vowel–zero alternations are strictly regulated and entirely predictable.

This view of syllabic structure, alongside the principles mentioned, means that the Semitic languages, in which words are essentially constructed on consonantal templates, and in which vowel–zero alternations are regularly seen across morphological paradigms, can only be analysed as having a CV syllable structure. This is the topic of the next section.

1.2 Semitic templatic morphology and syllable structure

Semitic languages generally have a non-concatenative system of morphology involving a lexically contrastive system of root consonants.[26] This means that lexical words that are semantically related share typically three consonants, known as radicals, while the vowels and other affixal consonants generally have a grammatical function. This can be seen in the following paradigms of (Standard / Literary) Arabic:[27]

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[23] Kaye *et al.* (1990:221).

[24] For a good summary, see Brockhaus (1995).

[25] '(i) A licensed empty nucleus has no phonetic realisation; (ii) An empty nucleus is licensed if (a) it is properly governed or (b) if it is domain final in languages which license domain-final empty nuclei' (Kaye, 1990:314). Proper government is defined by Kaye (1990:313) as: 'A nuclear position α properly governs a nuclear position β iff: (a) α is adjacent to β on its projection; (b) α is not itself licensed; (c) no governing domain separates α from β'. A nucleus which must receive phonetic interpretation is generally a schwa-type vowel.

[26] These are not freely combinable. The (first) major work on root co-occurrence (consonant compatibility) restrictions (or morpheme structure constraints) in Semitic is Greenberg (1950); see also Bender & Fulass (1978), Koskinen (1964), Hayward & Hayward (1989); for Afro-Asiatic see Bender (1978); see also Yip (1989). It is not possible within the confines of the current work to investigate the interaction of these constraints with emphatics; see McCarthy (1994) on guttural incompatibility.

[27] Data adapted from Kenstowicz (1994:396), which is recommended for a good discussion of what he terms 'root-and-pattern' morphology in Arabic.

(1)	study		draw	
	daras-a	'he studied'	*rasam-a*	'he drew'
	darras-a	'he taught'	*rassam-a*	'he made draw'
	dāris-(un)	'studying'	*rāsim-(un)*	'drawing'
	dars-(un)	'a lesson'	*rasm-(un)*	'a drawing'
	darrās-(un)	'a student'	*rassām-(un)*	'a draughtsman'
	dirās-a(tun)	'studies'	*risām-a(tun)*	'ordination'
	madras-a(tun)	'a school'	*marsam-(un)*	'a studio'
	ta-drīs-(un)	'teaching'	*ta-rsīm-(un)*	'making draw'

The data show that the only constancy in the various lexical items in each column is the three root consonants (radicals), *d-r-s* for the semantic notion of 'study' and *r-s-m* for 'draw'. Comparing the roots, however, and discounting the affixes which have been demarcated, it also becomes clear that the canonical shape of the words remains constant according to the grammatical category of the word. Under an autosegmental approach, where the consonants are represented on a separate tier, the first three forms of each column can thus be shown as follows (without the suffixes):

Figure 1.4 *The CV templates of d-r-s and r-s-m*

(i)

(ii)

While this is over-simplified, it exemplifies the basis of the templatic morphology system employed in Semitic languages, whereby the vowels and consonants can be seen as relating autosegmentally to templatic positions. We are now in the position to look at the syllable structure of languages like Arabic.

1.2.1 Arabic as CV-only

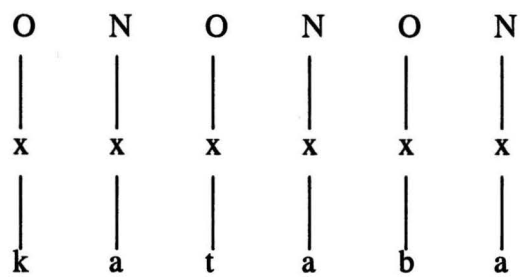
It seems that Arabic, despite appearances to the contrary, is really a CV language with no branching onsets, nuclei or rhymes.[28] The reason for this conclusion lies in the typical Semitic 'root-morphology' outlined above.[29]

My argument for CV syllabification in Arabic stems from the following question: if the initial *k* in a word like *katab(a)*, 'he wrote', is an onset (with a following nucleus), how can the same *k* in the word *yaktub(u)*, 'he writes', not also be an onset? All that has changed here is the 'disappearance' of the vowel, because the nucleus is not assigned any melodic content in this particular configuration. We have seen that a fundamental assumption of GP is that there is no derivational process of resyllabification (the Projection Principle), and Semitic root-morphology provides strong evidence motivating this.

The representations of *katab(a)* and *yaktub(u)* are therefore as follows:[30]

Figure 1.5 *The representations of kataba and yaktubu*

(i)

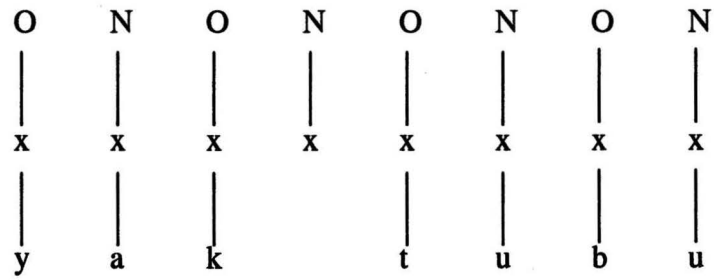


[28] I should note here that my conclusion re-Arabic syllable structure was reached independently, but is by no means novel. The CV analysis is strongly argued by Jean Lowenstamm, although he extends this to all languages under the 'Strict-CV' approach. I don't agree, however, that all languages are CV-only. Interestingly, Lowenstamm's work is predominantly on Semitic languages, for which the evidence for CV-only syllable structure is very strong. See Lowenstamm (1996). Additionally, Yoshida (1993) also convincingly argues the case for a CV analysis of Arabic (in a standard GP approach), with much more detailed argument (and more data) than I am able to present here.

[29] For a good introduction to this, see Kenstowicz (1994–420), Holes (2004:ch.3). See in particular the work of John J. McCarthy, e.g. McCarthy & Prince (1990).

[30] I use O and N here for onset and nucleus. I have not shown the R(hymal) level of nuclear projection.

(ii)



The representations above show *k* in both words to be linked to an onset position, and in *yaktubu* not to a rhyme ('coda'). I maintain that all consonants in Arabic are linked to onset positions.

The next question is: now that we have ruled out branching rhymes, what evidence is there to support branching nuclei? I suggest that, for the same reasons as above, there are no branching nuclei. In fact this is supported orthographically in Arabic, where 'consonants' (including 'long' *a i u*) are written with main characters and short vowels are diacritic marks above or below the main characters, thus giving us sequences of onsets and nuclei. The relevant 'transcribed' diacritics in Arabic are: a i u o ('o' is called *sukūn*, literally 'silence', and indicates the lack of a vowel). Orthographically, the word *yaktub(u)* is as follows:

$$Y^{a}K^{o}T^{u}B^{u}$$

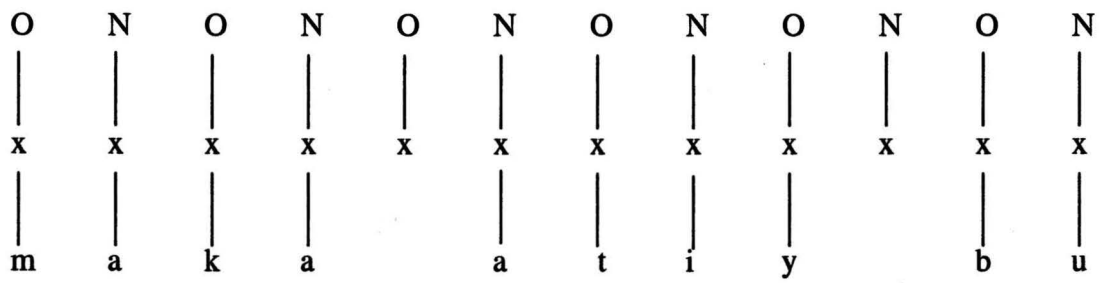
Compare this with *makātīb(u)* 'letters':[31]

$$M^{a}K^{a}A^{o}T^{i}Y^{o}B^{u}$$

Arabic orthography suggests six onset–nucleus sequences in *makātīb(u)* 'letters', which I represent as follows:

[31] This is the 'broken' plural form of *maktūb*.

Figure 1.6 The representation of makātību



In this way, the diacritic *sukūn* is an acknowledgement of an empty nucleus which is unexpressed. These plural forms of Arabic, which are known as 'broken' plurals, are crucial evidence for a CV-only analysis.[32]

Finally, the issue of long vowels merits further discussion. In many dialects of Arabic, the sequences written as (heavy) diphthongs are generally realised as monophthongs, e.g. 'iy' (transcription *ī*) is realised as [i:]. In many dialects, the Old Arabic sequences reflected orthographically as 'ay' (*ay*) and 'aw' (*aw*) generally have the reflexes *ē* and *ō* (i.e. [e:] and [o:]). However, there are many cases in which certain dialects have *ē* and *ō* alongside *ay* and *aw*.[33] Within the framework of Element Theory, *i~y* and *u~w* alternations are predictable, since both *i* and *y* contain only I, and *u* and *w* only U. The change is thus only one of the constituent to which the element is attached.[34] The same can also be said of the sequences *ay~ē* and *aw~ō*, which can be seen as follows:[35]

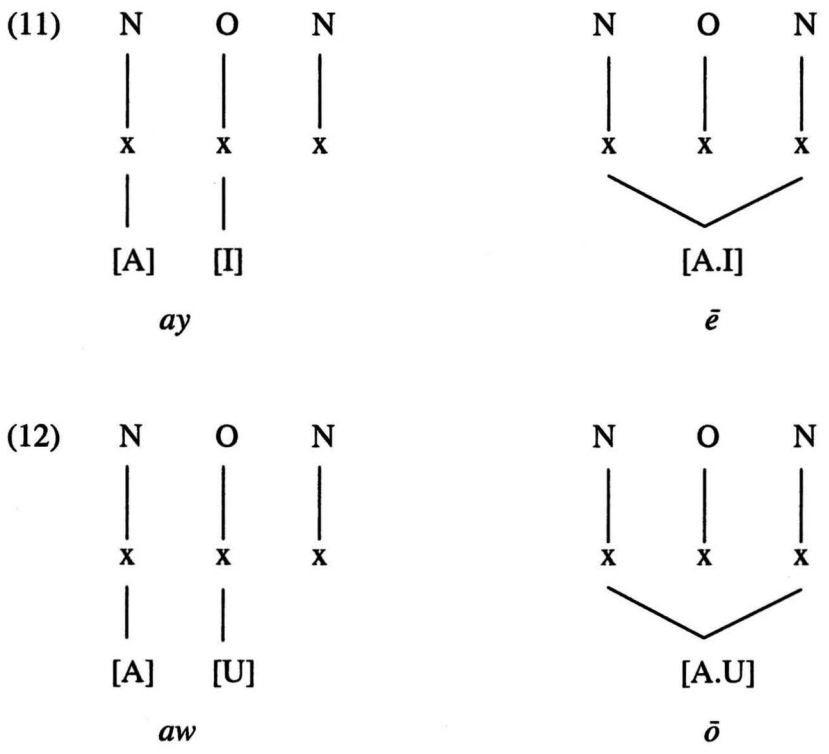
[32] As noted by Yoshida (1993:157), stress assignment is another strong piece of evidence. Although space constraints prevent detailed discussion of this, under the syllable structure presented here, it is necessary (for dialects such as Palestinian, Baghdadi and Damascene) only to say that stress falls on the antepenultimate ON sequence.

[33] Watson (2002) notes this for Cairene Arabic, for instance. See the variables discussed for a number of dialects in Chapter 5.

[34] In Chapter 3 I discuss the issue of the lack of *a~ʕ* alternation.

[35] Such a structural analysis is also argued for by Dickins (2007).

Figure 1.7 The representations of diphthongs–monophthongs



This view is supported by the medieval Arab grammarians. Indeed, al-Nassir (1993:34–5) sums up that the most well known of the grammarians 'seems to imply that the underlying form of Arabic structure is a number of syllables of the type CV.'

1.3 The literature on emphatics

In this section I present a brief overview of the literature on Arabic emphatics. Since Chapter 2 deals with the phonetic correlates, and Chapter 4 with the historical angle (comparative Semitic), the focus here is on presenting some background to what follows in the thesis. Therefore, I start by outlining the relevant points from the Arabic linguistic tradition, and I then move on to briefly overview the analyses of the post-SPE generative tradition.

There has been a vast amount written about Arabic 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); and investigating the extent of 'emphasis spread' in a given dialect.

The general consensus that seems to have been reached is that Old Arabic ('primary') emphatics were *ṣ ṭ ḍ ḏ̣*, and that the dialects today generally have *ṣ ṭ*, alongside either *ḍ* ~ *ẓ* or *ḏ̣*, and (more or less marginally) *ɫ* and *ṛ*, and occasionally *m̰* and *b̰*. The coronal emphatics *ṣ ṭ ḍ (ẓ) ḏ̣* (the obstruents) are traditionally seen as 'primary', or 'phonemic', and may cause the spreading of the emphatic quality to other segments, whereas any other emphatic segments are generally described as 'secondary' or 'non-phonemic', having become emphatic under the influence of a primary (triggering) emphatic, with the exception of some marginal cases of *ṛ* and *ɫ̣*.[36]

There has been much discussion over the production of emphatics, ranging from the descriptions of the Arab grammarians to instrumental studies seeking to discover the exact nature of the secondary pharyngeal constriction. The conclusion is that the pharyngeal constriction itself is not the only marker of the emphatic nature, although in much of the Western, post-SPE literature, some sort of pharyngeal constriction is assumed to be the main correlate of the phonological feature which distinguishes emphatics.[37]

1.3.1 The Arabic linguistic tradition

The earliest sources we have that discuss emphatics are those of the medieval Arab grammarians. In these are to be found not only descriptions of the articulation of Arabic sounds, but also discussions of the reasons for certain sound alternations. The terms used by the grammarians to classify (gutturals and) emphatics are often cited in the contemporary literature; less well cited seem to be the Arab grammarians' discussions of consonant–vowel interactions in the context of the overall sound system. To an extent, the writings of the grammarians appear to have stemmed from a

[36] Some researchers have argued that *ṛ* is a primary emphatic, and there have also been debates on the status of *ɫ* and *m̰*. See Younes (1994), McCarthy (1994), Ferguson (1956), Card (1983), among others. Chapters 5 and 6 discuss these 'secondary' emphatics.
[37] See Chapter 2.

desire to protect the classical language from what was seen as its 'corruption' in the first centuries of the Arabo-Islamic conquests, which they attributed to the acquisition of the language by the conquered communities.[38] It cannot be said that this field of grammar was purely prescriptive, though. In the writings, as well as in the reports of the debates between grammarians (at least in the earlier days), they often turn to, or relate the judgement of, those considered to be the speakers of 'pure' Arabic, the Bedouin. Certainly, the treatises take the form of descriptions of how the language is actually used. Nevertheless, the aim was not purely descriptive, either, since Arabic was the language of the Qur'an (the 'final revelation'), and thus had a religious significance.

The first important writings in the tradition of the study of Arabic grammar were the dictionary (*Kitāb al-ʕayn*) compiled by al-Khalīl ibn Aħmad and the grammatical description of Sībawayh (*Kitāb Sībawayhi*) in the late eighth century CE, both of the Baṣran school.[39] Sībawayh[40] is often credited with having been 'the (founding) father' of Arabic grammar.[41] The zenith of linguistic scholarship (likewise the other scholarly disciplines) is generally considered to have been the tenth century CE (during the Abbasid Dynasty), with the most notable amongst the tenth-century scholars who influenced linguistic scholarship being Ibn Sīna (Avicenna) and Ibn Jinnī.[42]

What is interesting from the work of Sībawayh is that he regards each segment (*ħarf*[43]) not just as an indivisible whole, but as being composed of a set of 'features'

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[38] See Versteegh (1997:3–5; ch.12).

[39] The two well-known schools of this period were those of the rival cities of Baṣra and Kūfa (southern Iraq).

[40] Abū Bishr ᶜAmr ibn ᶜUthmān ibn Qanbar, nicknamed Sībawayh, d. late 8th C. He was of Persian origin, and is sometimes thought to have been a native speaker of Persian and *not* Arabic, although I believe it is more likely that his detractors simply used his Persian origin to say that he was Persian and therefore couldn't speak 'pure' Arabic (See Versteegh, 1997:39; al-Nassir, 1993:4-5).

[41] Versteegh (1997:39), for instance, comments that 'Without exaggeration one could say that the entire linguistic tradition in Arabic is nothing but a huge commentary on the *Kitāb Sībawayhi.*' See also Bakalla (1981), Semaan (1968).

[42] See Bakalla (1981).

[43] The term *ħarf* (plural *ħurūf*) is often translated as 'letter', since it may refer to an archi-grapheme (I use this term because in the script, the shape of a 'letter' varies slightly according to whether it is initial, medial or final). It may also be used to mean 'phoneme' or 'speech sound', although there are contexts in which *ħarf* could be interpreted as 'syllable' (i.e. CV unit). It could also roughly be translated in some contexts as 'consonant', since the (short) vowels are represented diacritically (*ħarakāt*, 'movements', i.e. transitions). Lastly, it also means 'particle' (i.e. prepositions, definite article, co-ordinating conjunctions, etc), and is used sometimes by Sībawayh to refer to a word. See al-

(*ṣifāt*, lit. 'characteristics, traits'). That is, he does not simply describe the articulation of each segment, but groups them according to shared characteristics.[44] The classifications of Sībawayhi that are relevant to this study are those concerning *isti^{c}lā'*, 'elevation', *iṭbāq*, 'covering, lidding', and *imāla*, 'inclination'.[45] The term often now used in discussions of 'emphasis' is *tafxīm* (lit. 'aggrandisement', 'puffing up', or 'making portentous'), although this is used by Sībawayh only in reference to the 'long vowel' *alif* (i.e. *ā*), an allophone of which is, he says, produced with *tafxīm*.[46]

Sībawayh's classification according to the characteristic of *isti^{c}lā'* relates to the sounds that are 'elevated towards the upper palate', according to which he classifies *al-ħurūf al-musta^{c}liya* as *ṣ*, *ḍ*, *ṭ*, *ẓ*, *γ*, *q* and *x*. This notion of the uvulars and emphatics being commonly 'elevated' persists throughout the Arabic tradition. The *musta^{c}liya* sounds are also characterised by their prevention of *imāla*, i.e. 'inclining' the (long) vowel *a:* (the *ħarf* known as *alif*) and (short) *a* (the *ħaraka* called *fatħa* 'opening') in non-guttural contexts. The (long) vowel *a:* in Arabic may undergo *isti^{c}lā'* in the proximity of these seven 'elevated' sounds, such that it too becomes *musta^{c}li*. *Imāla* essentially means the 'inclination' of *a* towards *i*, i.e. fronting (/raising), whereas the effect of *isti^{c}lā'* is backing.[47] What is interesting in the context of the analysis to be discussed in Chapter 6 is that the sounds which are *musta^{c}liya* are classified (in this respect) as one class precisely because they prevent *imāla*,[48] and this angle is often not investigated in the recent literature on emphatics.

The characteristic of *iṭbāq* is used to designate *al-ħurūf al-muṭbaqa* (lit. 'covered with a lid'[49]) as the emphatics *s*, *ḍ*, *ṭ* and *ẓ*, as opposed to all the other

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Nassir (1993:9–10, 20–5) for discussion. The concept of *ħarf* as a CV unit (i.e. consonantal segment specified for a vowel transition, *ħaraka*, or zero / 'silence' in the case of *sukūn*) shows how the grammarians essentially viewed Arabic as having a CV structure, as discussed above.

[44] Bakalla (1981:35–7).

[45] See Bravmann (1934), Versteegh (1997), Semaan (1968), Carter (2004), Bakalla (1981), al-Nassir (1993), Sara (2007).

[46] Al-Nassir (1993:103). In fact the earlier grammarians rarely use the notion of *tafxīm*, although for the later grammarians the segments with the characteristic of *tafxīm* include the emphatics and uvulars and in some contexts *l* and *r*, along with *ā*. Some of the later grammarians also add *ħ* and *ʕ*.

[47] See Chapter 2.

[48] Additionally, Sībawayh discusses the role of *r* in preventing *imāla* in many (but not all) contexts, as noted by al-Nassir (1993:99–100). This issue is discussed further in Chapters 5 and 6. In the recent (generative phonology) literature on emphatics, Arabic *r* is sometimes considered as an emphatic (which de-emphaticises in some contexts), primarily because of the prevention of *imāla*. See Herzallah (1990), Younes (1994), Heath (1987), among others.

[49] Al-Nassir (1993:50) prefers the term 'enclosed'.

sounds being *γayr muṭbaqa* ('not covered'), or *munfatiħa* (lit. 'opened').[50] Sībawayh describes the articulatory correlate of *iṭbāq* as the tongue closing from its (primary) place up to that part of the tongue opposite the velum, towards which the tongue is raised, thus 'enclosing' ('covering with a lid') the sound between the tongue and the velum (secondarily) and the (primary) place of constriction.[51] He notes that 'these four [consonants] have two places on the tongue'.[52]

Another important point is Sībawayh's classification of the coronal emphatic *ṭ* and the uvular stop *q* as *majhūra* (loud) rather than *mahmūsa* (whispered). These two terms have been the subject of some debate and have often been inferred as relating to 'voiced' and 'voiceless' (some scholars prefer 'fortis' and 'lenis'), respectively. However, contrary to this view, and as I argue in Chapter 2, this indicates not that *ṭ* and *q* were (phonologically) voiced, but that they simply lacked the aspiration that the non-emphatic voiceless sounds had. In other words, the terms *majhūr* and *mahmūs* relate to aspiration (hence the notion of 'whispering' denoted by the root *h-m-s*).

In addition, the Arab grammarians noted that the emphatics caused assimilation (*idγām*). This was noted in particular with consonants that are directly adjacent, as well as the definite article *al-*.[53] This is exemplified by the following discussion from al-Suyūṭī (d. 1505CE), who designated this phenomenon as *iṭbāq* ('covering'):[54]

> Every *sīn* [*s*] which is followed by *ʿayn* [ʕ] or *ʁayn* [*γ*] or *xā'* [*x*] or *qāf* [*q*] or *ṭā'* [*ṭ*] may be transformed into *ṣād* [*ṣ*], for instance *yusāqūna* and *yuṣāqūna*...the condition for this is that the *sīn* should precede these consonants (i.e. the elevated ones) not follow after them, and that these consonants should be close to it

Clearly, this indicates a R–L spread of the emphatic feature from one of the 'elevated' consonants into the *s*, but this apparently doesn't apply L–R.[55]

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[50] Carter (2004:127); Bakalla (1981:34).
[51] Al-Nassir (1993:50).
[52] Al-Nassir (1993:51).
[53] See al-Nassir (1993:71-79) on Sībawayh's discussion of *idγām*.
[54] Cited in Kinberg (2001:188).
[55] As discussed further in Chapters 5 and 6.

Overall, what is interesting from the discussions of the grammarians is that they related the emphatics and uvulars but didn't analyse them as the same thing. In fact, the reason Sībawayh discussed the 'elevated' consonants was to say that they prevented *imāla*, which is an important point taken up again later in this thesis, and which is notably opposed to the more current analyses, under which the emphatics trigger spreading maximally across the word.

1.3.2 Western generative phonology

In the more recent literature on the phonology of Arabic gutturals and emphatics, there are conflicting views on whether the emphatic property is consonantal, vocalic or suprasegmental, and those who give a suprasegmental analysis differ in their opinion of the domain for which the property holds (for some it is the syllable, for some it is the word, and for others it is minimally the CV unit and maximally the word). There are also conflicting views over the relationship between uvulars, pharyngeals and emphatics. Lastly, there are conflicting views over which segments are realised as emphatic when the property does spread. For example, according to Ghazeli (1977:102), Cohen (1969) argues that the words *sōṭ* 'whip' and *ṣōṭ* 'sound' are contrastive. Ghazeli (1977:102), however, holds that this view is based on orthography, and that 'there are no Egyptian speakers capable of making such a phonetic distinction... They all pronounce both words identically as [ṣoṭ].'[56] Generally, however, the analyses presented in such debates have been said to vary because of cross-dialectal differences, a point taken up in the following chapters.

The main issues in contemporary discussions of emphatics are generally the following: (1) the exact articulatory and acoustic correlates of emphatics; (2) the phonological feature corresponding to 'emphatic'; (3) whether this feature is a property of consonants, vowels or generally prosodic (syllable or word); (4) how far the feature spreads; (5) what (if any) are the opaque / blocking segments. Additionally, there have been debates over whether there is a lexical emphatic *ṛ* (and *ḷ*, among other consonants).[57] Moreover, some researchers have argued that in addition to the primary

[56] *Sic.* This should read [ṣo:ṭ] (S. Ghazeli, p.c.).
[57] See Chapter 5.

emphatics, there is a lexical *a* alongside lexical *ä*, which accounts for *r~ṛ* alternations and other instances where *imāla* does not occur.[58]

One interesting point arising from the literature is that analyses generally see the emphatic property as spreading leftwards to a greater extent than rightwards. For instance, according to Davis (1995), one dialect of rural Palestinian has unbounded leftward spread (to the beginning of the word), whereas rightward spread is blocked by palatals.[59] However, analyses of such a phenomenon generally focus on one, at most two, dialects, and there are problems in extending such analyses across Arabic generally, since there are clear differences between dialects, and in some dialects there are many instances of what appears to be a 'back' context (typically called 'emphatic') in which there is no primary emphatic coronal present to spread an 'emphatic' feature.[60]

Although, as noted, there have been debates over whether the emphatic property is segmental or prosodic, and whether it is primarily a feature of vowels or consonants, most often within the generative phonology literature, analyses have focused on a consonantal feature inherent in (primary) coronal emphatics, which then spreads. The identification of this feature has therefore been a primary concern.

The initial move towards distinctive phonological features in the 1950s held that emphatics are characterised by the (acoustic) feature [flat].[61] However, with the advent of distinctive features that were primarily articulatory in nature, and with the counter-arguments that the feature [flat] also covers labialisation and retroflexion and is thus not appropriate, this has now largely been dropped.

Throughout the 1960s and 1970s many of the discussions of emphatics focused on 'emphasis' as a prosodic, rather than segmental, phenomenon, with analyses ranging from those of researchers such as Lehn (1963), for whom 'emphasis'

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[58] See Herzallah (1990), Younes (1993).

[59] The analysis presented in Chapter 6 of this thesis argues that while coronal emphatics may, at a lexical (consonantal) level, assimilate leftwards, much of what is generally seen as 'emphasis' is not in fact emphasis, but lack of *imāla*.

[60] This seems especially the case with Bedouin dialects and southern Iraqi, as will be seen later.

[61] Jakobson (1957). This feature relates to what can be seen as a general flatting of the acoustic spectrum, or downward shift of formants.

was a 'phonologic component...with the syllable as its structural domain, which patterns as a constituent on the syllable level', to Firthian analyses of E-systems.[62]

Post-SPE, the focus came back to distinctive features, although now generally articulatory in nature.[63] With the rise of autosegmental phonology, much more work was done on Arabic emphatics, often explicitly seeking to account for their patterning with uvulars (and to some extent pharyngeals), but also seeking to differentiate the differing behaviour of emphatic spread. A variety of features were proposed, most often [guttural],[64] [CP],[65] [pharyngeal],[66] or [RTR],[67] and such analyses often focused on the geometric arrangement of phonological features in the subsegmental structure.[68] Typically, analyses sought to account for not only the behaviour of emphatics in comparison with uvulars and pharyngeals, but often also the apparent spread of the feature inherent in emphatics.

This thesis departs fundamentally from such analyses in several ways. Firstly, as discussed, the framework used here assumes that phonological primes are monovalent and not based on articulatory phonetics, and are in this sense more abstract. Secondly, generative-phonological analyses have been conducted on the assumption that Arabic syllable structure has branching constituents, which, as discussed above, is refuted here. Lastly, the conclusion reached in Chapter 6 is that what is often analysed as 'emphasis spread' in Arabic cannot be accounted for only by assuming the spread of some emphatic property. Rather, many of these contexts can be seen more clearly as domains in which no *imāla* has occurred. Under this view, the situation is less clear-cut than often assumed, yet it should be noted that this arises from the argument that a phonological phenomenon cannot be seen in isolation from the overall sound system. This is a fundamental premise of the present work.

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[62] 'E' = emphatic. See Ingham (1974), El-Haleese (1971).
[63] With the exception of Card (1983), who used the feature [F2 drop], and Hayward & Hayward's (1989) feature [guttural].
[64] Hayward & Hayward (1989).
[65] CP = constricted pharynx, used by Hoberman (1987), among others.
[66] Herzallah (1990), McCarthy (1994).
[67] RTR = retracted tongue root (as opposed to ATR, advanced tongue root), used by Goad (1991), Davis (1995), Shahin (1996, 2002), Zawaydeh (1998).
[68] See McCarthy (1988) for a good overview.

1.4 Overview of the thesis

For the purpose of contextualisation, and in order to clearly define what is meant by 'emphatic', as well as being the preliminary to an understanding of the role of emphatics within the sound systems of Semitic languages, Chapter 2 investigates the meaning of 'emphatic' in an external sense, that is, the phonetic aspects. Emphatics are realised in some Semitic languages as ejectives, and in others as 'pharyngealised' or 'backed'. The chapter discusses the articulatory and acoustic correlates of Arabic ('backed') emphatics as well as ejective emphatics. Additionally, since there is clearly inter-dialectal variation in Arabic concerning the number of voicing contrasts (i.e. some dialects have a 2-way, others a 3-way series), the results of my own analyses are presented and evaluated. Chapter 3 then discusses the phonological representation of (both types of) emphatics and gutturals, within an Element framework, proposing a contour structure to segmental representations. In Chapter 4, I take a diachronic angle, discussing the sound system of Proto-Semitic and the development of the sound systems of Neo-Semitic languages, in particular the Semitic triads, and the development of 'backed' emphatics as a product of sound systems. The Emphatic Trajectory hypothesis is evaluated and placed into the context of an Element analysis.

In Chapter 5, I discuss the aim of setting up a comparative investigation into the phonological behaviour of emphatics across the dialects of Arabic. To this end, I discuss dialect classification and then look at the phonological variables to be detailed. The chapter then looks at representatives from the major dialect groups, detailing the reflexes of these variables. Chapter 6 then takes up the issue of analysing 'emphasis' in Arabic dialects, presenting data from four dialects and discussing why I refute the 'emphasis-spread' analysis.

Lastly, I conclude in Chapter 7 by evaluating the research and discussing the direction of future research necessitated by the conclusions reached here.

Chapter 2
The (Synchronic) Phonetic Realisation of Semitic Emphatics

To see a world in a grain of sand...

This chapter seeks to provide a background to the following chapters on Semitic (and more particularly Arabic) emphatics. The core of this chapter concerns the notion and nature of 'emphatic'. That is, what is called 'emphatic' is not always uniform, in that 'emphatic' *ṭ* in one Semitic language is not the same as 'emphatic' *ṭ* in another, either phonetically or phonologically. So the question is, what does it mean to be 'emphatic'?

The vast literature on the subject of Arabic emphatics widely acknowledges the phonological patterning of Arabic emphatics with gutturals, and Arabic emphatics are generally said to be predominantly characterised by secondary 'pharyngealisation' (or 'velarisation'). By contrast, in many Semitic languages they are actually realised (with glottalisation) as ejectives.

In Semitic languages with ejectives (which until relatively recently was thought only to be the Ethiopic languages), these are clearly cognate to the 'pharyngealised' emphatics of Semitic languages like Arabic. The traditional assumption was that the Ethio-Semitic ejective emphatics were an innovation due to Cushitic influence. More recently, and especially with better investigation of the Afro-Asiatic parent family,[1] this view has come to be challenged by some scholars, who posit ejectives as the 'original' Semitic emphatics. Many contemporary scholars now acknowledge the controversy, yet still the earlier 'Proto-Semitic-emphatics-were-pharyngealised' assumption seems to prevail. Although the historical angle is investigated more fully in Chapter 4, it does still beg the question 'what is emphatic?'. Can we assume that Arabic emphatics generally are simply 'pharyngealised'? And how do they compare with Ethio-Semitic ejectives? Moreover, what do we mean by 'ejective' and how does it fit into the sound system?

A last point is that, confusingly, it is not always clear for a given language what exactly we are dealing with, since descriptive grammars often adopt slightly

[1] See Chapter 4.

vague or ambiguous terms, and since it is conventional to transcribe all types of emphatic with a subscript dot (e.g. *ṭ ḳ*). Moreover, there is clear confusion between the use of cover terms such as 'emphatic', and articulatory terms such as 'pharyngealised' or 'glottalised', particularly as the latter relate to phonetic realisations which are not necessarily related to phonological categories.

In sum, there is a clear historical link in Semitic between what are normally called ejectives, and what are normally called pharyngealised consonants, even though, outside of the Semitic languages, these types of segments do not appear to form a natural class. In terms of their phonological representation, one would not expect them to be the same. The concern is thus with what exactly 'emphatic', 'ejective' and 'pharyngealised' consonants are, in both phonetic and phonological terms, and with the nature of the correlation between them (in Semitic). This chapter investigates the phonetic angle, and in this way serves to contextualise the phenomenon of the emphatics in Semitic languages generally, and, particularly, in Arabic.

In this chapter I firstly investigate what the different types of emphatics are, in phonetic terms, both articulatory and acoustic. I include acoustic evidence to support my arguments, not only for Arabic-style emphatics, but also for Ethiopic-style ejective emphatics. This is especially relevant in terms of voicing contrast, as will be seen, and is pertinent to the following proposals for phonological representation.

Additionally, I look briefly at the articulation and acoustic pattern of the uvulars and pharyngeals, since I claim that these are relevant to the issue of the development of emphatics, and since Chapter 3 shows how uvulars and pharyngeals are phonologically related to emphatics.

2.1 Ejectives

In this section I look at what exactly is meant by 'ejective', giving an overview of physical descriptions (in order to define the term 'ejective') and then of acoustic cues.

An ejective is a segment made with egressive glottalic airstream mechanism. European languages in general are normally said not to have ejectives, and to

Europeans they may seem 'exotic' sounds;[2] however, there are instances of glottalics in English. For instance, in many varieties of British English it would not be considered pathological[3] for the word 'mistake' to be produced utterance-finally with a final glottalic [k'], although it is in no way phonologically contrastive. There are many languages in which ejectives are phonologically contrastive segments, however.

Ejectives are estimated by Henton *et al.* (1992) to be the fourth most common type of stop cross-linguistically (the first three are voiceless unaspirated, voiced and voiceless aspirated, respectively), occurring in up to one fifth of the world's languages (Maddieson, 1984, has 'about 18%', Catford, 1992, has 'about 20%'). Semitic languages with ejectives are the Ethiopic and Modern South Arabian languages.

2.1.1 Realisation of ejectives

The most common types of ejectives are stops and affricates,[4] although there are also ejective fricatives.

As previously noted, an ejective is characterised by two (normally) co-occurring constrictions, the first at the larynx (more specifically, the glottis) and the second at some point of the supralaryngeal tract. The glottal closure ensures that only the air trapped in the chamber between the larynx and the supralaryngeal constriction is used to generate the sound, hence the designation 'glottalic airstream mechanism' (as opposed to 'pulmonic airstream mechanism'). The glottalic airstream is initiated by the abrupt upward movement of the entire larynx,[5] compressing the air trapped between the glottis and the supralaryngeal constriction locus,[6] and giving the effect of a 'piston'. This causes the characteristic 'popping' sound, since the release of the supralaryngeal constriction causes the air to rush outwards rather quickly, in order to rebalance the air pressure behind the oral constriction with the ambient pressure (like

[2] Elliott's (1897) Ndebele dictionary says that ejectives are 'totally indescribable and impossible for a European to acquire'(!), as cited in Doke (1923:706–7), quoted here from Fallon (2002:4).
[3] As Ladefoged (1983:351) puts it: 'what is a pathological voice quality in one language may be phonologically contrastive in another...one person's voice disorder is another person's phoneme.'
[4] It should be noted here that 'affricate' designates a phonetic category which behaves in many languages like a stop. Particularly, ejective affricates are often phonetically affricated but otherwise behave as fricatives. This is discussed later.
[5] Ladefoged (1993:130) notes a rapid upward displacement of the larynx by 'about one cm' in his observations of Hausa ejectives.
[6] The compression of air causes a rise in air pressure between the two constrictions of about two times that caused by the pulmonic mechanism. (Ladefoged & Maddieson, 1996:78.)

the way in which a weather front between areas of differing pressure, shown as isobars, causes wind).[7]

Here, some comments would be in order concerning phonation and VOT. Firstly, the definition of ejective VOT, according to Catford (1983:345), is the time-lag between the oral release and the onset of glottal vibrations. There is some cross-linguistic variation in glottal and oral release timing, since, as Kingston (1985:16–17) puts it: 'the glottal closure may be released together with or soon after the oral one or it may be significantly delayed...Corresponding to this difference...is an impression that ejectives with simultaneous release of glottal and oral closures are less forceful than those where the glottal release is delayed.' Fallon's (2002:271) survey gives the shortest reported ejective VOT as 10 ms, for Abkhaz (Catford, 1983), and the longest, for Bzedukh, as 114 ms (Catford, 1992).

Regarding the 'less forceful' ejective release mentioned above, it is to be questioned how far these could be considered ejectives (phonologically, at least). For instance, (in some positions) in some languages (e.g. Hausa and Zulu), where an ejective is realised with simultaneous oral release and onset of voicing (a VOT of 0 ms), in terms of the voicing parameter the (weak) ejective has the acoustic characteristics of a 'plain' voiceless stop and, in Fallon's (2002:271) words, may have 'such weak ejection that merger with the voiced[8] stops becomes a distinct phonetic possibility'. Therefore, ejectives, when robust, have significant voicing lag, whereas they may in some cases be 'weak', having no voicing lag, and thus almost merging with 'plain' voiceless stops, which I treat as a case of lenition, much in the way a voiceless aspirated or voiced stop may lenite to plain voiceless. What is relevant is whether or not an ejective contrasts phonologically with a plain voiceless stop within

[7] This can be contrasted with implosives, which employ *ingressive* glottalic airstream, i.e. the larynx (with vibrating vocal folds) moves downwards, enlarging the pharyngeal chamber and thus reducing oral pressure.

[8] Fallon (2002:271) notes 0 ms VOT as one acoustic characteristic of a voiced stop. Therefore, what Fallon calls 'voiced' must be interpreted informally and is, strictly speaking, 'plain' voiceless, since the interaction of voicing and aspiration yields a possible four-way laryngeal opposition in plosives, i.e. voiceless aspirated, 'plain' voiceless, fully voiced, voiced aspirated ('breathy'). This is in contrast to the traditional voiced–voiceless opposition, which implies the possibility of only a two-way laryngeal opposition in plosives cross-linguistically. In terms of VOT, 'voiceless aspirated' has a significant voicing lag, 'plain voiceless' has an approximately simultaneous closure release and voicing onset (i.e. VOT value around 0), 'voiced' has significant pre-release onset of voicing (i.e. a negative VOT value), and voiced aspirated has both significant pre-release voicing onset and a period of post-release (voiced) aspiration (i.e. 'murmured' aspiration).

a given language or otherwise has the systemic function within the sound system of an ejective.

2.1.2 Auditory and acoustic characteristics

There are several possible acoustic cues for ejectives. However, as may have been inferred from the above discussions, this is not homogenous across languages, or even within languages. For instance, Monaka (2001:74) cites Lindau (1984)'s investigation of Hausa and Navaho ejectives: 'Hausa ejectives showed regular voicing at vowel onset whereas Navaho ejectives showed creaky voice after the release of the stop which continued into at least the first portion of the vowel.' Monaka rightly concludes (2001:74) that 'These observations make the determination of cues for ejective stops in the languages of the world rather difficult, the different experimental techniques used by the researchers also being a contributing factor.' Therefore, here I shall attempt a brief overview of the most salient cues, as this will have a bearing on our discussion later of the phonological representation of ejectives.

Firstly, I noted above that a 'weak' ejective may have little or no voicing lag. There also appears to be a direct correlation between VOT length and supraglottal pressure. As summarised by Fallon (2002:273), 'laryngeal raising plays a major role in influencing changes in oral pressure (P_0) and therefore, the intensity of the release burst which creates the distinct popping characteristic of ejectives'. For instance, Tigrinyan ejectives, as shown by Fre Woldu's (1985, 1988) oral airflow measurements, have roughly twice the pressure of voiceless aspirated stops, and 3–4 times that of voiced stops. Fallon (2002:274–5) further elaborates to clarify the interaction between larynx-raising and VOT: 'Some of the most salient acoustic characteristics of ejectives are due to the increase of oral pressure, which largely derives from the raising of the larynx. When the compression is less, the burst is less intense, and the VOT is generally shorter.' In other words, raised larynx, hence supraglottal pressure, is associated with longer VOT, whereas with lower supraglottal pressure and shorter VOT, ejectives become perceptually closer to 'plain' voiceless obstruents.

As noted above, in some languages, creaky voice appears also to be a factor involved in the production of ejectives. However, since researchers have observed that 'irregular phonation at vowel onset may not be a reliable cue for ejectives',[9] as we noted earlier with Hausa having regular vowel–onset voicing, but Navaho having creaky voice, it is therefore a factor in some language systems but not others. In terms of the phonological representation of ejectives, this is predictable, as will be seen later.

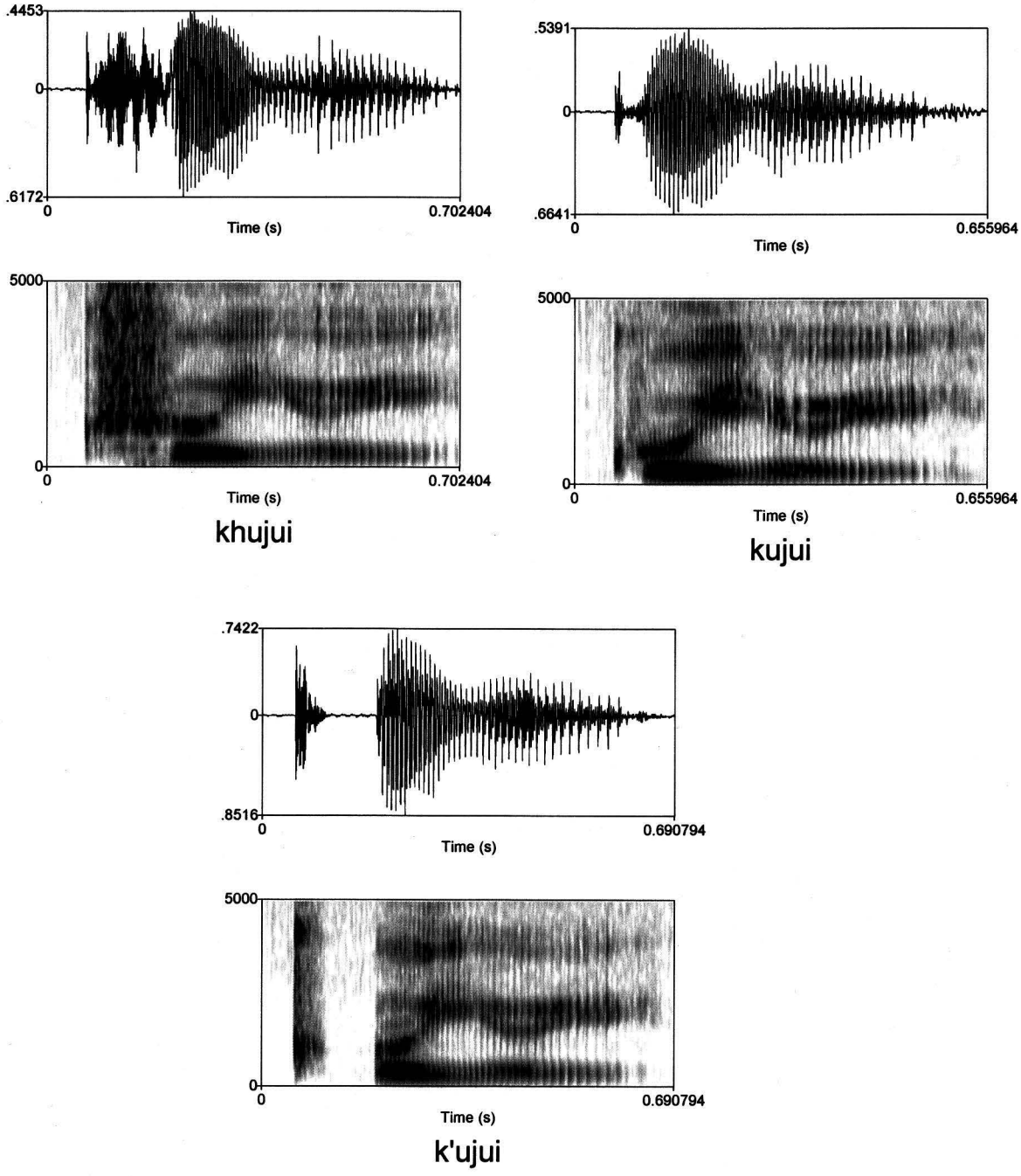
A final cue to be mentioned here is the high burst amplitude (of the release) typical of ejectives in languages like Tigrinya (Fre Woldu, 1985) and Xhosa (Jessen, 2002). This can be evaluated by measuring the rate of airflow at the lips. Since high burst amplitude is a direct result of significantly increased oral pressure, it will therefore be treated as integral to the cue. In fact, the high burst amplitude of ejectives in one Semitic language, Tigrinya, may be seen in the waveforms in Figures 2–5 presently.

In summary, the cues to be taken as typical for ejectives are: increased supraglottal pressure along with a significant voicing lag (negative VOT value). What is relevant perceptually is that the delay between the abrupt oral release caused by increased oral pressure and the onset of voicing is silent (i.e. a 'stop-lag' as opposed to the 'noise-lag' of voiceless aspirates). This contrast is illustrated for velars by spectrograms (accompanied by waveforms) of the three Quechua words [k^{h}ujui], [kujui] and [k'ujui]:[10]

[9] Monaka (2001:134).

[10] These soundfiles are available both online, courtesy of the UCLA Phonetics Laboratory (http://www.phonetics.ucla.edu/), and on the CD accompanying Ladefoged (2001) (Recording 12.9). Both the waveforms shown in Ladefoged & Maddieson (1996:80) to illustrate voice quality following ejective stops show a clear period of silence following the decay of the release burst.

Figure 2.1 *Spectrograms and waveforms of Quechua [k^{h}ujui], [kujui] and [k'ujui] illustrating (respectively) 'noise-lag', 'no lag' and 'stop-lag' of the initial velar stops; data from Recording 12.9 of Ladefoged (2001), spoken by an adult male*



Quechua has a three-way contrast in its stop and affricate series: voiceless aspirated, plain voiceless and ejective. Figure 2.1 clearly exemplifies an interesting difference between the three stops. The voiceless aspirate has a significant voicing lag, the duration of which is clearly noisy (i.e. a 'noise-lag'). The plain voiceless has a very short voicing lag during which the decay of the burst is visible. The ejective has

a significant voicing lag which is almost (although not quite) as long as that for the aspirate, but the duration of the lag shows the decay of the burst release – often followed by a brief silence – and then a second burst as the glottal constriction is released. Thus, a 'double-edge' (or double-burst) is visible on the spectrogram indicating the 'stop-lag'.

The Tigrinya stop series is shown in Figures 2.2–5, below.[11] Figure 2.2 shows the three coronal stops in initial position, Figure 2.4 shows the three velar stops in initial position, and, for comparison, Figure 2.5 shows the three velar stops word-internally. What the Tigrinya tokens show,[12] rather than the particularly clear period of silence visible in the Quechua tokens, is more often a period of creak immediately following the release of the glottal constriction and before the onset of periodic vocal fold vibration. This is due to the tension of the vocal folds as they are tightly constricted (and the larynx is raised) between the release of the oral constriction and the release of the glottal constriction. As discussed above, this tight glottal constriction and thus tension is what creates the 'popping' sound, or abrupt and forceful release, that characterises ejectives. However, this period of silence tends in some languages to be followed by creaky vowel onsets, and in others by modal vowel onsets. The two waveforms presented in Ladefoged & Maddieson (1996:80) show a Navajo ejective followed by creaky voice, but a Hausa ejective followed by modal voice.

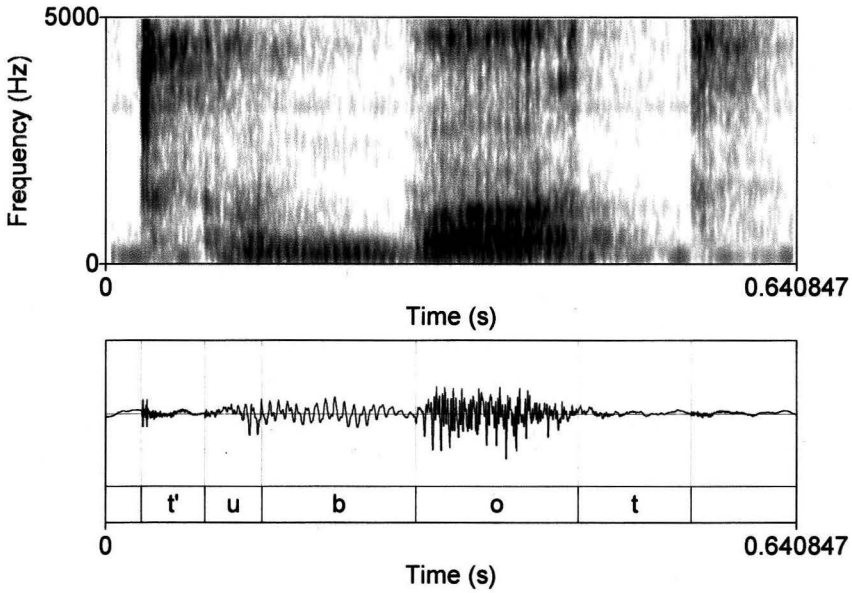
Here, a point of note is necessary regarding the measurement of VOT in ejectives. As noted previously, ejective VOT is defined as the period between the release of the oral constriction and the onset of glottal vibrations.[13] However, the nature of the glottal vibrations marking vowel onset in an ejective may be very different from that seen in pulmonic egressive stops. This is apparent in the Tigrinya data below. That is, if VOT is defined as the onset of periodic glottal vibration, then

[11] The soundfiles from which these acoustic analyses were made were kindly provided by Bernard Howard. They are available from the archive of the Phonetics Laboratory at SOAS.
[12] Note that the Tigrinya recordings, which were made in 1952, are marred by a considerable degree of background noise, so the waveform does not show a flat baseline anyway, and the spectrograms are rather dark. Not all the tokens were measurable due to this, although there was plenty of material for which clear analyses were possible. The release bursts are very clear on these waveforms and spectrograms. However, the waveforms presented here should not be taken to indicate that ejectives in Tigrinya tend not to have a period of silence following the decay of the burst, but rather that this is often not visible in the analyses of these recordings due to the age and quality of the recordings.
[13] Catford (1983:345).

the tokens below would exhibit abnormally long VOT times. Moreover, since a small burst of what looks like a glottal pulse is seen at the point of the glottal release, even though this may be markedly creaky and irregular at the onset (and thus not definable as periodic vocal fold vibration), it means that much of what is perceived as the vowel would be included, by this criterion, as part of the VOT of the ejective consonant. Therefore, for measurement of the Tigrinya ejectives examined for this thesis, I take the VOT to be the period between the (beginning of the) release of the oral constriction and the release of the glottal constriction, as seen on the waveform.[14]

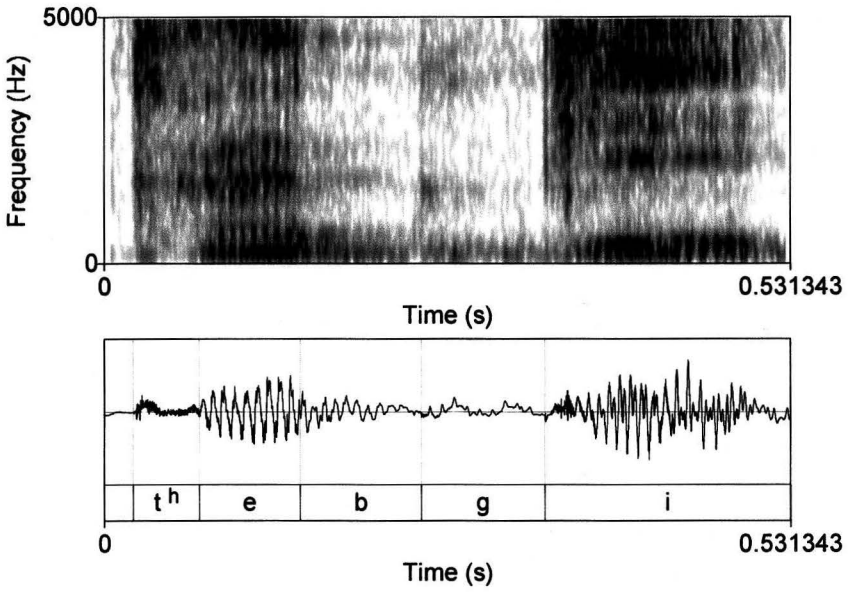
Figure 2.2 *Spectrograms and waveforms showing Tigrinya coronal stops in initial position; data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*

(i) *Coronal ejective: [t'ubot]*



[14] However, it should be noted that while the criterion of glottal release holds for Tigrinya, there are languages in which the glottal constriction is released considerably before the onset of glottal vibration. The waveform of a Hausa ejective in Ladefoged & Maddieson (1996:80) shows the release of the glottal constriction to occur somewhere around 50ms before the onset of glottal vibration (which here is modal not creaky), and even before the decay of the oral burst is complete. Thus, it could be said that measuring the point of the release of the glottal constriction of the Tigrinya ejective, since this coincides with the onset of voicing (however irregular), does not, strictly speaking, contradict the definition of the measurement criterion of ejective VOT, as per Catford (1983).

(ii) Voiceless aspirated coronal: [t^{h}ebgi]



(iii) Voiced coronal: [därbi]

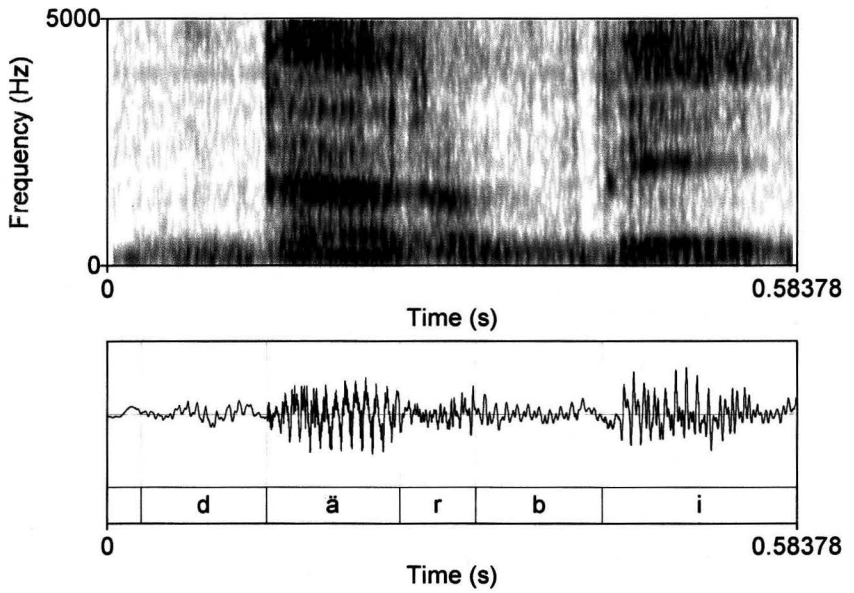


Figure 2.2(i) [15] shows that the ejective coronal stop (in *t'ubot*) has a particularly abrupt release. The period of 'stop-lag' between the release of the oral closure and the onset of vocal fold vibration lasts for 59ms and is indicated on the waveform. The voiceless coronal stop (in *tebgi*) is shown as aspirated, with a period

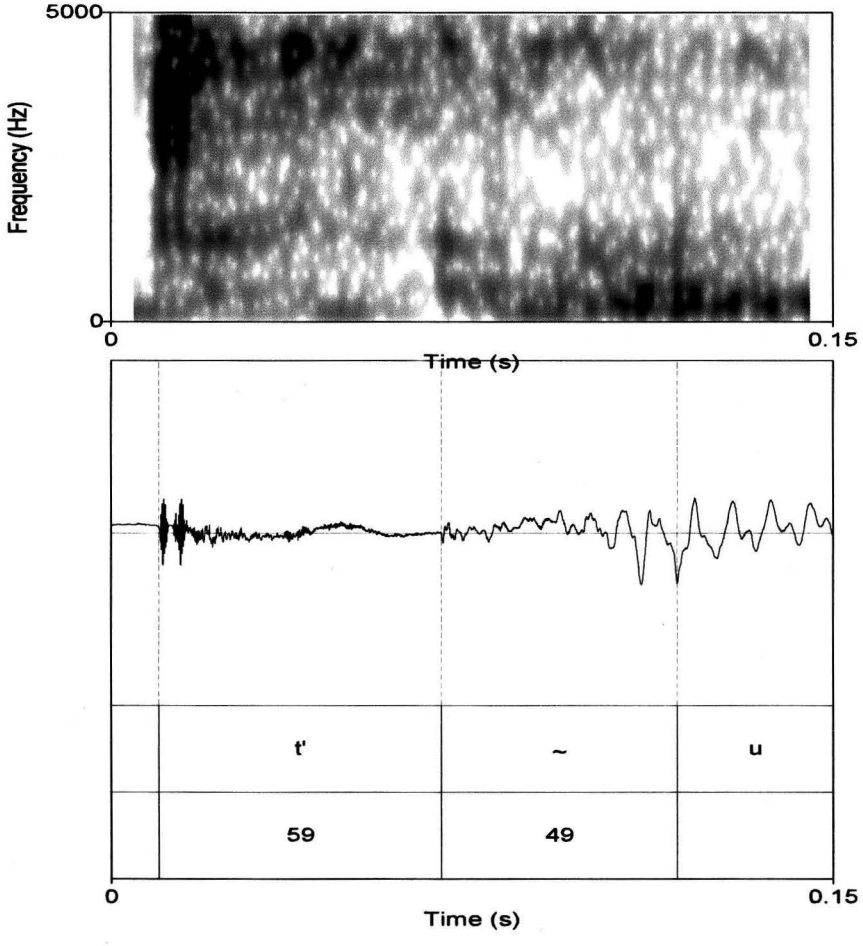
[15] In all the Tigrinya tokens shown here, the stress falls on the second syllable. I cannot see any correlation in this corpus between the duration of the cue (i.e. stop-lag, noise-lag and voice-lag) and the stress pattern.

of 'noise-lag' – indicated on the waveform – following release of about 51ms. The voiced coronal stop (in *därbi*) has a period of pre-voicing lasting for about 110ms, as indicated on the waveform.

What is particularly different between the spectrograms and waveforms of the voiceless stops *t* and *t'* is the onset of the vowel. In *t'ubot*, the vowel following *t'* starts much more irregularly with a marked lack of strong formant structure and lack of regularly spaced striations in comparison with the vowel following the *t* of *tebgi*. This is illustrated in Figure 2.3 below, with (i) showing the magnified portion of *t'u*, with the creaky part of the vowel indicated, and (ii) showing the magnified portion of *te*, with the aspiration comparable with the 'stop-lag' portion of the ejective.

Figure 2.3 *Tigrinya initial voiceless coronal stops showing the creaky vowel following [t'] vs the modal vowel following [t^h] (magnified portions of the spectrograms and waveforms shown in Figure 2.2, above)*

(i) *[t'u̯]*



(ii) *[t^he]*

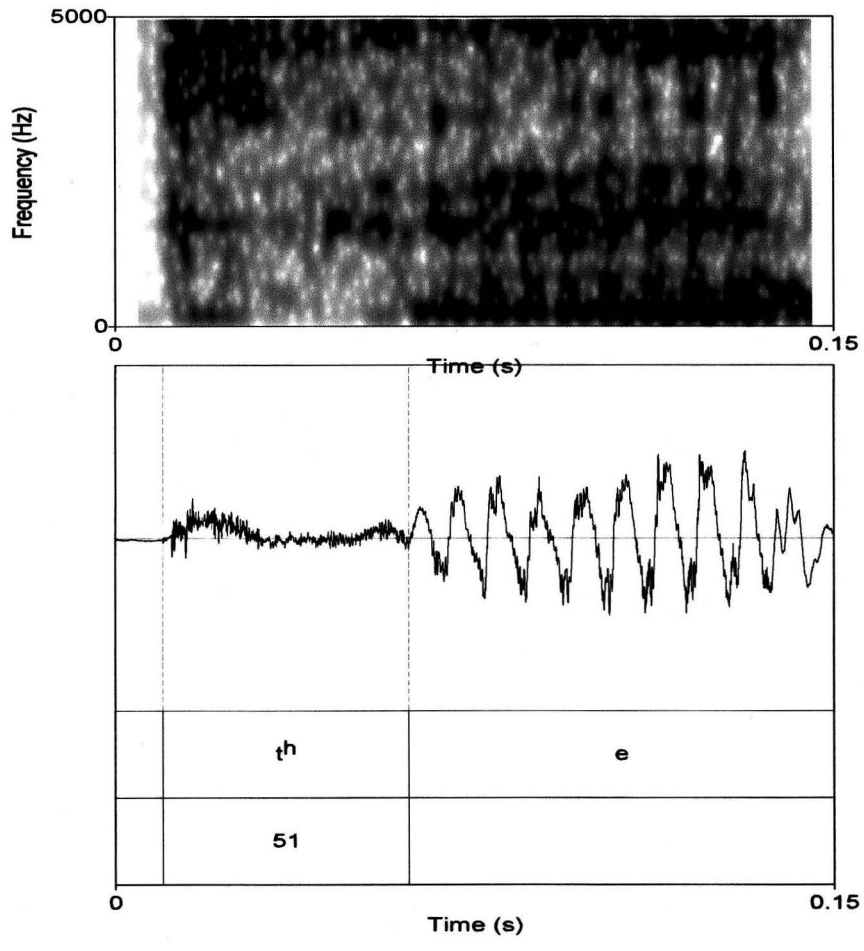
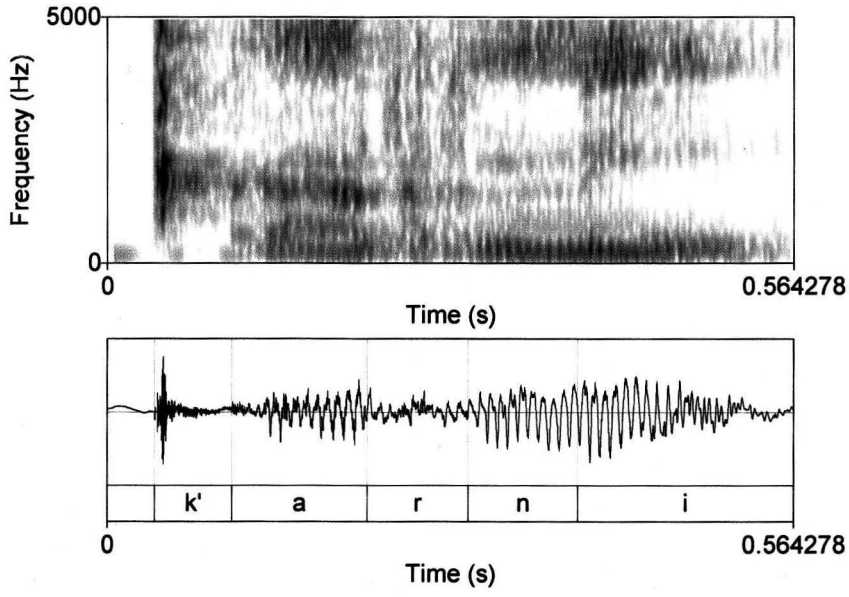


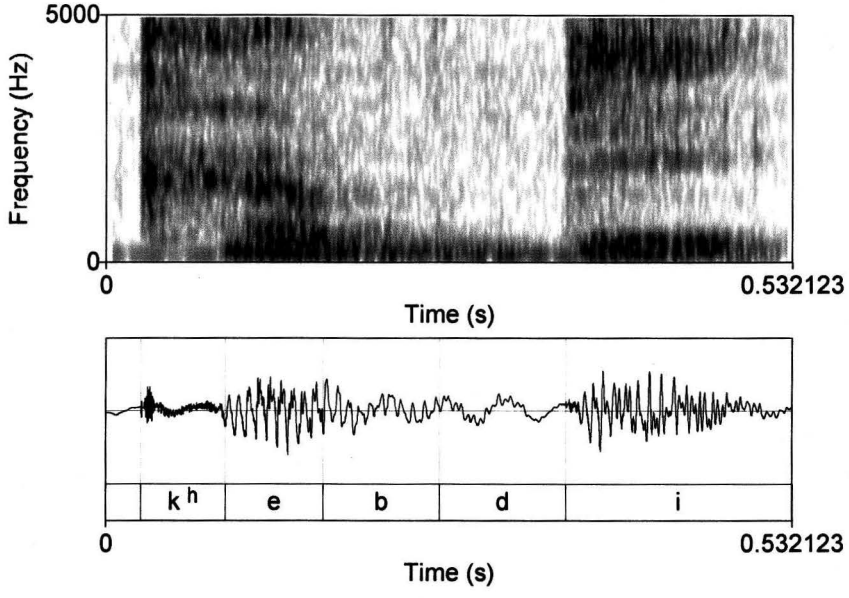
Figure 2.4, following, shows the velar stop series of Tigrinya, in word-initial position. Again, the abrupt release of the ejective is clear in comparison with the voiceless aspirated stop, as is the irregular onset to the vowel following glottal release. The ejective stop-lag (*k'arni*) is about 64ms; the noise-lag of the voiceless aspirate (*kəbdi*) is approximately 66ms; the voiced velar stop (*gəreb*) has a long voicing lead – approximately 127ms.

Figure 2.4 *Spectrograms and waveforms showing Tigrinya velar stops in initial position; data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*

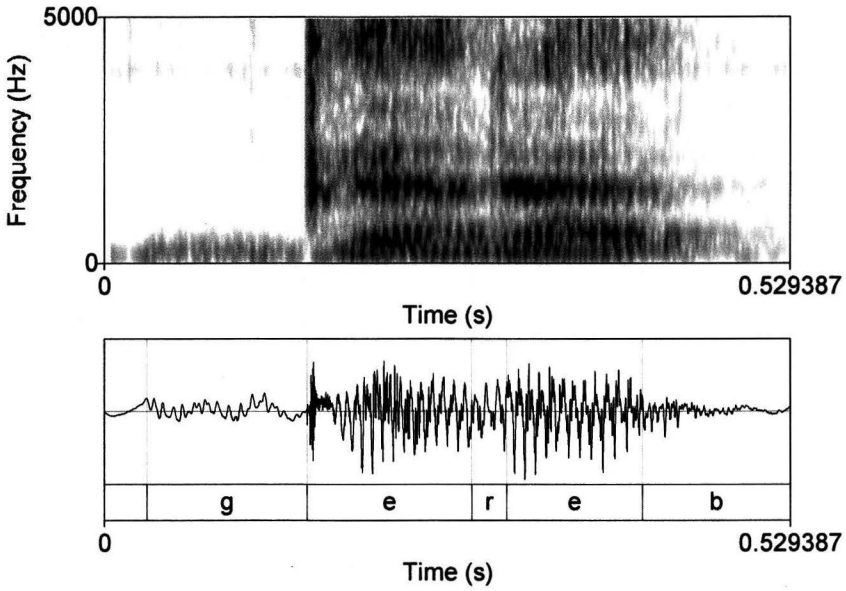
(i) *Velar ejective: [k'arni]*



(ii) *Voiceless aspirated velar: [k^{h}əbdi]*



(iii) Voiced velar: [gəreb]



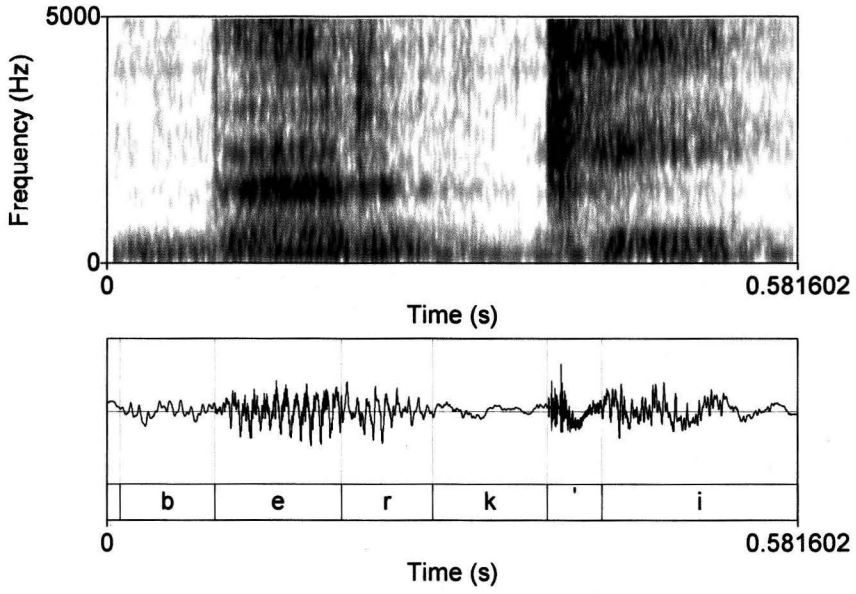
Below is Figure 2.5, showing the velar series word-medially. The target segments *k'*, *k* and *g* are shown as the second part of a consonant cluster, demonstrating that the cues to the voicing status of these segments do not appear to lenite in this position[16] (the voiceless aspirate and the ejective are shown following a sonorant and the voiced stop is shown following a voiceless fricative, both of which could potentially affect the following obstruent).[17] The results are similar to those found for the word-initial stops. The stop-lag of the ejective (in *berk'i*) measures approximately 46ms between oral and glottal release. The noise-lag of the voiceless aspirated velar stop (in *berki*) measures approximately 56ms. The voiced velar stop (in *nəfgi*) is, again, significantly pre-voiced, and the duration of vocal fold vibration between the decay of the voiceless frication of the *f* and the burst release of *g* is approximately 114ms.

[16] It could be argued that syllable-initial stops are in the perceptually strongest positions and thus not prone to lenition.

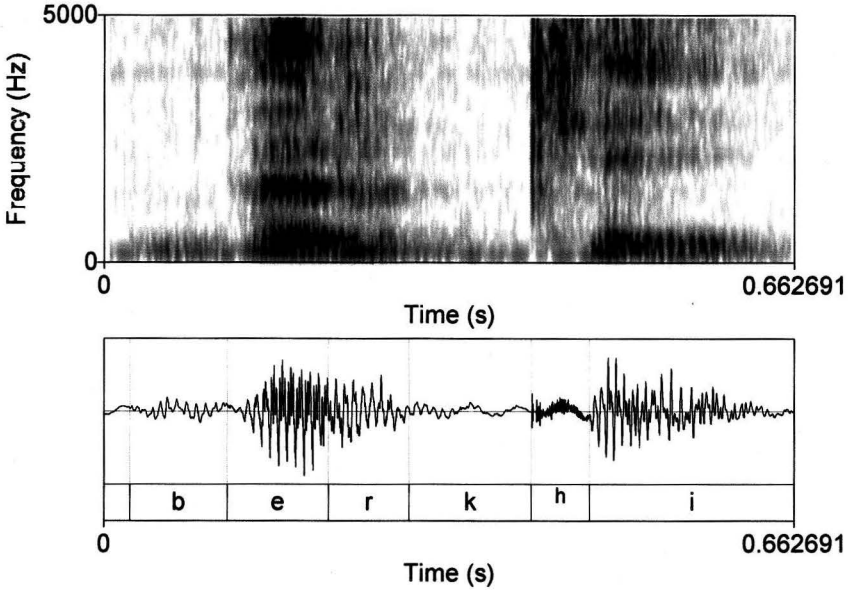
[17] Also, in Tigrinya, many stops lenite post-vocalically – see Palmer (1957). Fitzgerald (2003) notes that in Southern Tigrinya (spoken in the Tigray province of Ethiopia), velar stops spirantise after vowels and gutturals and word-initially, while in Northern Tigrinya velar stops spirantise only post-vocalically. Also, in Northern Tigrinya bilabial stops (not included here because *p* and *p'* have a marginal phonemic status) spirantise post-vocalically, while in Southern Tigrinya the spirantisation environment is wider. This indicates that the subject whose tokens are analysed here is a speaker of Northern Tigrinya.

Figure 2.5 *Spectrograms and waveforms showing Tigrinya velar stops in medial position; data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*

(i) *Velar ejective: [berk'i]*



(ii) *Voiceless aspirated velar: [berk^{h}i]*



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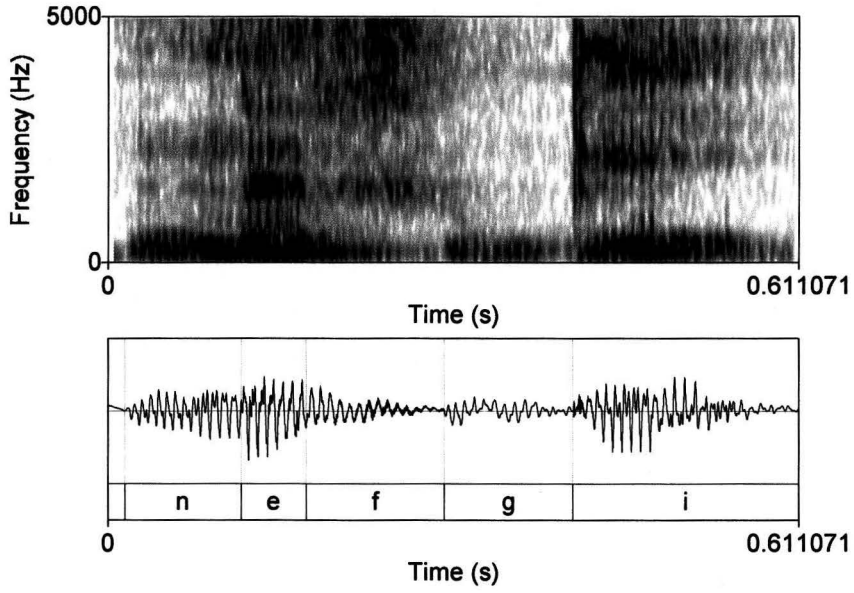
(iii) Voiced velar [nəfgi]



As regards the VOT zone as a potential perceptual cue of ejectives, a brief study of this for the Tigrinya data is now presented. In all, VOT measurements have been calculated from 60 tokens taken from the Tigrinya recordings. These comprise 10 tokens each for the ejectives *k'* and *t'*, the voiceless (aspirates) *t* and *k*, and the voiced stops *d* and *g*. The mean VOT values for each of the six stops are shown in Figure 2.6(i) below.[18] Figure 2.6(ii) shows the range of values obtained for each of the six stops.

[18] The actual results are presented in the Appendix.

Figure 2.6(i) *Mean VOT values (ms) for the 6 Tigrinya stops t, k, t', k', d, g (n = 10); data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*

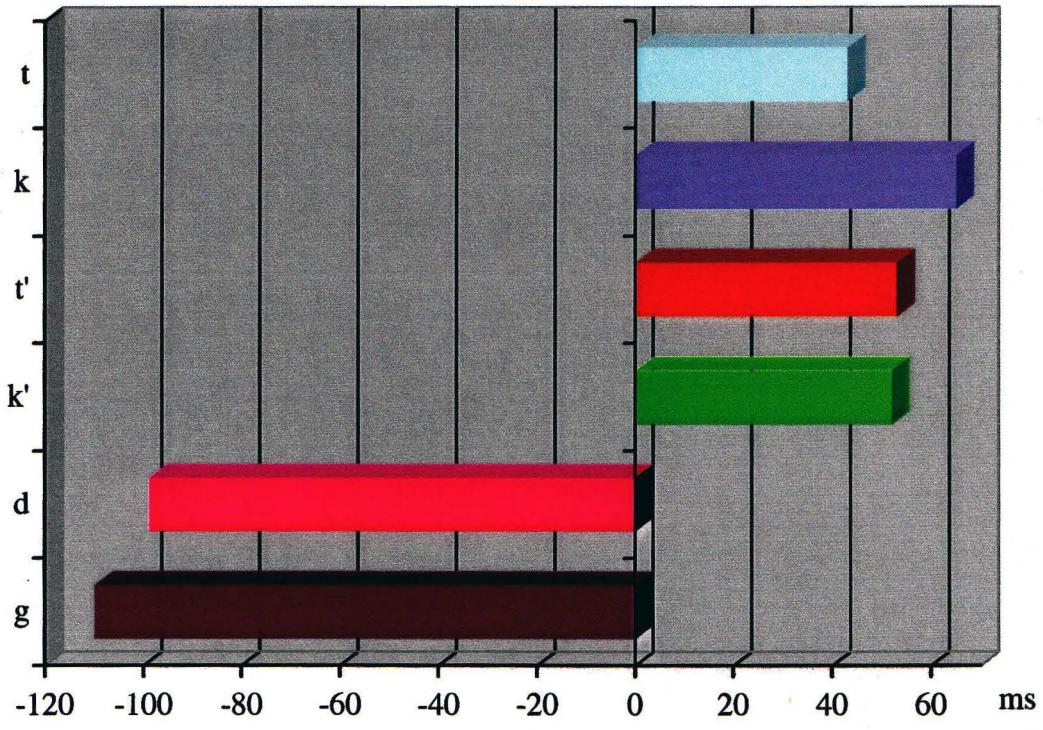
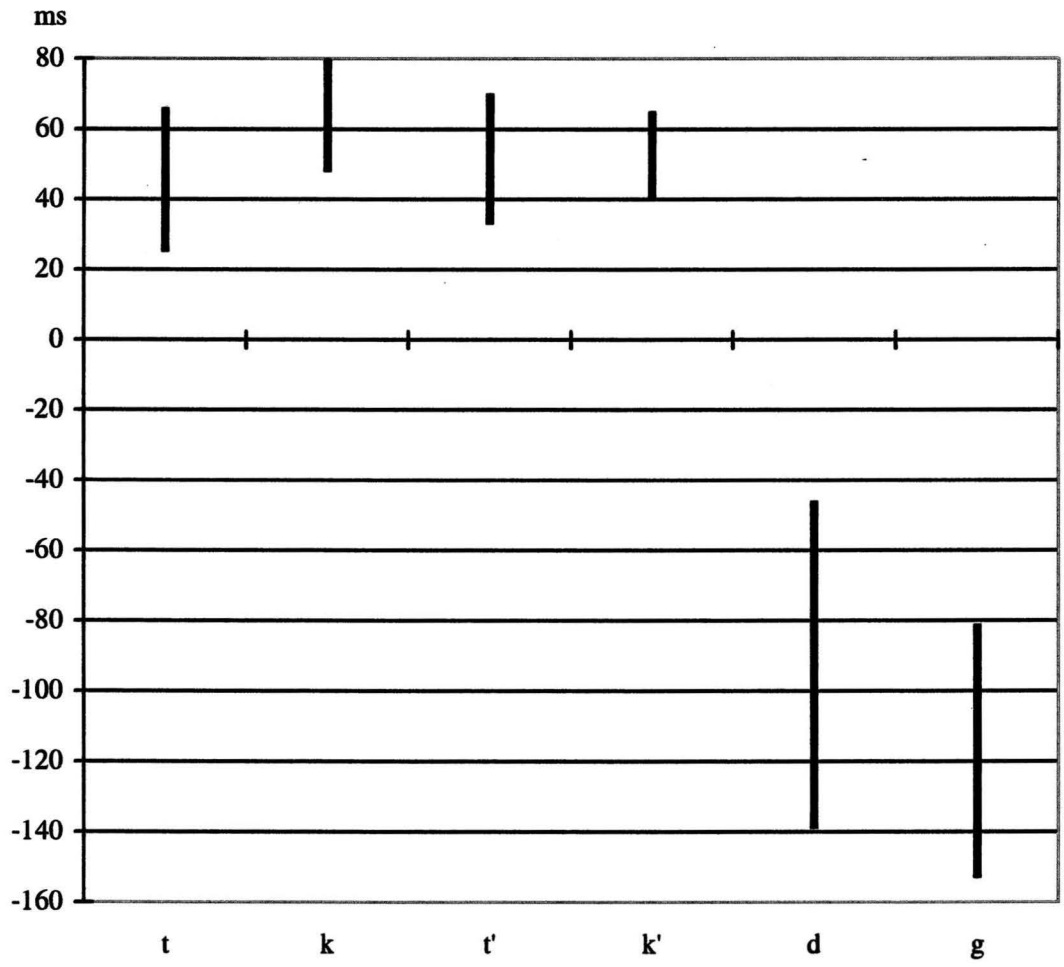


Figure 2.6(ii) Ranges of VOT values (ms) for the 6 Tigrinya stops t, k, t', k', d, g (n = 10); data from the archive of SOAS Phonetics Laboratory, spoken by an adult male



In summary, the evidence presented here indicates that the 'stop-lag', 'noise-lag' and 'voice-lead' cues for stops in Tigrinya appear particularly robust syllable-initially. Post-vocalically, in Tigrinya the stops lenite, so that the voiced stops are often partially or fully de-voiced and the velars spirantise to [x] and [x'], with the force of the ejective not always clear word-finally. The difference between *t* and *t'* is also often not very clear in this position.

Overall, it is clear that the acoustic cues for ejectives are the abruptness and high energy of the release, which decays quickly and is followed by either a visible period of silence preceding the burst of the glottal release, or by glottal release characterised by irregular and slow-starting glottal vibration (creaky vowel onset).

What is interesting is the evidence that the two series of Tigrinya which are voiceless appear not to be differentiated by VOT zones. It may be expected that in terms of voicing series, languages would prefer to maximise contrasts by maximising the distinctiveness of VOT zones. A language such as Tigrinya could then have, for instance, a voiceless (non-emphatic) series tending to be realised with very little voicing lag (especially since the voiced series appears to have a particularly long lead time), contrasting with the longer lag of the emphatics (ejectives). The fact that this is not the case indicates that the acoustic cues of the emphatic series relate not only to the VOT values (hence my designation 'stop-lag' as opposed to the 'noise-lag' of the voiceless aspirates). The study of Ladefoged & Cho (2001) notes that many languages may use VOT as a feature to enhance the distinction between ejectives and other voiceless stops. Their one exception to this was the Athabaskan language Hupa, which has three contrasting velar stops, one with a mean VOT of roughly 45ms,[19] an ejective with a mean VOT of nearly 85ms, and a voiceless aspirate with a mean VOT of about 80ms. It appears that Tigrinya also does not differentiate its two voiceless stop series by VOT alone.

Thus, a language like Tigrinya appears to have no 'plain' series – each series having a 'distinctive feature'. In terms of articulatory parameters, these series are likely to correspond to the glottal settings of 'lax' (i.e. vibrating, thus voiced) 'stiff-and-open' (i.e. voiceless aspirated) and 'stiff-and-closed' (i.e. ejective).

The phonological representation of ejectives is discussed in Chapter 3, where this latter point is taken up again. Next, however, we proceed to a discussion of the realisation of Arabic-style emphatics.

2.2 'Pharyngealised' emphatics

Production of Arabic emphatics is usually said to involve secondary pharyngealisation, velarisation and/or uvularisation. Bessell (1992:23) looks at the typology of 'pharyngealized' consonants, summarising that they 'occur in 7/693 (1%) languages in Ruhlen (1975). Four of these are Arabic, two are Caucasian and one is a Berber language.' This may not be a truly representative sample, since it is not always clear

[19] Their data is presented in a bar chart giving VOT values to the nearest 5ms.

exactly what is meant by the term 'pharyngealisation', either articulatorily or acoustically. In this way, what may be exactly the same phenomenon may be termed something else and thus not included. Alternatively, what is termed 'pharyngealisation' may be different both phonetically and phonologically from the Arabic emphatics,[20] especially since 'pharyngealisation' may interact with other phenomena (such as e.g. retroflexion) and thus be included elsewhere in Ruhlen's categorisation. Nevertheless, the indications are at least that pharyngealised consonants are typologically far less common than ejectives.

The Old Arabic[21] emphatics are usually cited as *ṣ ṭ ḍ ḏ̣*.[22] Although modern dialects have differing inventories, most dialects include at least three of these four,[23] along with, most commonly, *l̩ r̩ m̩ b̩*. The coronal obstruent emphatics are traditionally seen as 'primary', or 'phonemic', whereas any other emphatic segments are often described as 'secondary' or 'non-phonemic'.[24]

2.2.1 Realisation of 'pharyngealised' emphatics

As previously noted, coronal emphatics are produced with coronal restriction along with (at least) some kind of secondary pharyngeal approximation. Additionally, I shall show that the voicing status of emphatics is not necessarily the same as that of the non-emphatics.

There has been much discussion over the production of emphatics, ranging from the descriptions of the Arab grammarians to instrumental studies seeking to discover the exact nature of the secondary pharyngeal constriction. The conclusion is that the pharyngeal constriction itself is not the only marker of the emphatic nature, although in much of the Western, post-SPE literature, some sort of pharyngeal constriction is assumed to be the main / only articulatory correlate of the property that

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[20] This is the case with 'pharyngealisation' in Caucasian languages.
[21] In this thesis, the term 'Old Arabic' will be used generically to denote earlier forms of Arabic. The term 'Classical Arabic' is used sometimes to denote the Arabic of the Qur'an, sometimes to denote the Arabic of medieval literature. Yet in these periods there were distinct dialects, and both literature and the descriptive accounts of the medieval grammarians displayed discrepancies.
[22] There is debate over whether Classical Arabic ض (transliterated in this thesis as *ḍ*) was [d̪], [ð̪], or some kind of lateral, as discussed in Chapter 4.
[23] *ḍ* and *ð̪* are merged in most dialects to *ḍ* or *ð̪* (~ *ẓ*) (see Chapter 5).
[24] Some researchers argue that *r̩* is a primary emphatic, and there have also been debates on the status of *l̩*. See Ferguson (1956), Younes (1994), McCarthy (1994), Card (1983), among others. It has also been argued that *m̩* and even *b̩* are sometimes primary emphatics. See Chapters 5–6 for discussion and analysis.

distinguishes emphatics. It is apparent that the issue of Arabic emphatics highlights the problem of viewing sounds in terms of articulatory features.

The earliest sources we have that discuss the production of emphatics are those of the Arab grammarians. Sībawayh describes the articulatory correlate of *iṭbāq* as the tongue closing from its (primary) place up to that part of the tongue opposite the velum, towards which the tongue is raised, thus 'enclosing' ('covering with a lid') the sound between the tongue and the velum (secondarily) and the (primary) place of constriction. He notes that 'these four [consonants] have two places on the tongue'.[25]

Interesting in the current context is that Sībawayh also classes the coronal emphatic *ṭ* as well as the uvular stop *q* as *majhūra* ('loud') rather than *mahmūsa* ('whispered'). These two terms have been the subject of some debate and have often been inferred as relating to 'voiced' and 'voiceless' (some scholars prefer 'fortis' and 'lenis'), respectively. According to this interpretation, the segments *ṭ* and *q* were classified by Sībawayh as 'voiced', which has led scholars to suppose that these segments were indeed voiced in Old Arabic. However, contrary to this view, and rather than being puzzling, it indicates to me that Arabic indeed fitted into the Semitic system of the voicing triads, such that *ṭ* and *q* were not actually voiced, but that they simply lacked the aspiration that the non-emphatic voiceless sounds had. In other words, the terms *majhūr* and *mahmūs* relate to aspiration (hence the notion of 'whispering' denoted by the root *h-m-s*). This point will be shown presently in acoustic analyses.

More recently, instrumental studies have shown that the articulation of emphatics involves moving the tongue dorsum back towards the upper pharynx, as the secondary articulation, i.e. simultaneously with the primary articulation (e.g. a coronal gesture). Ali & Daniloff (1972) observe that the upper pharyngeal wall is not actively involved in the articulation of emphatics (it is the tongue dorsum that retracts), 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 vertebra.

[25] Al-Nassir (1993:50–1).

The investigation conducted by Marcais (1948), involving palatograms and radioscopy, indicates that the articulation of emphatics involves both retraction and muscular tension. The retraction is of the back of the tongue (the root approaching the back of the pharynx) as well as the tip. With the retraction of both tongue root and tip, sulcalisation of the tongue body may be seen in the palatal region. The palatograms show that in the production of *ṭ*, the tongue tip is approximately 8mm further back than it is for *t*. Lehn (1963) also confirms that both pharyngeal constriction and apical retraction are involved in the production of emphatics, along with muscular tension.

Phonetic evidence supporting the claim that it is the consonants which are the emphatic target, and that the vowels are thus affected by the consonant, can be found in Ali & Daniloff (1972), in cinefluorographic tracings, where the vowels adjacent to the emphatics also display the backward movement of the tongue towards the rear wall of the pharynx, but only about half as much as that of the emphatics.

However, retraction may not be the only articulatory modification involved. For instance, Lehn (1963:30–1) observes that the articulation of emphatics in Egyptian Arabic involves 'slight retraction, lateral spreading, and concavity of the tongue and raising of its back (more or less similar to what has been called velarization)', and then that it additionally involves at least one of the following: 'pharyngealisation' proper, i.e. faucal and pharyngeal constriction; a degree of labialisation, i.e. 'slight lip protrusion or rounding'; 'increased tension of the entire oral and pharyngeal musculature resulting in the emphatics being noticeably more fortis than the plain segments'. Therefore, as Al-Masri & Jongman (2004:96) see it, 'we cannot equate emphasis with pharyngealization proper as many linguists have posited'. In other words, the production of an emphatic does not necessarily involve, in comparison with its non-emphatic counterpart, only (uvulo-)pharyngealisation. This in itself indicates that the general use of a term such as 'pharyngealisation' / 'uvularisation' to describe the phenomenon of emphasis, or a phonological analysis of emphasis using features which are solely articulatory in nature (e.g. [RTR] or [CP]), may be misleading. This reiterates the point that Arabic emphatics have to be seen within the broader context of the Semitic sound system, within which the emphatics, seen in purely articulatory terms, range in nature from ejective to (at least) uvulo-

pharyngealised. Moreover, even an attempt to define this particular aspect of emphatics is problematic, since researchers have reached different conclusions as to whether the constriction is generally pharyngeal, specifically upper pharyngeal ('uvularisation'), or specifically lower pharyngeal ('pharyngealisation'). For this reason, many prefer to designate it 'pharyngealisation', since this term focuses on a general role of the pharynx in the production of emphatics.

Generally, we could say that the particularly resonant quality of emphatics may be enhanced by increasing the volume of the oral cavity. In addition to tongue retraction (and perhaps lip-protrusion, or at least lack of lip-spreadedness), this is also achieved by lowering the jaw in production of the emphatics in comparison with the non-emphatics. This lowering is what causes the dorsal concavity, or sulcalisation, observed in x-ray tracings. The effect of increasing the volume of the oral cavity by such means also potentially serves to prolong any period of pre-voicing, since supra-glottal air pressure is lowered by the increase in volume of the oro-pharyngeal cavity, meaning that glottal vibration can endure for a longer period before the release of the oral constriction. This point will be taken up again in instrumental analyses of VOT in the following subsection, since it is relevant to the finding that the voiced emphatic *ḍ* generally has a longer voicing lead than the non-emphatic voiced stops (e.g. *b* and *d*).

Another means of enlarging the oral cavity is lip protrusion. While in many dialects of Arabic there is either a degree of lip protrusion in emphatic production (in citation forms), or at least an apparent contrast between spread-lip position for non-emphatics and neutral lip-position for emphatics,[26] it is known that there are varieties of Arabic in which the production of emphatics involves lip protrusion / rounding which has become a systematic part of the emphatic sound. This is what we see, for instance, in Ṣanᶜāni Arabic (Yemen), in which 'emphasis has two or three articulatory correlates: pharyngealization – velarization and prolabialization.'[27] Further, Watson (2002:269) [28] observes that 'in a number of modern Arabic dialects, pharyngealization ... is enhanced ... in the pharyngealized oral consonants by labialization and lateral spreading and concavity of the tongue.'[29] In many dialects,

[26] See this characterisation in Ingham (1973, 1974, 1976).
[27] Watson (1996:45).
[28] Also Watson (1999).
[29] The point of enhancement will be taken up again in the discussion of the acoustic correlates of emphatic sounds.

such as Cairene,[30] there is slight lip protrusion or rounding, but this is confined to the emphatic segment itself (and thus not systematised), while in Ṣanᶜānī labialisation is systematic to the point where the labial quality spreads across the word.[31] The phonological effects of this are discussed in Chapters 5–6.

2.2.2 Auditory and acoustic characteristics

Ladefoged (1993:231) describes one type of secondary articulation as the superimposition of a narrowing of the pharynx, arguing 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. This is the central tenet of this thesis (i.e. the equation of vowel-quality [ɑ] and the notion of 'pharyngeal').

In acoustic terms, it has been well documented that emphatics exhibit significantly lowered second formant and perhaps slightly raised first formant transitions.[32] Several researchers claim that the upper pharyngeal constriction of emphatics is responsible for the low F_2 transitions, whereas the lower pharyngeal constriction caused by retracted tongue root (in feature terms, analysed as [-ATR]) causes raised F_1.[33] Goad (1991) and Shahin (1996, 2002) claim that 'emphasis' is really backing (in other words, phonetically velarisation or uvularisation), which causes lowered F_2, whereas it is ATR-harmony (or pharyngealisation) that causes lowering, which is evidenced in raised F_1 alongside the lowered F_2.[34] Obrecht (1968) claims that it is only the lowered frequency of the second formant which causes a segment to be perceived as emphatic. However, there is some distinction which must be drawn here, since it is known that labialisation or lip protrusion also causes significantly lowered F_2. Labialisation is characterised by low F_2 due to the increase in volume of the oral cavity created by lip protrusion. The low F_2 typical of

[30] Watson (2002:270) citing Lehn & Abboud (1965) and Harrell (1957).
[31] Watson (2002:270).
[32] See Younes (1982), al-Ani & el-Dalee (1984), Kuriyagawa *et al.* (1988), Herzallah (1990), Zawaydeh (1998), Giannini & Pettorino (1982), among others. Also Younes (1993) reports F_2 drop in vowels affected by neighbouring emphatics, but does not mention the first formant. However, his spectrograms show higher F_1 transitions in an emphatic environment, e.g. in comparing the minimal pair [daallaat] and [ḍaạllaat] (pp.143–4).
[33] Card (1983), Shahin (1996).
[34] ATR vowel harmony alongside uvularisation harmony has been proposed for Palestinian Arabic (see Shahin, 1996, 2002). However, the laxness of the vowels in these environments is a correlate of either a short vowel or emphasis, and is thus not distinctive. See my discussion in Chapter 3.

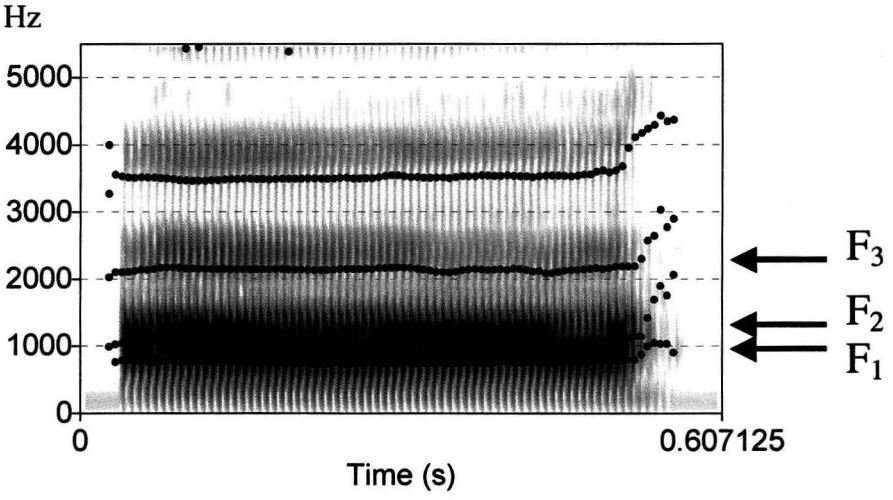
uvularisation / pharyngealisation is also enhanced by an increase in the volume of the oral cavity, through tongue retraction and sulcalisation (via jaw-lowering). Therefore, there is some overlap between uvularisation / pharyngealisation and labialisation. However, a distinction should still be drawn, since although it may be predominantly the lowered F_2 of the CV transitions that caused an emphatic to be perceived as such, the raised F_1 is still a regular, noticeable feature, and it is this pattern that distinguishes *u*-type from *a*-type resonance quality.

Figure 2.7, below, shows the typical formant patterns of cardinal vowels 1 [i], 5 [ɑ] and 8 [u],[35] with the formant structures marked.

[35] The soundfiles from which these analyses were drawn are from Bruce Hayes' website: http://www.linguistics.ucla.edu/people/hayes/103/charts/VChart/.

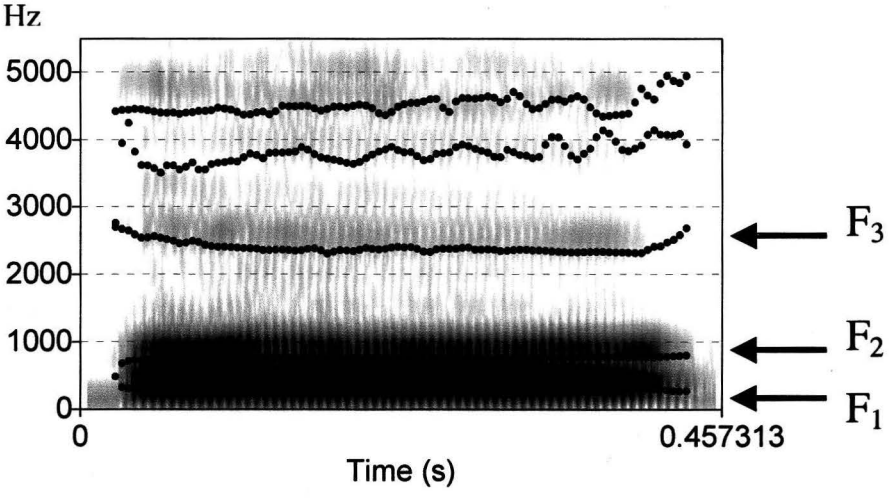
Figure 2.7 *Spectrograms of cardinal vowels [a], [u], [i] showing the formant structures; data from Bruce Hayes of UCLA (adult male)*

(i) *Cardinal vowel 5 = [a]*



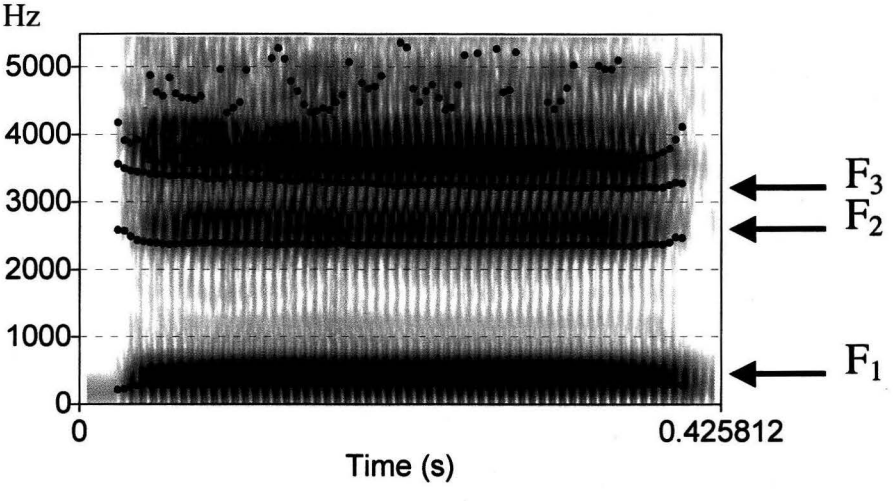
ɑ

(ii) *Cardinal vowel 8 = [u]*



u

(iii) *Cardinal vowel 1 = [i]*



i

This can be summarised in the following typical patterns:[36]

- 'pharyngeal' [ɑ] – low–mid spectral convergence of F_1 & F_2 c. 1000 Hz
  – low–mid concentration of energy (mAss)
- 'labio-velar' [u] – low spectral convergence of F_1 & F_2 c. 500 Hz
  – low concentration of energy (rUmp)
- 'palatal' [i] – high spectral convergence of F_2 & F_3 c. 2500–3000 Hz
  – low and high concentrations of energy (dIp)

Thus, typically, transitions into an [ɑ]-like vowel show raised F_1 and somewhat lowered F_2, while those into an [u]-like vowel will show significantly lowered F_2, and those into an [i]-like vowel will show significantly raised F_2.

The midpoint frequencies of the vowels given in Figure 2.7, above, are shown in Table 2.1 (Hz):[37]

Table 2.1 *Midpoint frequencies (Hz) of the cardinal vowels [a], [u], [i] shown in Figure 2.7 (data from Bruce Hayes of UCLA)*

Vowel	F_1	F_2	F_3	$F_2 - F_1$	$F_3 - F_2$
[ɑ]	737	1048	2168	311	1120
[u]	302	754	2399	452	1645
[i]	291	2353	3235	2062	882

The data in Table 2.1 give the following values when converted into the Bark scale:[38]

Table 2.2 *Midpoint frequencies (Bark) of the cardinal vowels [a], [u], [i] shown in Figure 2.7 (data from Bruce Hayes of UCLA)*

Vowel	F_1	F_2	F_3	$F_2 - F_1$	$F_3 - F_2$
[ɑ]	6.796	8.813	13.55	2.017	4.737
[u]	3.047	6.918	14.225	3.871	7.307
[i]	2.932	14.097	16.165	11.165	2.068

[36] See the schematic spectra representing acoustic templates for the elements [A], [U] and [I] in Harris (1994:139), where 'mAss', 'rUmp' and 'dIp' are coined as labels for these spectra.
[37] To the nearest whole figure.
[38] Conversion, as per Traunmüller (1990), is: $z = [(26.81 \times f) / (1960 + f)] - 0.53$. Values rounded to 3 decimal places.

The reason for showing the Bark-scaled data above is that there is evidence for a critical distance between formants whereby if 'two formant frequencies are separated by less than 3–3.5 Bark, integration (fusion into a single peak [on the spectral template]) will occur.'[39] That is, according to the Spectral Integration Hypothesis, integrated formants will be perceived by listeners as effectively one spectral energy peak.

The values in Table 2.2 show that (at least for the values of the vowels analysed here) the first and second formants of the vowel [ɑ] are likely to be perceived as one spectral peak (i.e. energy is particularly salient in the low–mid part of the sonorant frequency range of the spectrum), and the second and third formants of the vowel [i] are likely to be perceived as one spectral peak (i.e. energy is particularly salient towards the high end of the sonorant frequency range of the spectrum, in addition to the energy peak at the very bottom of it). The pattern of [u] shows that the first and second formants (for this instance of [u]) are marginally outside the critical distance for spectral integration, but this could still be considered near spectral integration (as compared with [ɑ], which shows definite spectral integration). However, the value for the third and second formants of [u] show these to be perceptually very distinct, and thus quite unlike the pattern for [i], whereby these formants form one perceptual peak.

In one respect, a certain similarity between [ɑ] and [u] can be seen: for [ɑ], F_1–F_2 are close enough to be perceived as effectively one spectral peak;[40] for [u], F_2 is so lowered that it approaches F_1.[41] Thus, if the second formant were particularly salient in the perception of [u], there would be a potential perceptual similarity with [ɑ], for which the perceptually merged peaks may be seen to have their energy mass beginning at around the same frequency as the salient energy mass of the second formant of [u]. While I am not claiming that the formant patterns of [ɑ] and [u] are similar enough as to be perceptually confusable in isolation, I suggest that as a minor modification of a sound with other salient resonant characteristics, i.e. a secondary articulation, the systematic contrast between 'plain' and pharyngealised / uvularised

[39] Hayward (2000:155–6).
[40] Here, though, the fact that the third formant is also slightly lowered means that perceptually, a huge mass of energy is perceived in the middle of the sonorant frequency range.
[41] Although it should be observed here that the third formant is thus very distinct from the first and second.

vs that between 'plain' and labio-velarised, may not be especially distinct. I.e., since the lowering of the second formant to approach the (rising) first (creating one salient mass of energy) is likely to be a characteristic of the formant transitions of a pharyngealised / uvularised segment, and since formant transitions are necessarily relatively rapid, it is possible that the formant transitions of a labio-velarised segment (where F_2 is significantly lowered into the region of the salient energy mass seen with [ɑ]) may be similar enough to achieve roughly the same perceptual effect.

Moreover, in a sound system which phonologically exploits resonance patterns in consonants (especially if there is a particularly small vowel inventory), the vowels are likely to become part of this systematic contrast, such that the resonance pattern which most clearly differs from the 'modified' segment may become associated with the 'plain' segments. That is, in a system that begins to exploit a 'pharyngeal' contrast primarily in its consonants (as seen in the development of emphatics), since this is associated with one characteristic resonance pattern, and thereby, by default, with any vowel which has that characteristic pattern, it is likely that the segments associated with 'non-pharyngeal' will become associated with the resonant pattern most distinct from that of 'pharyngeal'. Thus the [i] pattern is likely to become associated with 'non-pharyngeal', contrasting with the [ɑ] pattern of 'pharyngeal', potentially leaving the [u] pattern as either neutral or associated with either of the salient resonance patterns of the sound system. However, since the F_1–F_2 and F_2–F_3 patterns of [u] are perceptually exactly the opposite of the F_1–F_2 and F_2–F_3 patterns of [i], it is overwhelmingly likely that [u] will come to be associated with the 'pharyngeal', rather than the 'non-pharyngeal', segments, or, in perceptual terms, 'back' vs 'front'.[42] This patterning is seen in certain dialects of Arabic, while in other dialects this [u]-patterning of 'back' (opposing 'front') sounds is not as systematic.

One final point here is that while emphatics are known to have significant effects on adjacent vowels (backing / lowering of *i*, generally a lowering / backing of *a* and prevention of the raising / fronting effects of *imāla*, depending on the dialect), *u*

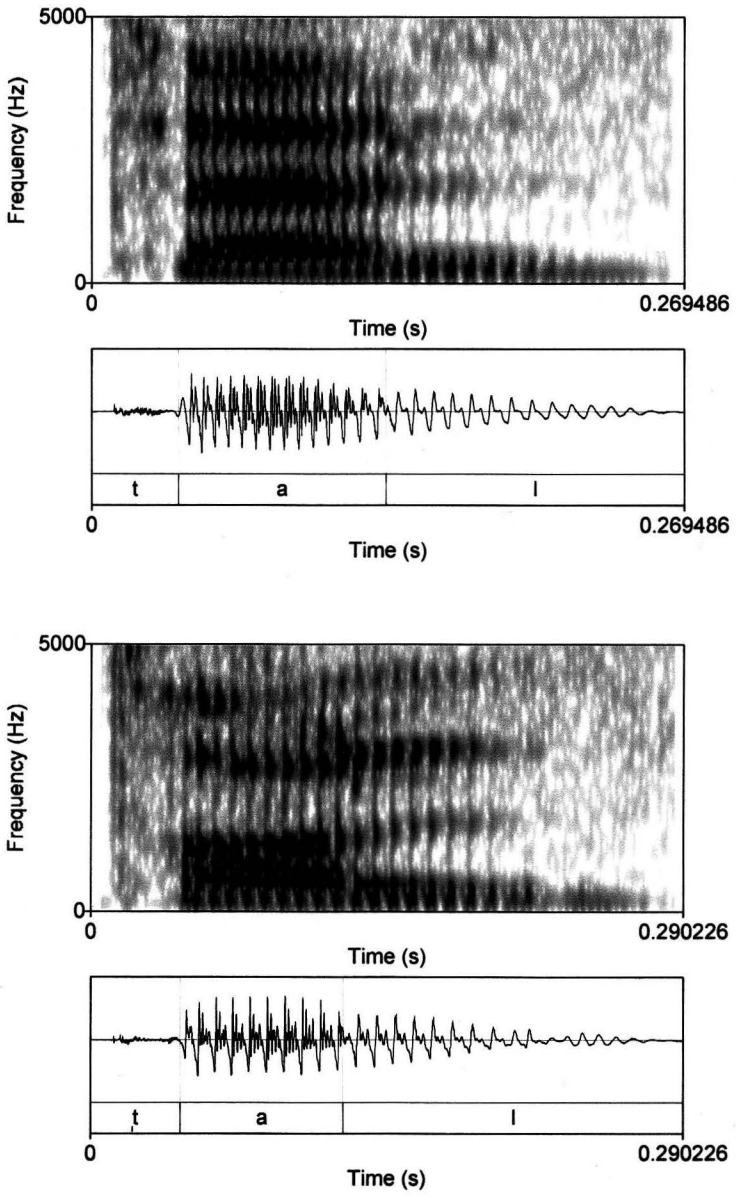
[42] See Chapter 6 where I show how these are phonologically exploited in Arabic.

is for some dialects reported to be the least affected.[43] However, this has more to do with the effects of *imāla* in the non-emphatic environment, as discussed in Chapter 6.

Figure 2.8, following, shows spectrograms (and waveforms) of Syrian Arabic plain and coronal emphatic stops:[44]

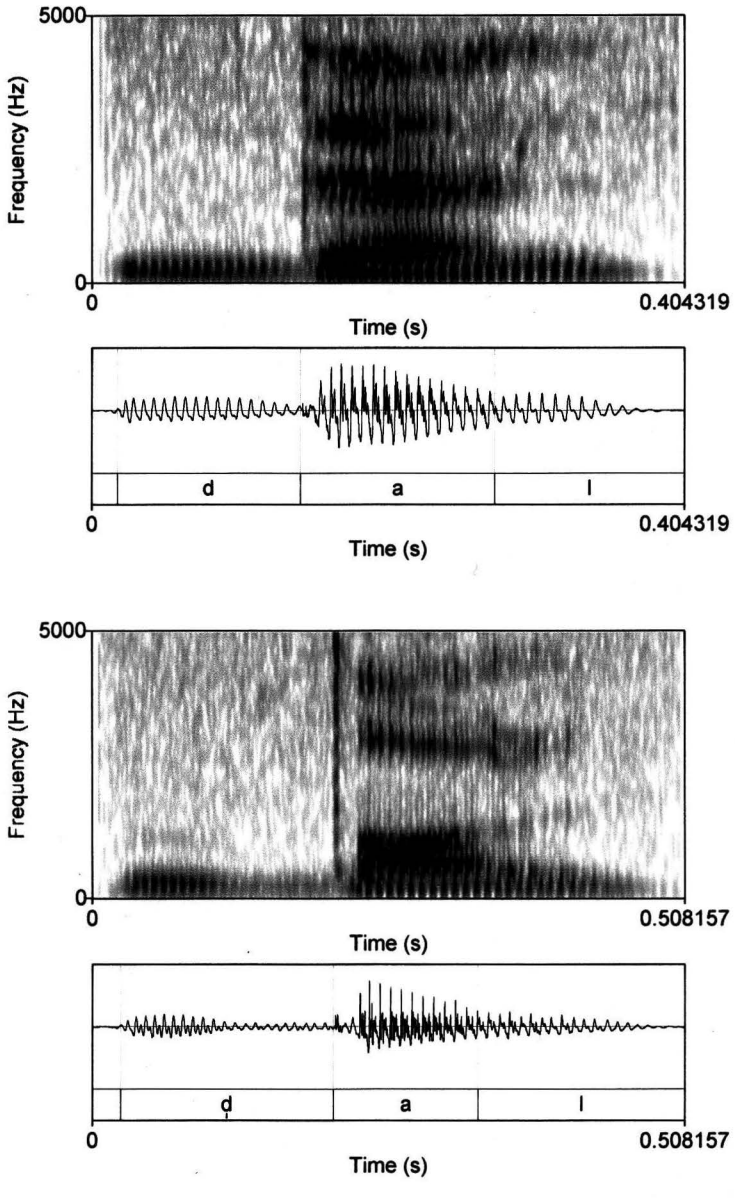
Figure 2.8 *Spectrograms and waveforms showing Syrian Arabic 'plain' vs emphatic coronal stops word-initially; data from the UCLA phonetics database, spoken by an adult male*

(i) *Voiceless coronal stops [t] and [ṭ]*



[43] Younes (1982:14–15,27), for instance, shows for Rural Palestinian Arabic that short vowels display considerable backing in the emphatic environment, except for *u* (which he says is inherently back).
[44] These soundfiles are available from the UCLA phonetics database and downloadable from: http://www.phonetics.ucla.edu/.

(ii) Voiced coronal stops [d] and [ḍ]

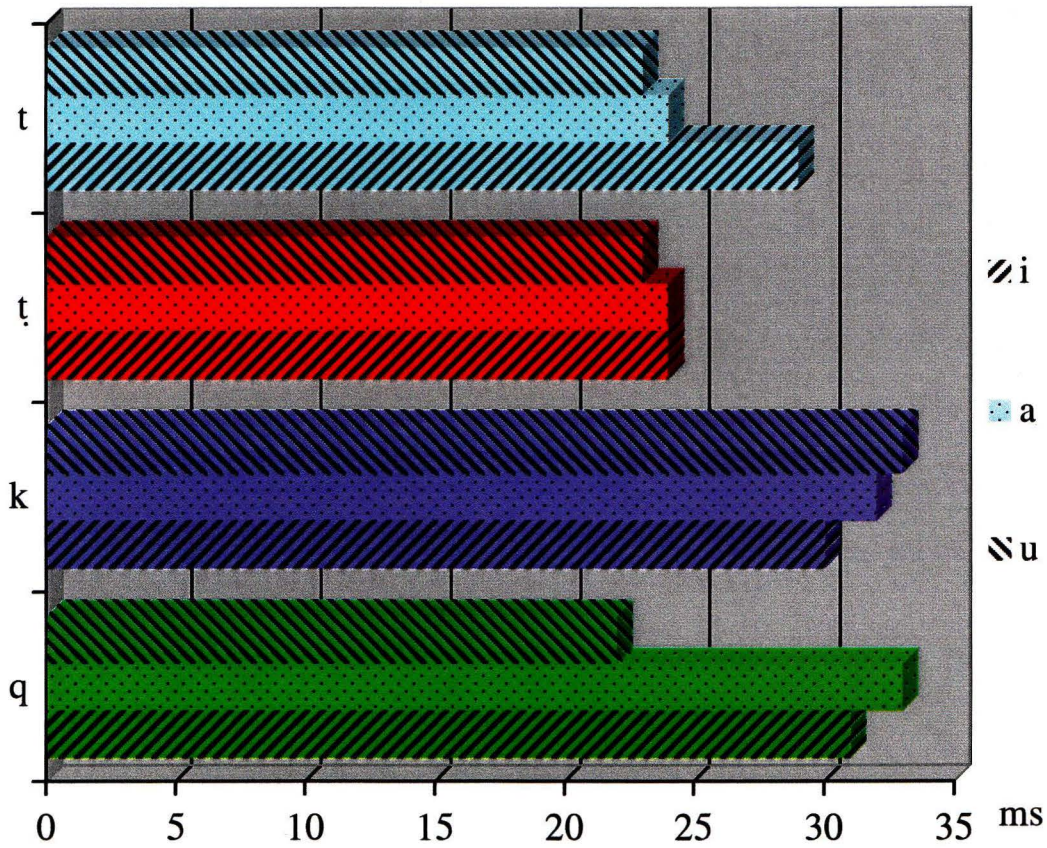


These spectrograms clearly show approximation of the first and second formants of the vowel following the emphatics, as compared with the non-emphatics, with the F_1 transitions noticeably raised.[45] It is also clear that both the voiceless stops (*t* and *ṭ*) are lightly aspirated[46] and that voiced *d* and *ḍ* are fully voiced, with a significant period of voicing lead.[47] Voiced emphatic *ḍ* also has a longer closure duration and intra-oral pressure is probably greater, resulting in a 'double-edge' effect.

[45] In the case of *a*, it is not just the transitions that are affected, but also the steady state of the vowel. Thus, *a* has the allophone [æ] after *d* and [ɑ]–[ʌ] after *ṭ* and *ḍ*.
[46] VOT values 30 and 35 ms, respectively (values to the nearest 5 ms).
[47] VOT values -130 and -185 ms, respectively. Burst duration (i.e. the difference between the burst release and the rise time of the following vowel) is 20 ms for *ḍal* but only 10 ms for *dal*.

A study of VOT in Syrian Arabic by Jesry (1996) (using three subjects from different parts of Syria)[48] tested word-initial obstruents uttered within the frame *qāla...al-'ān* ('he said...now'). The following graph summarises Jesry's results for average VOT values (ms)[49] of voiceless stops in the environment of short vowels:[50] [51]

Figure 2.9 *Syrian Arabic – mean VOT values of voiceless stops preceding [i], [a], [u] (n = 30); (from Jesry, 1996; the results are his analysis of 10 tokens from 3 adult subjects for each of the 12 target CV sequences)*



[48] The regions of origin of the speakers or dialect-types spoken were not mentioned; the study was of 'Arabic', the carrier sentence and target words were Standard Arabic, and the stimulus presented orthographically. Target phones were also Standard Arabic. However, while speakers may (to a gretaer or lesser degree) be aware of some differences in pronunciation between Standard / Classical Arabic and their native dialect, factors such as VOT seem to be unconscious and therefore uncontrolled, even where a speaker is aiming at 'Standard' Arabic.

[49] To the nearest whole figure.

[50] The results given for the long vowels [i:] and [u:] showed VOT values on average 7ms longer and 10ms longer respectively than the corresponding short counterparts. For the long vowel [a:], the results varied from 3 ms longer to 3.5 ms shorter than the corresponding short vowel.

[51] See the Appendix for tables listing the actual results relating to all the following graphs.

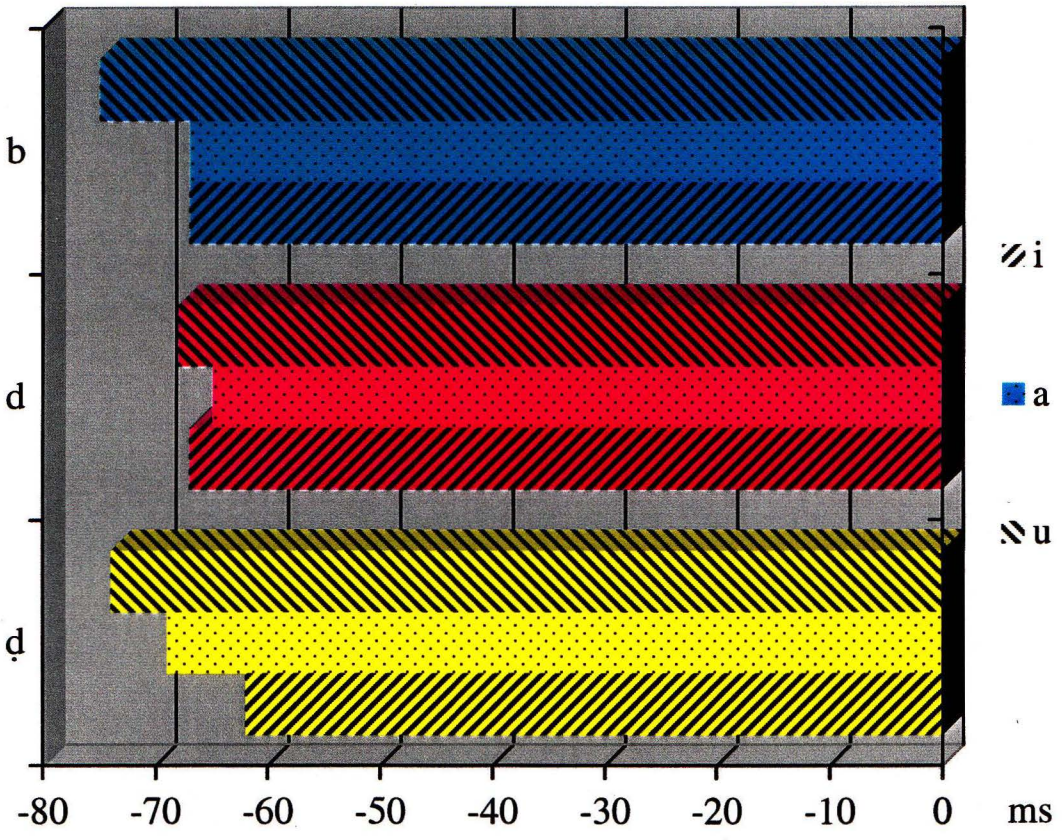
From this, we can summarise two things for Jesry's Syrian subjects: 1) VOT did not change consistently as a function of vocalic environment when the vowel is short; 2) VOT increased as a function of type of stop (i.e. place of articulation and emphatic vs non-emphatic) in the following order: ṭ < t < q < k, although the differences were not great or consistent enough to indicate any degree of linguistic significance. However, it is known that place of articulation affects the VOT values of lag stops such that VOT increases with relative backness (from anterior–posterior occlusion).[52]

Overall, the results indicate that for these subjects, all four voiceless stops are what would be considered 'short-lag' stops,[53] that is, somewhere between the norms for voiceless stops in English (aspirated) and French or Spanish (unaspirated).[54]

For the voiced stops, the following graph is a summary of Jesry's results for the average voicing lead values in ms in the environment of short vowels:[55]

[52] See Lisker & Abramson (1964), and for voiced stops Smith (1978).
[53] Ladefoged & Cho (2001:217) note that one cannot give an exact boundary for where a voiceless stop is effectively 'plain' vs 'aspirated'. Their study of 18 languages shows that 'aspiration' is a continuum.
[54] See Lisker & Abramson (1964), whose average values for English voiceless stops are: *p* 58ms; *t* 70ms; *k* 80ms.
[55] Although the long vowels follow the general pattern summarised with respect to each other, there is no consistent pattern of difference in the values of the voicing leads of stops preceding long vowels in comparison to their short counterparts (i.e. sometimes they are longer, sometimes shorter, sometimes the same, apparently fairly randomly).

Figure 2.10 *Syrian Arabic – mean VOT values of voiced stops preceding [i], [a], [u] (n = 30); (from Jesry, 1996; the results are his analysis of 10 tokens from 3 adult subjects for each of the 9 target CV sequences)*



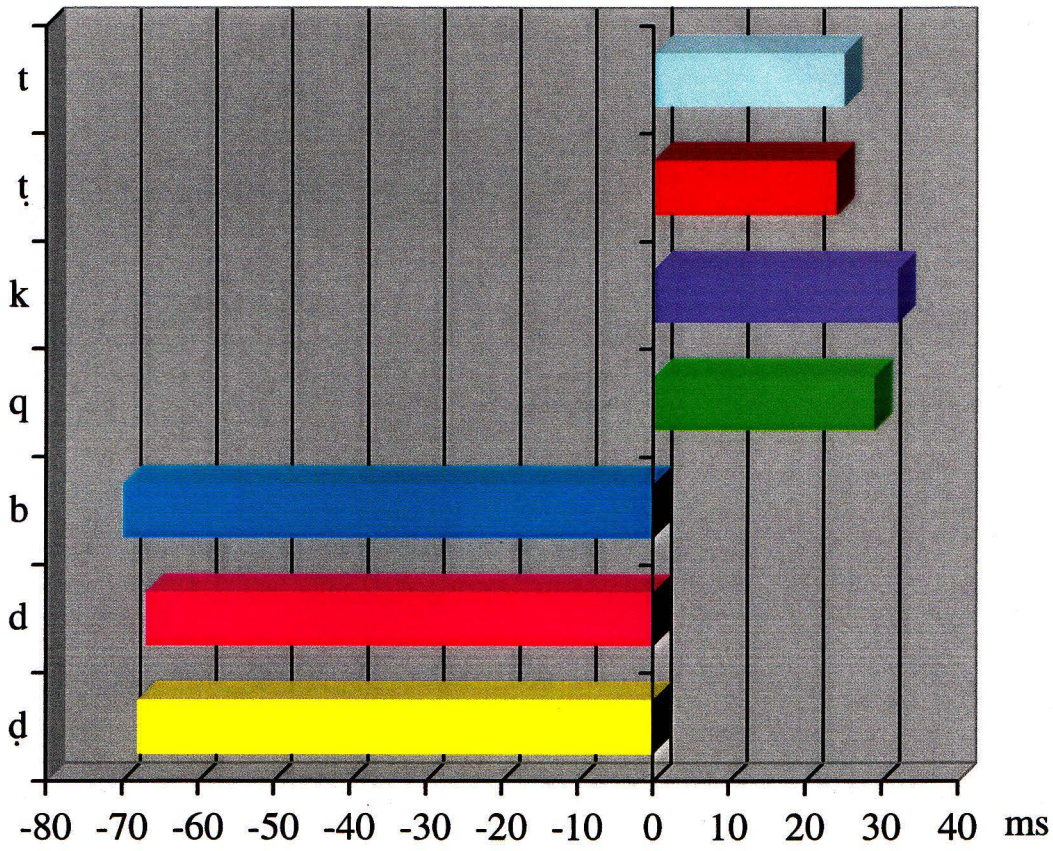
We can summarise from these results that any increase in voicing lead as a function of either vocalic context or type of voiced stop (emphatic vs non-emphatic) is not linguistically significant.[56] However, in both these respects the results are interesting. Firstly, the results do consistently show that voicing lead increases slightly preceding a high back vowel. There is also a tendency for shorter lead in stops preceding (long or short) *i* than preceding any of the other vowels. Secondly, the results show that in the environment of short vowels the duration of voicing lead is least for the non-emphatic coronal, with the order: *b* > *ḍ* > *d*. If the long vowels are included, however, this order becomes *ḍ* > *b* > *d*. It is known that labials tend to have longer voicing lead durations than coronals,[57] but interesting that there is some

[56] Although Jesry (1996:117–18) states that voicing lead increases consistently for stops preceding high back vowels, since the results range only from -62 to -75 ms (i.e. a difference of only 13 ms between the longest and shortest voicing leads), this cannot be considered linguistically significant.
[57] See Lisker & Abramson (1964), Lehiste (1970), Smith (1978), Yeni-Komshian *et al.* (1977), Flege & Port (1981).

variation here between the labial and emphatic coronal *ḍ*. As noted earlier, the lowered jaw alongside the dorsal concavity increases the size of the oral cavity, thus allowing glottal pulsing to endure for a longer period without releasing the constriction due to the initial lowered intra-oral air pressure.

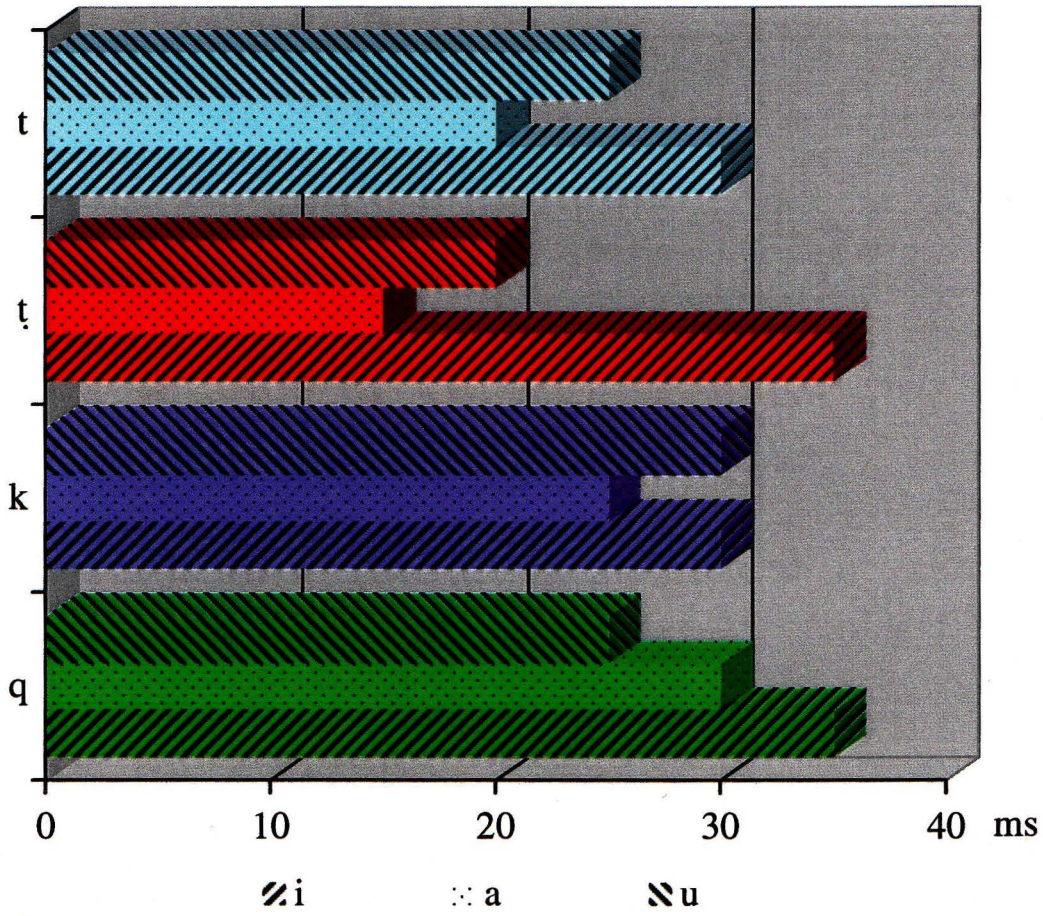
Overall, while there are small differences in VOT values between the voiceless stops and also between the voiced stops, these are phonetic and probably somewhat variable. In terms of linguistic significance, we can summarise that for the speakers of Syrian Arabic tested by Jesry, stops may be either voiced or voiceless (slightly aspirated), i.e. that there are two categories. This is shown in the graph below, which illustrates the mean VOT for all stops (averaged across vocalic environment).

Figure 2.11 *Syrian Arabic – mean VOT values of all stops preceding short vowels (n = 90); (from Jesry, 1996; the results are his analysis of 30 tokens from 3 adult subjects for each of the 7 stops)*



The results obtained by Jesry (1996) are supported by a study of voicing in Lebanese Arabic conducted by Yeni-Komshian *et al.* (1977), whose results for voiceless stops preceding short vowels are summarised as follows:

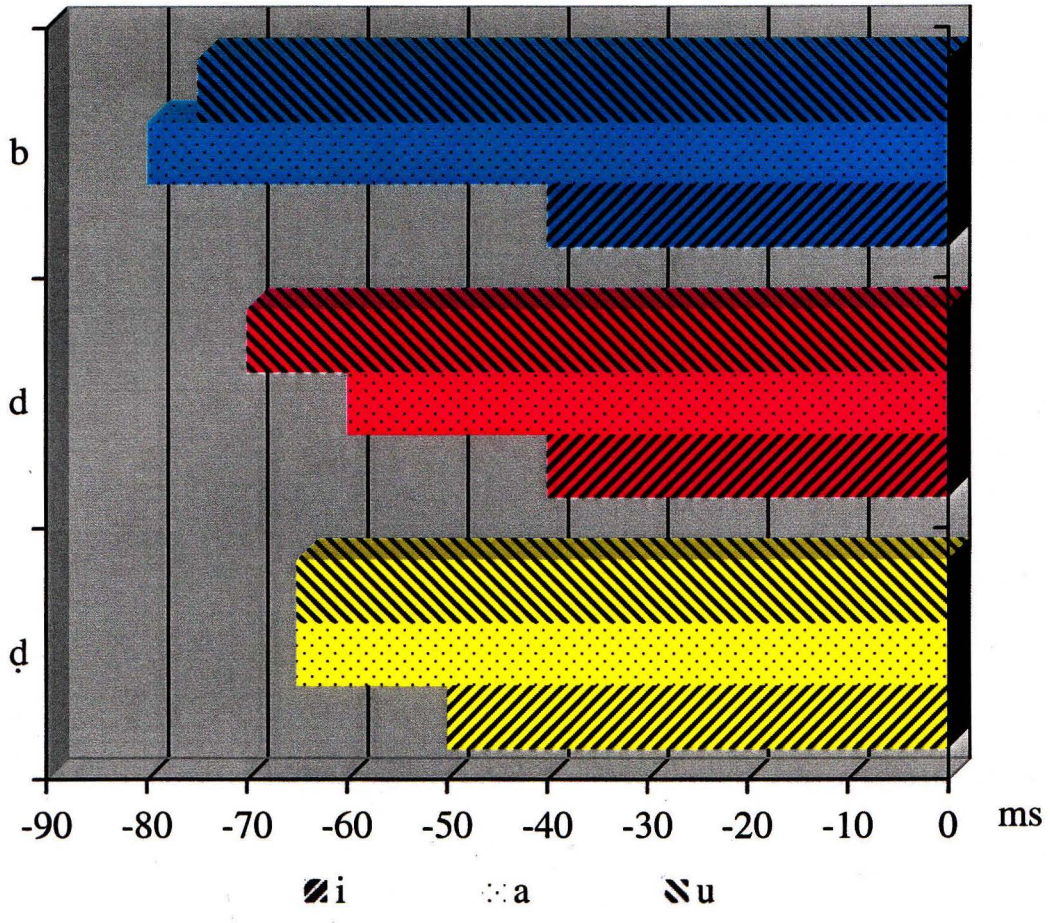
Figure 2.12 *Lebanese Arabic – mean VOT values of voiceless stops preceding [i], [a], [u] (n = 64); (from Yeni-Komshian et al., 1977; the results are their analysis of 8 tokens from 8 adult subjects for each of the 12 target CV sequences)*



The results above show that voiceless stops preceding *i* have a longer VOT than those preceding *a*, and a tendency to have a longer VOT than stops preceding *u*. In terms of VOT as a function of type of stop (place of articulation and emphatic vs non-emphatic), the shortest VOT time is more likely to be shown by emphatic *ṭ* and / or non-emphatic *t*, and the longest possibly by *q*. There is too much overlap, however, for this to be considered really systematic.

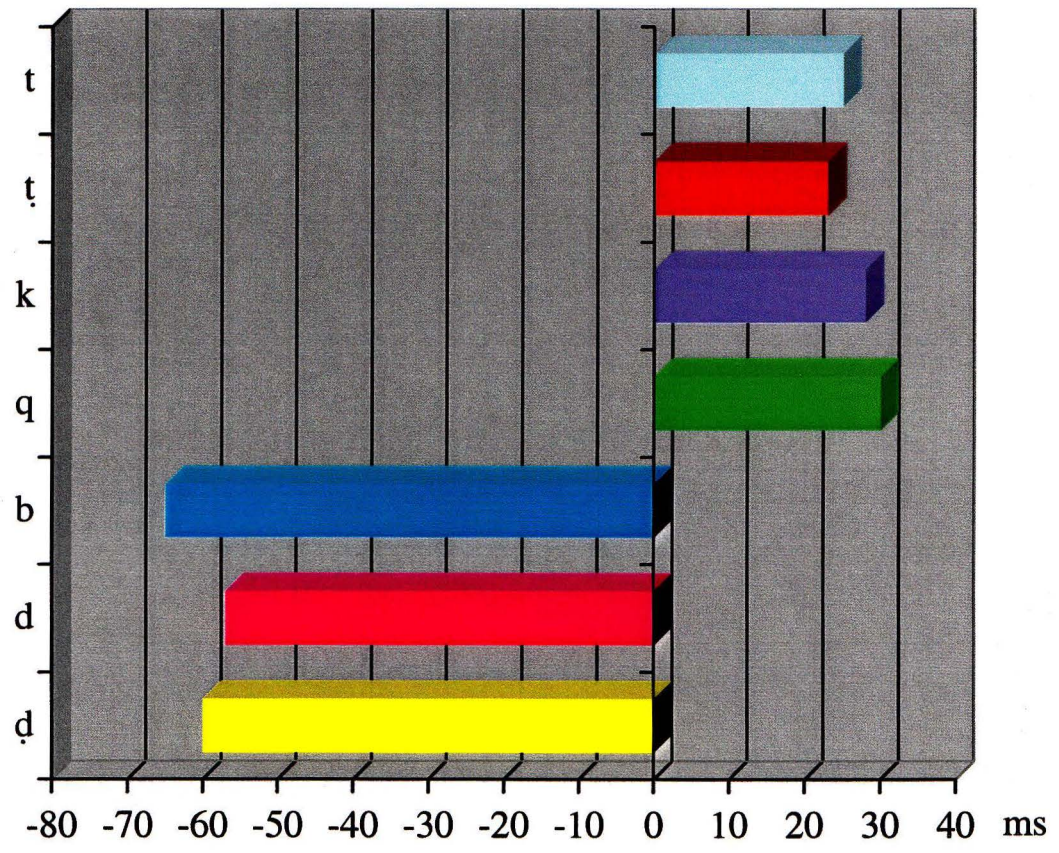
Yeni-Komshian *et al.*'s (1977) results for voiced stops preceding short vowels are shown in Figure 2.13 below.

Figure 2.13 *Lebanese Arabic – mean VOT values of voiced stops preceding [i], [a], [u] (n = 64); (from Yeni-Komshian et al., 1977; the results are their analysis of 8 tokens from 8 adult subjects for each of the 9 target CV sequences)*



The results above show consistently that the shortest lead for voiced stops is of those preceding *i*, which are always shorter than that of stops preceding *u* or *a* (there is some overlap betweent the latter two). In terms of type of stop (place of articulation / non-emphatic vs emphatic), however, there seems to be some overlap, although the mean values show the decreasing order *b* > *ḍ* > *d*. It is clear that the two dialects have similar phonological / perceptual VOT zones, as can be seen in the following chart, which should be compared with that given for the results of Jesry (1996) (Figure 2.11):

Figure 2.14 *Lebanese Arabic – mean VOT values of stops preceding short vowels (n = 192); (from Yeni-Komshian et al., 1977; the results are their analysis of 24 tokens from 8 adult subjects for each of the 7 stops)*



However, we cannot assume that results such as those above are uniform across Arabic dialects. In fact, it is possible that there may be an interesting pattern in terms of Levantine urban dialects (such as those investigated by the two studies above), which seem to be more innovative in this respect, compared with Bedouin(-origin) dialects.[58]

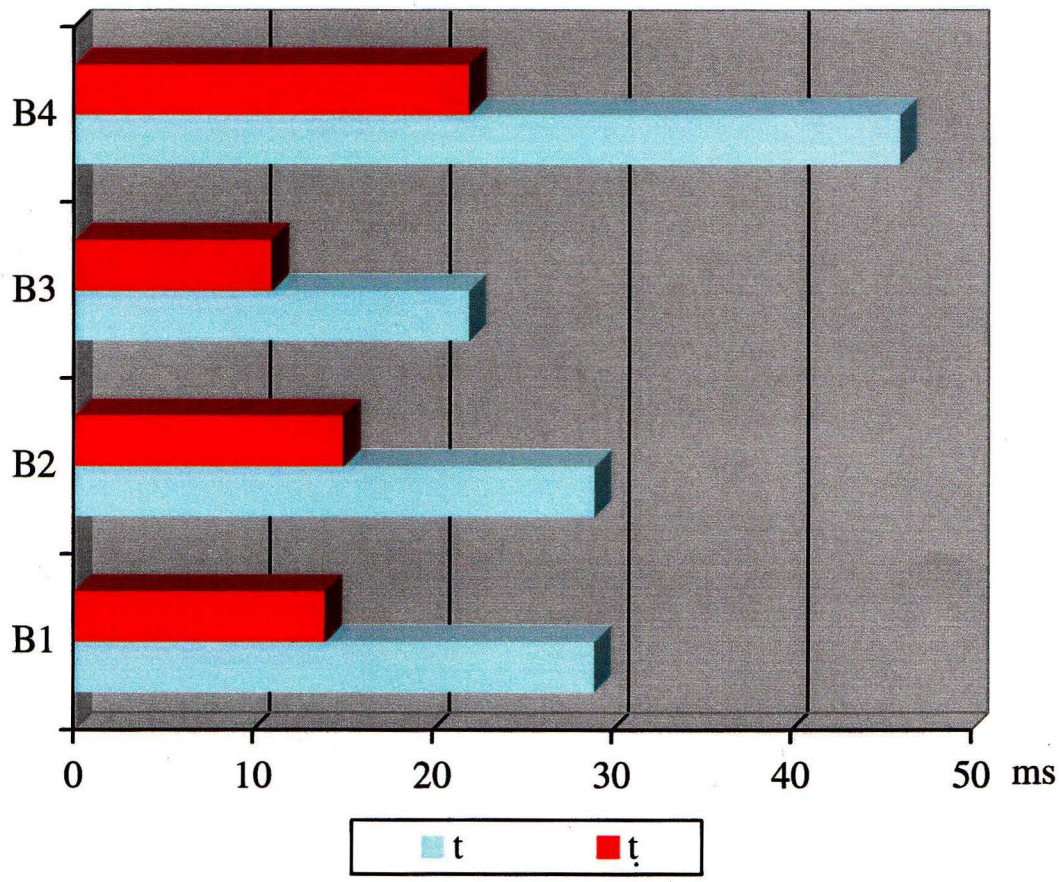
Heselwood (1996) discusses the contrast between Baghdadi and Cairene Arabic in terms of the VOT of *t* and *ṭ*. What he found, in an instrumental investigation of the production of *t* and *ṭ* word-medially and word-initially by four speakers of Muslim Baghdadi[59] Arabic and four speakers of Cairene Arabic, was that for the

[58] Arabic dialect geography is discussed in Chapter 5. Here, the purpose is to point out that there appears to be some dialectal variation in terms of the potential range of VOT values of emphatic / non-emphatic stops, which may be predictable according to dialect type. Chapter 3 demonstrates the historical development of this variation.

[59] See Chapter 5 for dialect classification. Muslim Baghdadi (unlike Jewish and Christian Baghdadi) is a Mesopotamian *gilit* dialect, and thus a Bedouin-origin dialect.

Cairene speakers *t* and *ṭ* are voiceless and aspirated, both with quite a wide range of VOT values, but with the ranges and means of the VOT values for both *t* and *ṭ* being extremely close. In other words, there is no distinction in laryngeal status between *t* and *ṭ* in Cairene Arabic. This contrasts, however, with (Muslim) Baghdadi Arabic, for which *t* is voiceless aspirated and *ṭ* is 'plain' voiceless (with short lag), and the VOT values for *t* tend to be roughly double that of *ṭ*. The range of values for *t* is also noticeably wider than that for *ṭ*. His results are summarised in the charts below, with mean VOT values (in ms) per subject in Figures 2.15 (Baghdadi speakers) and 2.16 (Cairene speakers), and with the absolute range of VOT values for each of the two dialects in Figure 2.17.[60]

Figure 2.15 *Muslim Baghdadi Arabic – mean VOT values of [ṭ] and [t] (n = 4); (from Heselwood, 1996; the results show the means of 4 tokens for each of 4 speakers, labelled B1–B4)*



[60] The actual results are tabulated in the Appendix.

Figure 2.16 *Cairene Arabic – mean VOT values of [ṭ] and [t] (n = 4); (from Heselwood, 1996; the results show the means of 4 tokens for each of 4 speakers, labelled C1–C4)*

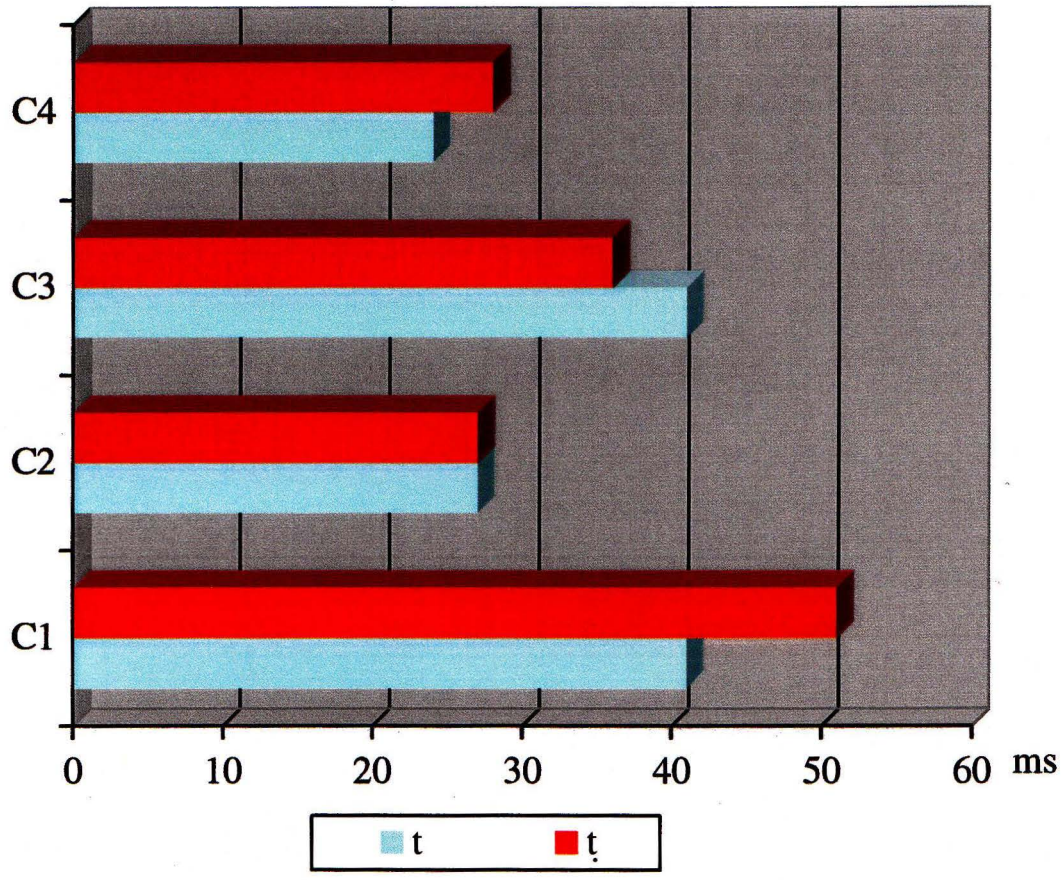
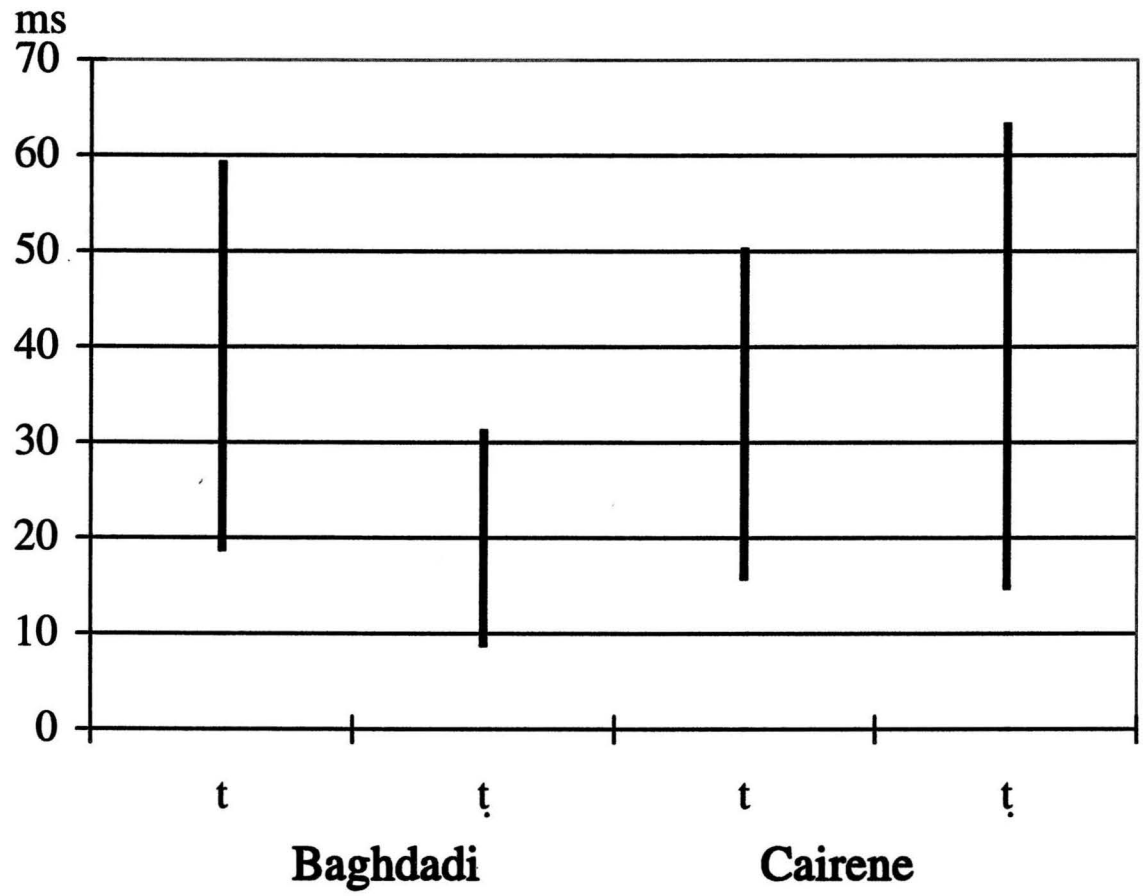


Figure 2.17 *Muslim Baghdadi vs Cairene Arabic – ranges of VOT values for [ṭ] and [t] for all 4 speakers of each dialect; (from Heselwood, 1996; the ranges are across the total 16 tokens per target)*



The results obtained for Cairene (by Heselwood, 1996) are very similar to those obtained for Lebanese Arabic (by Yeni-Komshian *et al.*, 1977) and for Syrian Arabic (by Jesry, 1996).

For some dialects of Arabic, such as Iraqi, it is often noted in descriptive grammars that *ṭ* is unaspirated, whereas *t* is aspirated. Grammars for other dialects (such as Cairene and Damascene) don't note this, however.[61] The studies above indicate that this may be systematic, rather than accidental. This leads one to wonder how far dialects can be classified as being of one type or another in terms of how many categories of distinctive voicing are included in the sound system of a given

[61] Although Harrell (1957:27) observes that in Egyptian Arabic, *ṭ* has an unaspirated allophone in free variation with the (normally) aspirated realisation when *ṭ* is in the onset of a stressed syllable.

dialect.[62] In order to lend a little more credence to this hypothesis, I have conducted acoustic analyses of varieties of Arabic that can be classified as Bedouin(-origin), that is, Baghdadi Arabic and, broadly, Saudi Arabic. VOT values have been measured for a number of tokens, and the results displayed below.

The tokens analysed for Baghdadi Arabic were taken from the CDs accompanying Alkalesi (2001), which comprises 16 lessons.[63] The results are shown in graphs below (tables showing the tokens and individual measurements are given in the Appendix).[64]

The analysis consists of 48 tokens in total, six for each of the eight stops *t ṭ k q b d ḍ g*.[65] The tokens were selected from Lessons 9–16[66] on the basis of being word-initial (in order to be able to measure the VOT of the voiced stops) and of being followed by the vowel *a*.[67] The mean VOT values[68] (rounded to the nearest millisecond for all my analyses) for each of the eight stops are displayed in Figure 2.18 below, while Figure 2.19 shows the actual ranges of VOT values obtained for each of the eight stops.[69]

The results presented in the graphs below clearly back up Heselwood's (1996) study with regards to the voiceless stops. That is, both *t* and *k* are voiceless aspirates

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[62] I have not been able here to investigate this comprehensively, as it is an enormous undertaking. It remains as the topic of future research.

[63] Just over 6 hrs 41 mins of recording, which consisted of dialogue and lexical items (each recorded twice), by one speaker (the author). He describes the dialect as that of 'middle-class Baghdad', although clearly of the *gilit* (Muslim Baghdadi) type.

[64] Although three sets of analyses were performed, on three different sets of tokens, only the results of Analysis 1 are discussed here. This is because Analyses 2 and 3, of voiced stops, showed nothing further. The results of all three analyses are tabulated in the Appendix.

[65] The Iraqi dialects of Baghdad and southwards are known as the *gilit* dialects because they are marked by the realisation of **q* as *g* (although there are dialects further to the south where *q* is commonly realised as *j* [dʒ] or *y* [j]). There are many lexemes which are, however, realised with *q*. Additionally, these dialects (to varying degrees) palatalise *k* in certain environments to *č* [tʃ]. See Chapter 5 of this thesis. The voiceless aspirate *p*, which exists marginally in Iraqi Arabic (normally in loans from Farsi and English), has not been included in these analyses, because although the few tokens in these recordings which contain this segment are produced as voiceless aspirates, it is my experience that very few Iraqi Arabs actually produce this segment as voiceless, and instead merge it with *b*. Lastly, in these dialects, the emphatic segments **ð̣* and **ḍ* have merged to *ð̣* (in some lexemes realised as non-emphatic *ð*). However, some tokens in these recordings were produced with [ḍ], presumably for pedagogical reasons to differentiate them from *ð̣*. In Iraqi Arabic normally, these two segments have completely merged.

[66] The exception to this is two tokens of [ḍɑ:buṭ] (from /ð̣ābuṭ/), which are from Lesson 5 – this is because there were very few tokens on the CDs with this segment in initial position.

[67] The exception to this is, again, the two tokens of [ḍɑ:buṭ], in which [ḍ] is followed by long [ɑ:].

[68] VOT values for voiceless stops have been calculated by measuring the duration of the period between the burst release of the stop (marked at the beginning of the amplitude change on the waveform, and checked against the spectrogram) and the onset of regular glottal pulsing (evidenced in most cases by the appearance of the second formant, checked against the waveform). The VOT values for voiceless stops have been calculated by measuring the duration of glottal pulsing preceding the burst release (as seen on the waveform and checked against the spectrogram) with the onset of voicing evidenced by amplitude deviation from the baseline of the waveform (against the spectrogram).

[69] The actual results obtained from each token are tabulated in the Appendix.

and *ṭ* and *q* are both voiceless unaspirated. The means of these VOT values were: *t* 31ms, *k* 39ms, *ṭ* 11ms, *q* 15ms. Therefore, the mean values for *t* and *k* are more than double those for *ṭ* and *q*, respectively. Moreover, Figure 2.18 shows that the two ranges (*t / k* vs *ṭ / q*) are discrete. Therefore, in Iraqi Arabic, unlike the dialects of Syria and Lebanon discussed above, there are two series of voiceless stops: voiceless aspirated and 'plain' voiceless. It is clear that these dialects, which are generally considered more conservative, have the three-way voicing series seen in the Semitic languages that have ejectives (such as Tigrinya), and as generally assumed for Proto-Semitic.

However, the results for the voiced series are not so clear, in two respects. Firstly, although I argue for a three-way voicing series, what evidence is there against a four-way series? That is, if e.g. emphatic *ṭ* is of a different voicing series from its so-called 'plain' counterpart *t*, it is feasible that emphatic *ḍ* by analogy may have developed into a different voicing series from *d*, thus having a significantly longer voicing lead. I have never seen it claimed for any language that there are two distinctive series of voiced stops,[70] but this cannot be ruled out on this basis alone. The other study seen of emphatic vs non-emphatic VOT, that of Heselwood (1996), analysed only the voiceless stops, so there is no other work available to check this issue for Baghdadi Arabic (i.e. a Bedouin-origin dialect type). However, my analysis shows that whereas *ḍ* clearly tends to have a longer lead than the other voiced stops, the value of this lead is nowhere near double that of *d* (the mean VOT values are: *b* -41ms, *d* -47ms, *ḍ* -76ms, *g* -47ms), and the ranges of VOT values are not discrete (recall that this was the case for *t* vs *ṭ*). The voicing lead is markedly longer than that of the other voiced stops, but as discussed, this is to be considered a phonetic effect and not linguistically significant.[71]

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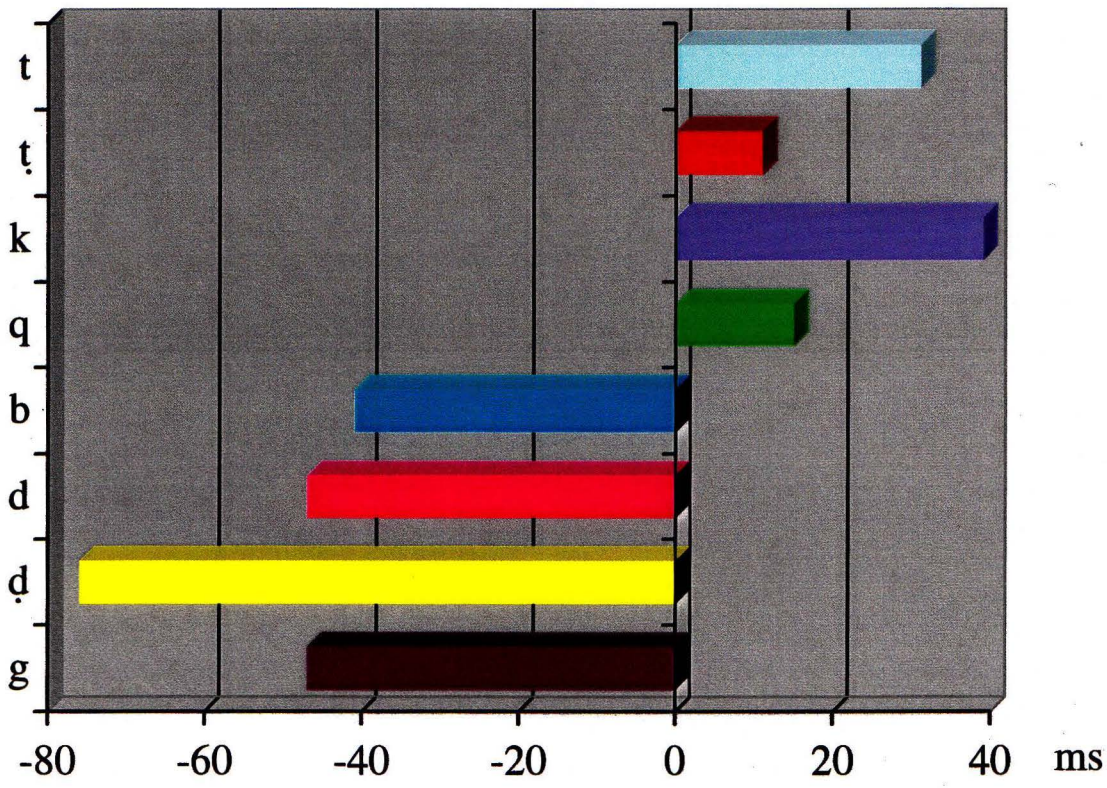
[70] By this, I mean two series differentiated by the length of the voicing lead alone. Thus, I am not including here the voiced vs implosive distinction, or the voiced vs breathy-voiced distinction; likewise the voiced vs pre-nasalised voiced distinction, as in languages like Gbeya, Yulu, Sara, Berta, Ngizim, Alawa and Siriono (see Maddieson, 1984).

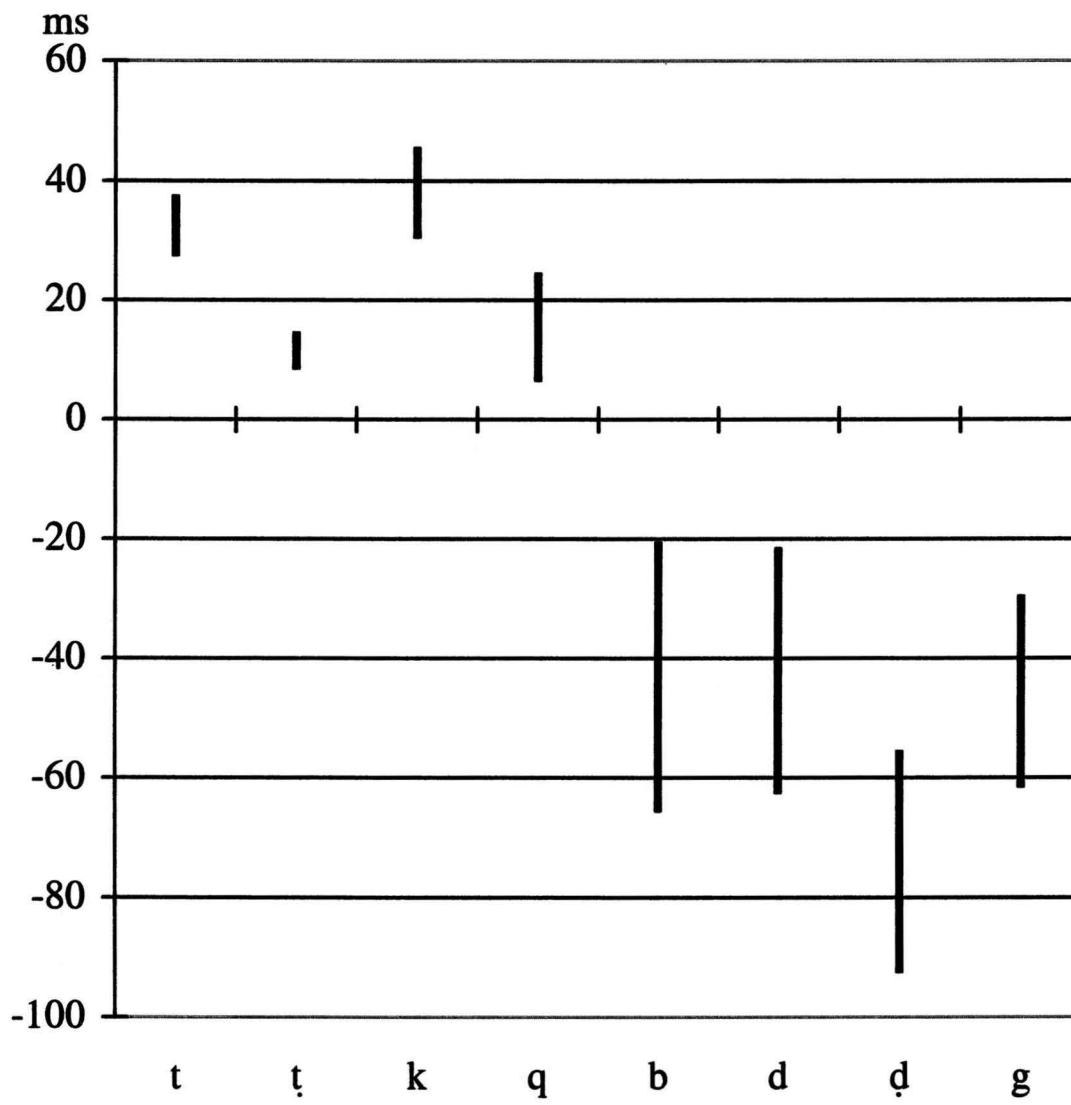
[71] The other two analyses (of voiced stops from other parts of the soundfiles) showed that, overall, *ḍ* had a mean voicing lead greater than that of the non-emphatic voiced stops, with the range of absolute values for *ḍ* tending to be wider than, although not discrete from, the ranges of values for *b d g*. The results are therefore not presented here, although they are tabulated in the Appendix. It should also be noted that *gilit* Iraqi dialects do not have emphatic *ḍ* naturally (it is merged with *ḍ̪*), but presumably for pedagogical reasons was pronounced as a stop in these soundfiles where it is written as such (in Standard Arabic). This may also have affected the results. Additionally, it should be noted that the voicing lead values for the tokens in Analysis 2 are much longer than those for Analysis 1. This is because the Analysis 2 tokens were selected from Lesson 1, which focuses strongly on pronunciation

Figure 2.18 *Baghdadi Arabic – mean VOT values of 8 stops (n = 6); data from the soundfiles accompanying Alkalesi (2001), of one adult male subject*



and the differentiation of certain sounds. They were thus spoken more slowly, with distinguishing features (such as voicing) exaggerated.

Figure 2.19 *Baghdadi Arabic – ranges of VOT values for 8 stops; data from the soundfiles accompanying Alkalesi (2001), of one adult male subject; the ranges are across the 6 tokens of each stop*



Having evaluated the results for Baghdadi Arabic, the question now is whether other dialects that are considered to be of a conservative type would produce the same results as Baghdadi Arabic, rather than, say, Syrian, Lebanese or Cairene. The results of my analyses of tokens from the KACST Arabic Phonetic Database[72] are presented below. The database consists of the results of nine experiments on seven Saudi Arabian speakers of Arabic conducted between 1984 and 1987, and contains the

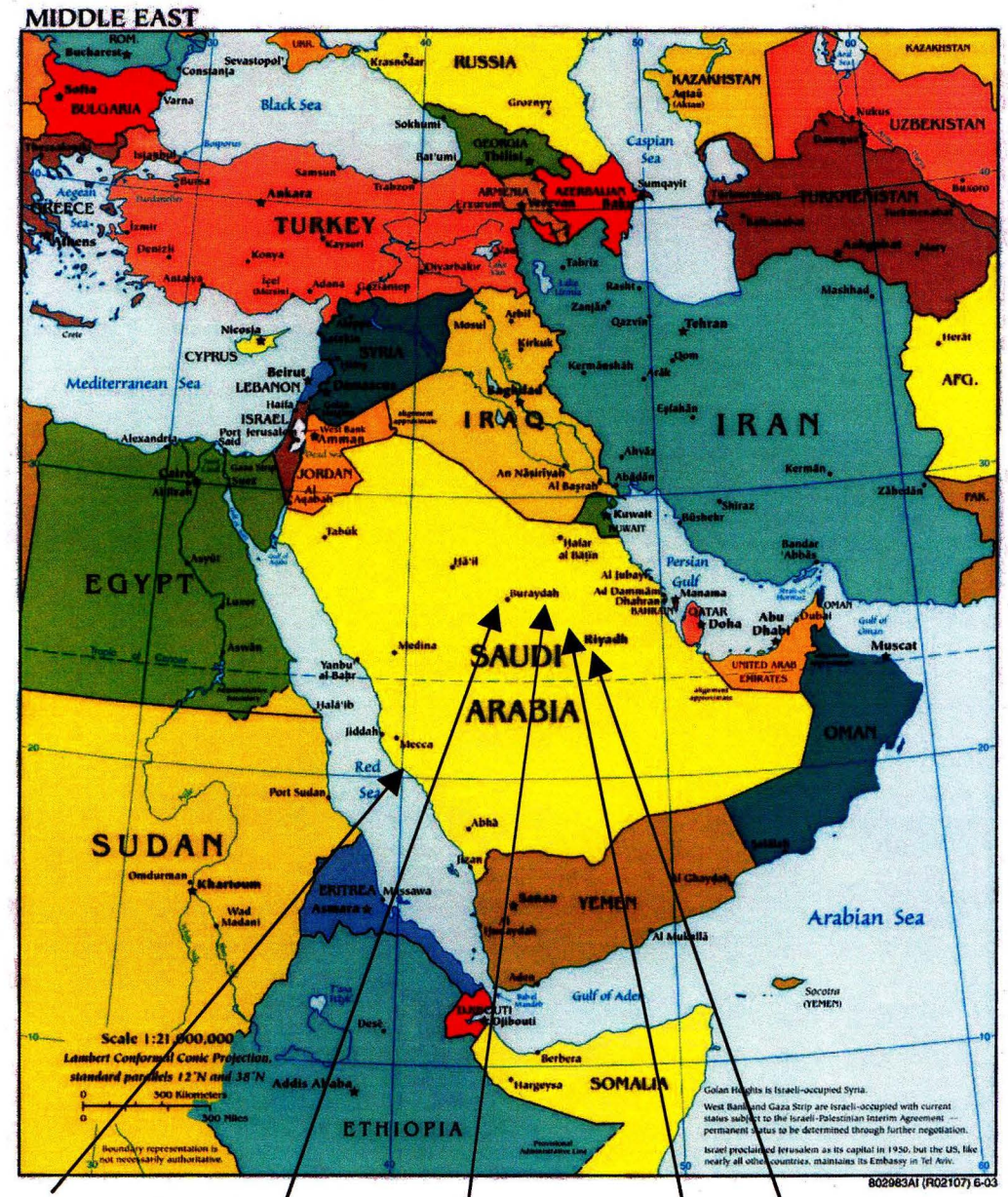
[72] The database, available on three CDs, is part of an ongoing speech technology project at the Computer and Electronics Research Institute of King Abdulaziz City for Science and Technology in Saudi Arabia. See www.kacst.edu.sa.

soundfiles of all tokens recorded for the experiments. The target consonants[73] are presented in different positions within a carrier frame consisting of *z* and one of the three short vowels *a*, *u*, *i*, meaning that there are twelve tokens for each target consonant: 1) word-initially, word-medially and word-finally, 2) within each of three vocalic environments 3) geminate or single. Thus, for example, there are twelve tokens for the target consonant *t*: /taz/, /tuz/, /tiz/, /zataz/, /zutuz/, /zitiz/, /zattaz/, /zuttuz/, /zittiz/, /zat/, /zut/, /zit/. In my analyses, however, I have examined for the voiceless stops only those in word-initial and word-medial position, and for the voiced stops only those in word-initial position.

Although the dialects spoken by each subject were not made directly clear, the birthplace of each was given. Six of the subjects come from the central Najd areas of north-eastern Arabia, and one from western Arabia.[74] This can be seen indicated on Map 2.1, below.

[73] Strictly speaking, the targets here are every *ħarf*, or consonantal segment, of Standard Arabic. This means that sounds such as *g*, which in many of the dialects of the Arabian Peninsula is the reflex of **q*, are not included in the database.
[74] An overview of Arabic dialect groups is given in Chapter 5.

Map 2.1 Saudi Arabia with birthplaces of KACST informants[75]



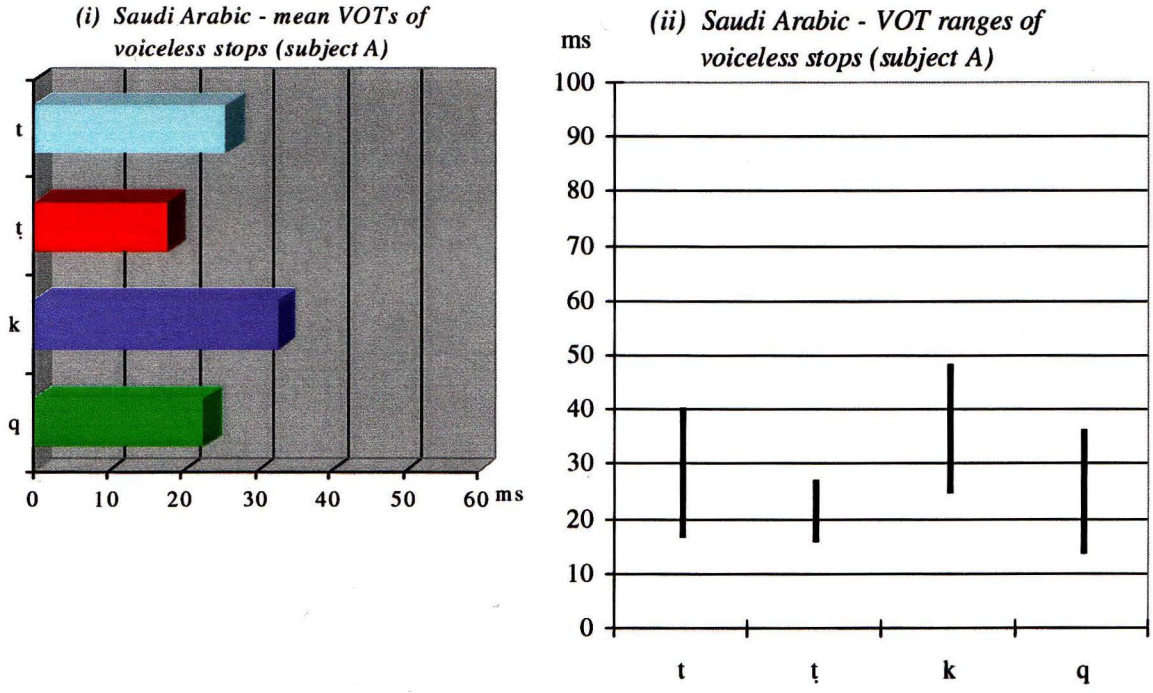
The mean values of the VOT measurements for all KACST subjects are summarised for each of the target voiceless stops *t ṭ k q* into Figures 2.20–6, below. For each subject, the mean values have been calculated from nine tokens of each

[75] Map adapted from "Middle_east_pol_2003", downloaded from www.lib.utexas.edu.

consonant, that is, one for each of *a*, *i* and *u*, in word-initial and word-medial position (the latter both single and geminate).[76]

Therefore, for the voiceless stops, a total of 252 tokens have been examined. Figures 2.20–6 show both the mean values as well as the range of values obtained per speaker, per target consonant. Overall, the mean VOT values in msec of voiceless stops for the group (across seven subjects) is *t* 35, *ṭ* 16, *k* 44, *q* 18. Therefore, it seems that here, too, VOT for *t* and *k* tend to be at least double that for *ṭ* and *q* (the exceptions are subject A and the coronals of subject M). Moreover, it can be seen from the ranges of values given in Figures 2.20–6 that the ranges for *t* and *k* tend to be discrete (or almost discrete) from those for *ṭ* and *q*, with the exception of subject A and the coronals of subject M. Lastly, for subject H, one anomalous instance of a VOT of 10 ms for *t* was noted, but *otherwise* his VOT ranges are discrete (and the mean VOT of *t* is still a little over double that of *ṭ* for this subject).

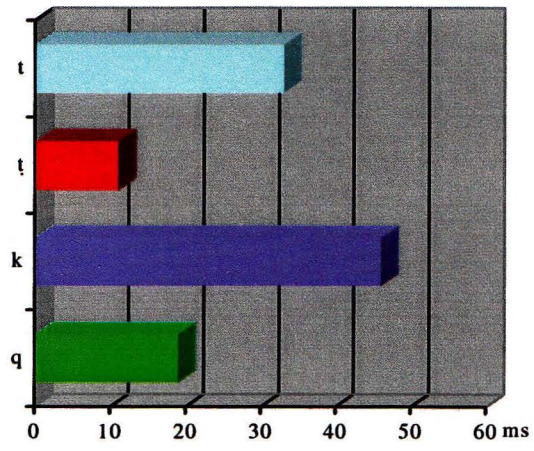
Figure 2.20 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (A, born in Riyadh); data from KACST database*



[76] Values rounded to the nearest whole ms. Actual values for all speakers are given in the Appendix.

Figure 2.21 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (B, born in Shaqra); data from KACST database*

(i) Saudi Arabic - mean VOTs of voiceless stops (subject B)



(ii) Saudi Arabic - VOT ranges of voiceless stops (subject B)

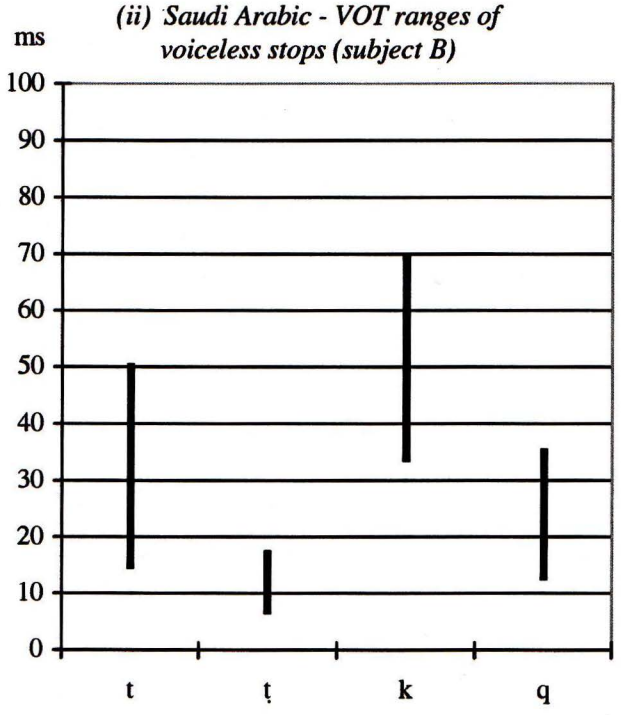
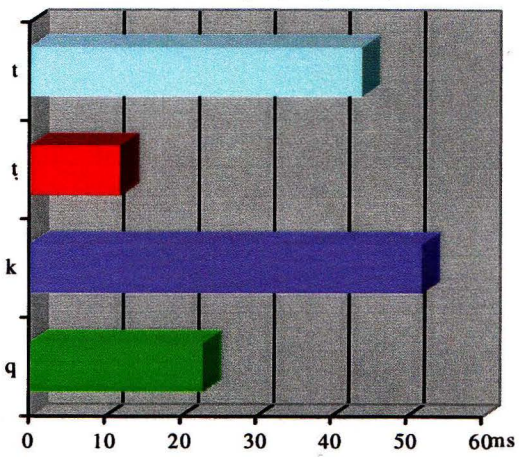


Figure 2.22 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (F, born in Buraidah); data from KACST database*

(i) Saudi Arabic - mean VOTs of voiceless stops (subject F)



(ii) Saudi Arabic - VOT ranges of voiceless stops (subject F)

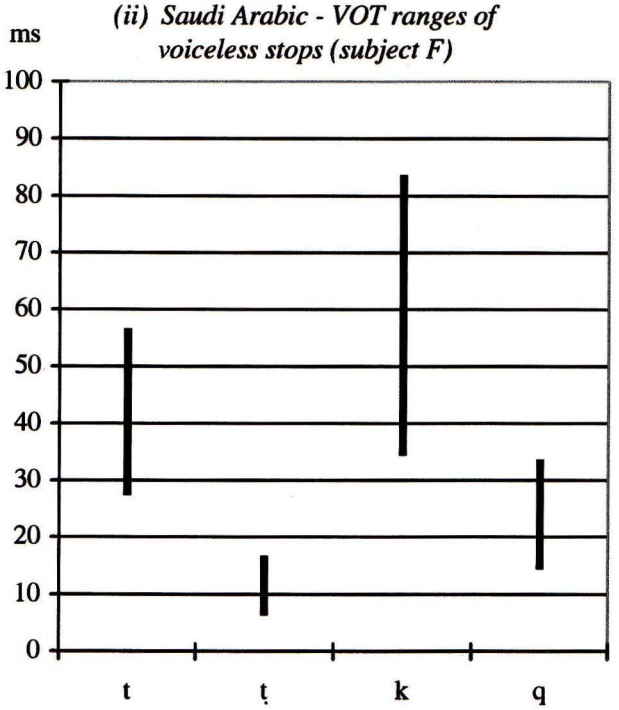
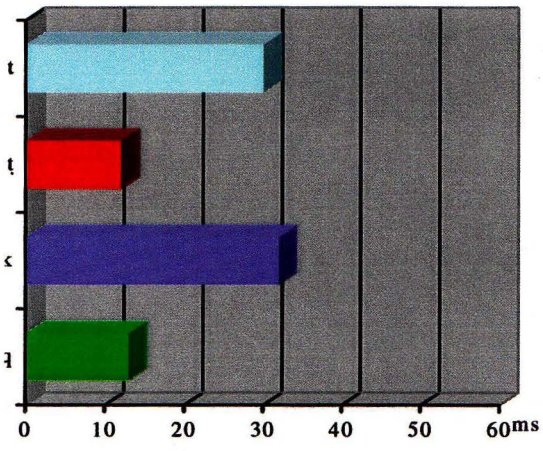


Figure 2.23 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (G, born in Albaha); data from KACST database*

(i) Saudi Arabic - mean VOTs of voiceless stops (subject G)



(ii) Saudi Arabic - VOT ranges of voiceless stops (subject G)

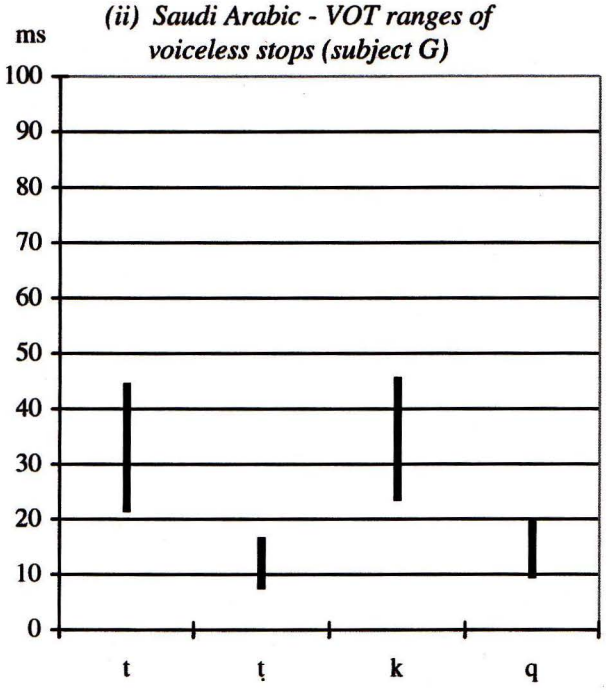
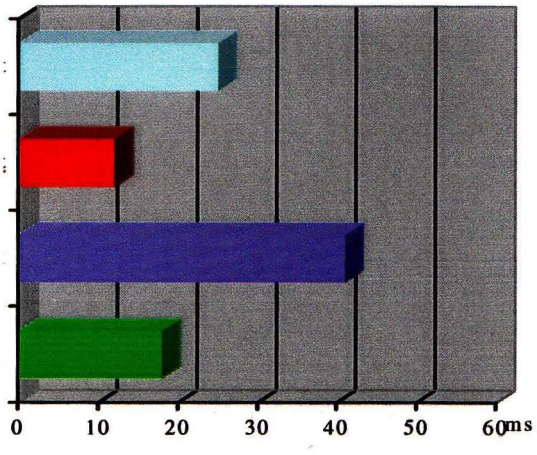


Figure 2.24 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (H, born in Huraymila); data from KACST database*

(i) Saudi Arabic - mean VOTs of voiceless stops (subject H)



(ii) Saudi Arabic - VOT ranges of voiceless stops (subject H)

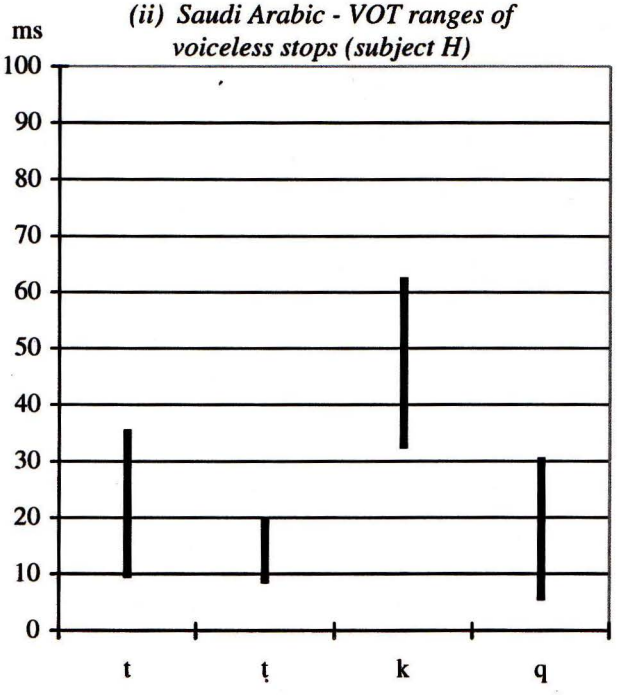
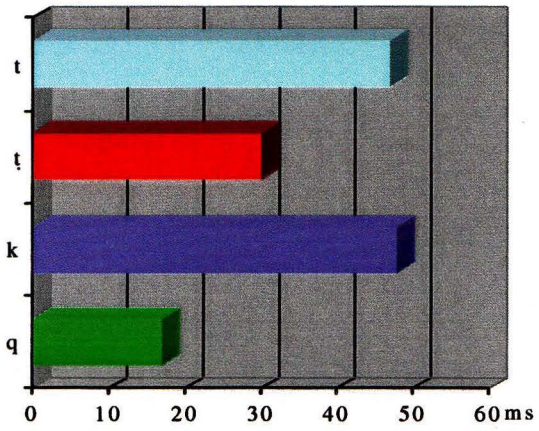


Figure 2.25 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (M, born in Riyadh); data from KACST database*

(i) Saudi Arabic - mean VOTs of voiceless stops (subject M)



(ii) Saudi Arabic - VOT ranges of voiceless stops (subject M)

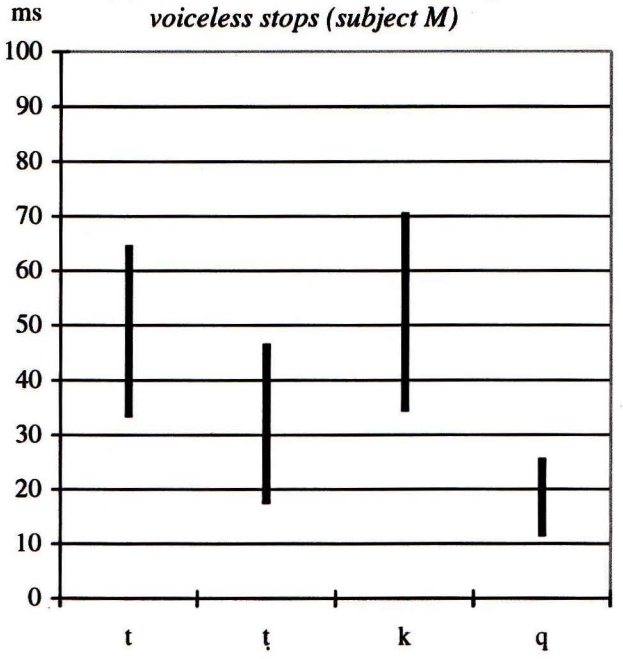
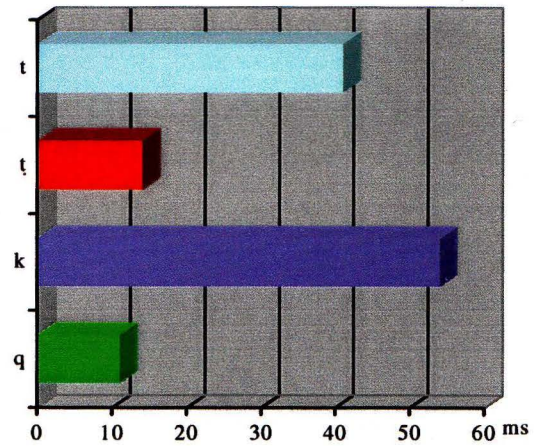
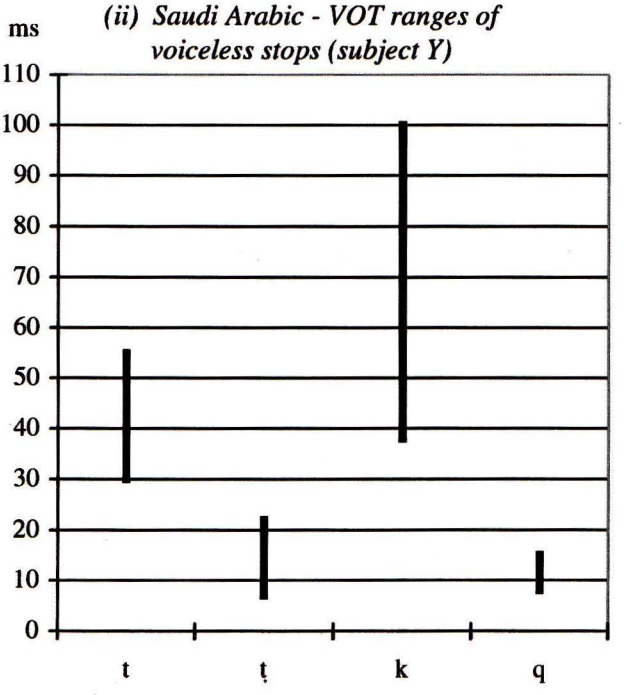


Figure 2.26 *Saudi Arabic – means and absolute ranges of VOT values for voiceless stops (n = 9) for one adult male subject (Y, born in Riyadh); data from KACST database*

(i) Saudi Arabic - mean VOTs of voiceless stops (subject Y)



(ii) Saudi Arabic - VOT ranges of voiceless stops (subject Y)

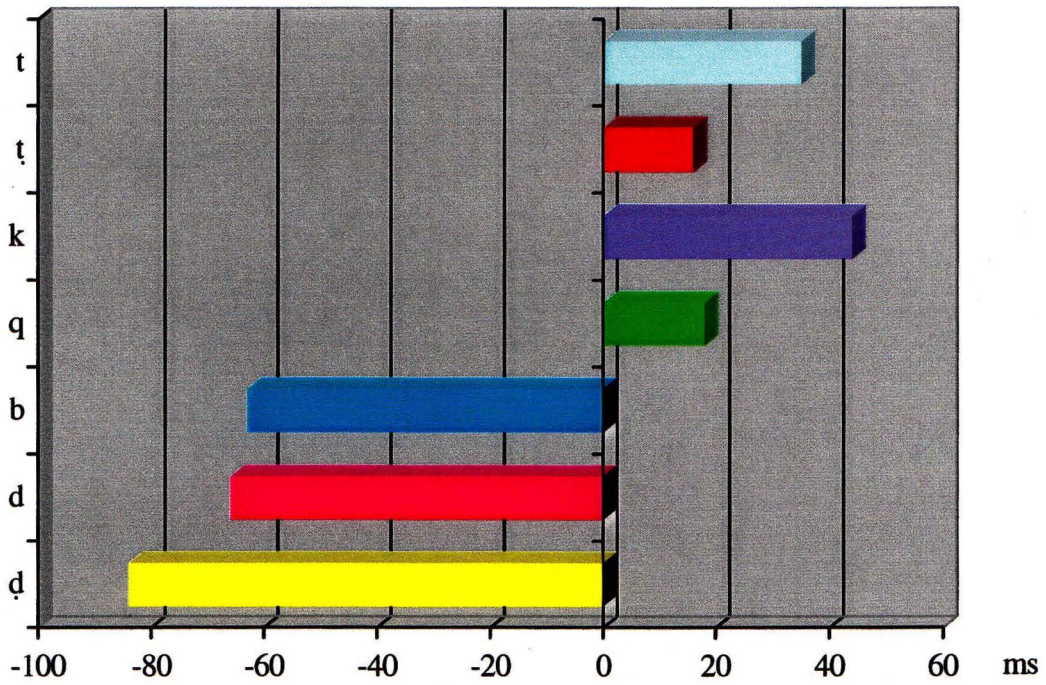


Figures 2.20–6 show that both *ṭ* and *q* are produced with less than half the VOT of *t* and *k* (the overall mean VOT values in msec for these segments across the group are: *t* 35, *ṭ* 16, *k* 44, *q* 18).

The results of the VOT values obtained for the voiced stops *b d ḍ*[77] examined from the KACST database[78] gave mean VOT values (msec) for the group (across seven subjects) as *b* -63, *d* -66, *ḍ* -84. The results are not dissimilar to the Baghdad Iraqi results given above, i.e. *ḍ* tends to have a longer voicing lead, but not long enough or consistently enough for it to be considered linguistically significant rather than a phonetic effect (as discussed).

Figure 2.27 below summarises the overall mean VOT values (i.e. results averaged across all speakers) obtained for Saudi Arabic from the KACST database.

Figure 2.27 *Saudi Arabic – mean VOT values of all stops across 7 subjects (for voiceless stops, n = 63; for voiced stops, n = 21); data from KACST database*

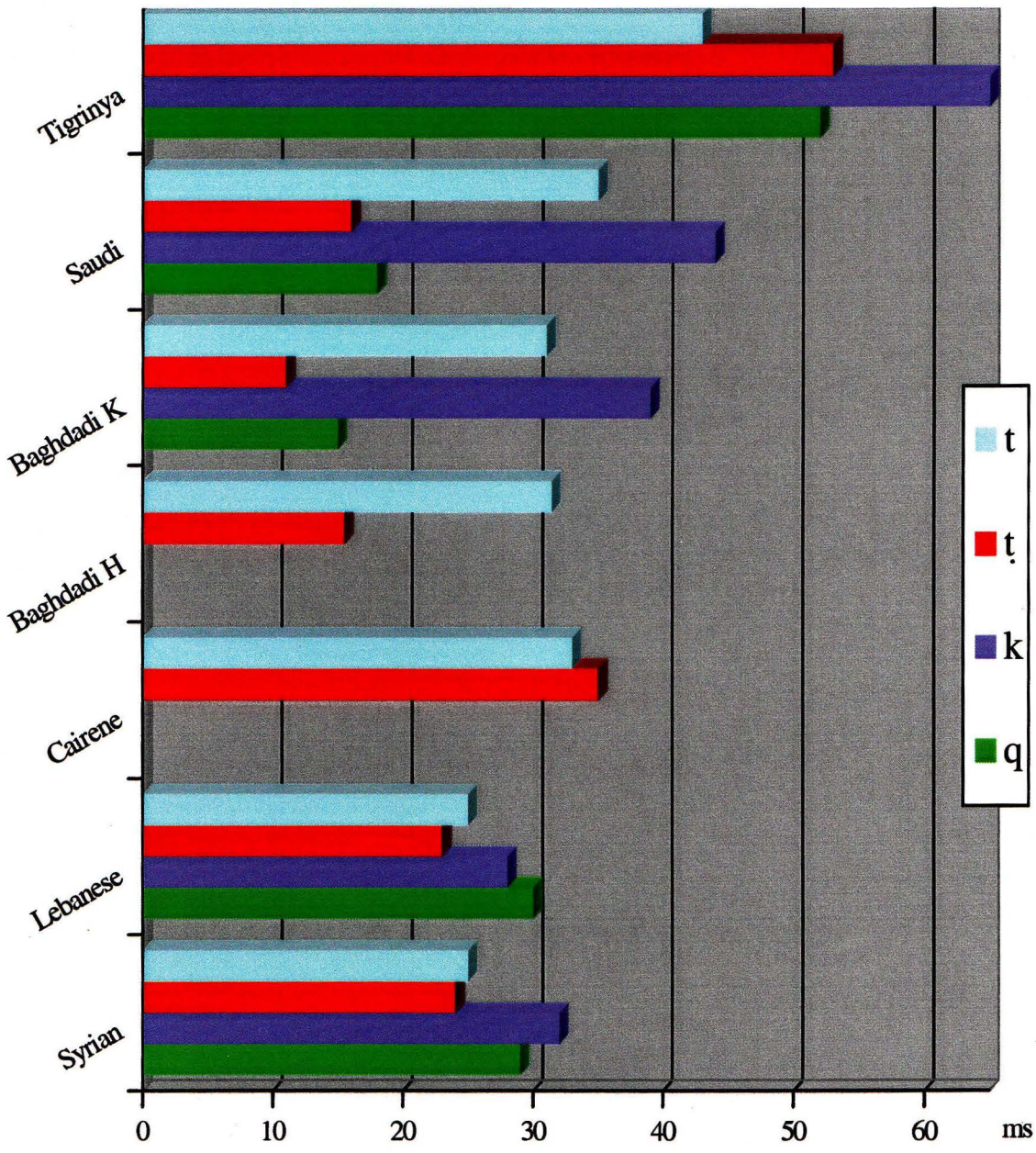


[77] As noted, the target segments comprise those of 'Standard' Arabic, rather than Arabian Arabic. Therefore, *g* is not included, and *ḍ* and *ḍ̊* are intended as separate segments, although the actual realisation of some speakers for both is *ḍ̊* (fricated to a greater or lesser degree), which is more characteristic of Arabian dialects.

[78] Mean values were calculated from the available three tokens per stop, that is, one for each of *a*, *i* and *u*, all in word-initial position.

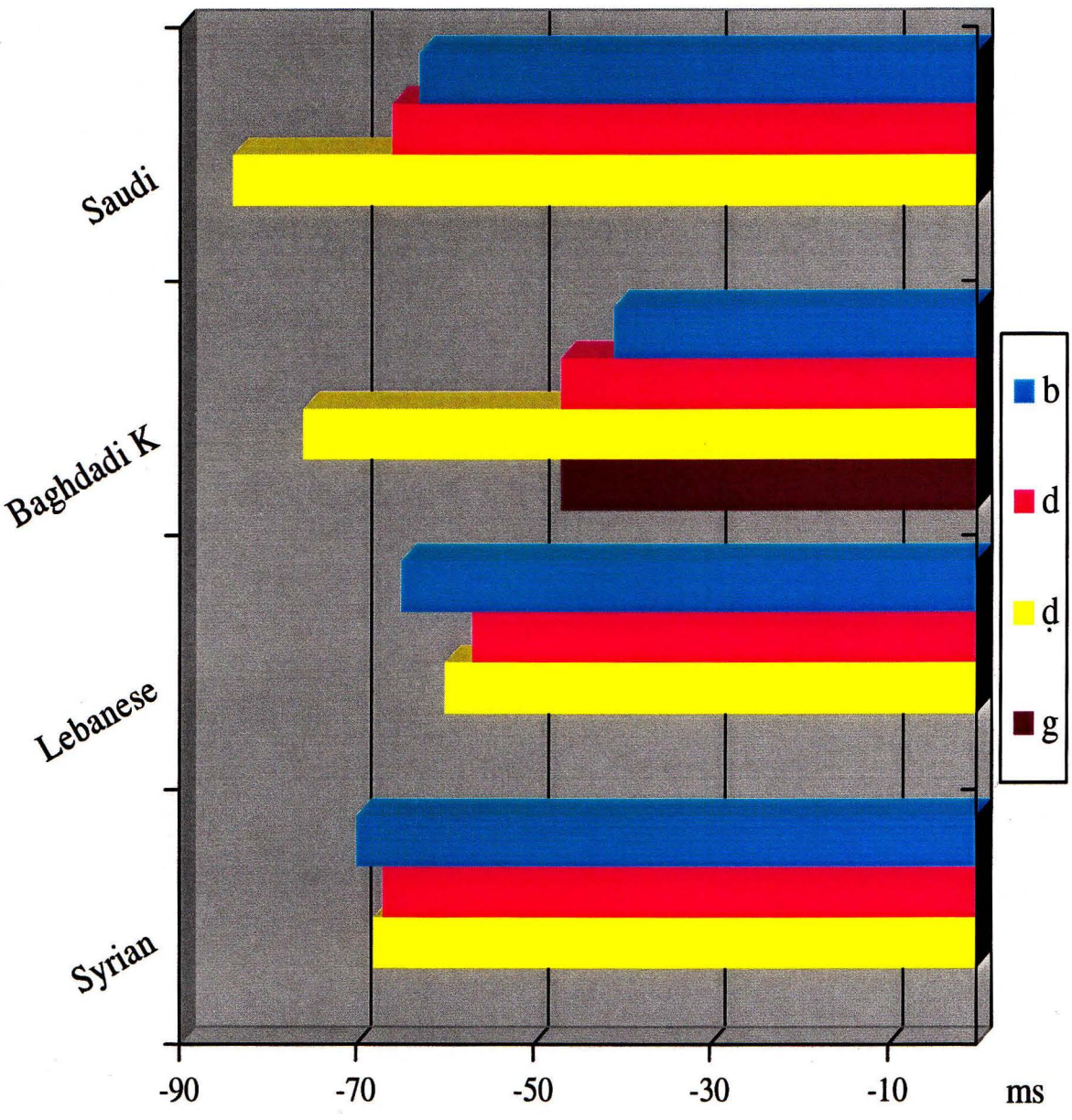
To reiterate the results presented in this section, graphs comparing overall mean VOT values for all the studies presented here[79] are shown in Figure 2.28 for voiceless stops (including Tigrinya ejectives) and Figure 2.29 for voiced stops:

Figure 2.28 *Mean VOT values of voiceless stops in 5 dialects of Arabic and in Tigrinya (from Figures 2.6, 2.9, 2.12, 2.15, 2.16, 2.18, 2.27); data sources: Tigrinya = SOAS Phonetics Lab; Saudi = KACST database; Baghdadi K = Alkalesi (2001); Baghdadi H = Heselwood (1996); Cairene = Heselwood (1996); Lebanese = Yeni-Komshian et al. (1977); Syrian = Jesry (1996) (NOTE: for Tigrinya, q = [k'])*



[79] For the Baghdad Iraqi dialect of Alkalesi (2001), only the results of Analysis 1 are given, as they were most carefully controlled; the results of Heselwood (1996) relate only to *t* and *ṭ*, and those of Jesry (1996) and Yeni-Komshian (1977) have only seven stops (no *g*); the results for Saudi Arabian Arabic (KACST), averaged across the seven subjects, relate to the 252 voiceless tokens examined.

Figure 2.29 *Mean VOT values of voiced stops in 4 dialects of Arabic (from Figures 2.10, 2.13, 2.18, 2.27); data sources: Saudi = KACST database; Baghdadi K = Alkalesi (2001); Lebanese = Yeni-Komshian et al. (1977); Syrian = Jesry (1996)*



Clearly, this is not a systematic and comprehensive analysis of this phenomenon. However, the evidence is that Arabic emphatic *ṭ* and uvular *q* do not pattern with the voiceless aspirates *t* and *k* as regards voicing in some dialects, but that in others they do. This seems likely to correspond with the type of dialect. The Bedouin-origin dialect types discussed above, i.e. Saudi (Arabian) and Muslim Baghdadi (Mesopotamian *gilit*), contrast *t* and *ṭ* for voicing as well as other correlates

of 'emphatic';[80] the Levantine and urban Egyptian dialect types discussed above – i.e. Syrian, Lebanese, Cairene – do not contrast *t* and *ṭ* for voicing. Thus, the Bedouin-origin dialect types have a voicing series corresponding to 'emphatic' (at least for the voiceless emphatics), whereas in the Levantine / urban Egyptian dialects the voiceless emphatics have merged with the voiceless non-emphatics in terms of the voicing series, so that 'emphatic' has no laryngeal function of its own (this can be seen in Figure 2.28 by contrasting the bars corresponding to the overall mean VOT values obtained for each stop for the two types of dialect). It seems likely that the neutralisation of the voicing contrast between voiceless emphatics and non-emphatics in some dialect types would have been due to the increased phonological importance of the salience of the (backed) resonance quality of emphatics. Since it is not particularly economical to have multiple features associated with one contrast (by which I mean that it places more burden on both the phonology and on the motor system),[81] the one which is more salient phonologically / perceptually is likely to prevail. Thus, this is relevant to the overall sound system of a given dialect, and to the phonological behaviour of emphatics. The latter has a bearing since emphatics seem to have different spreading properties in different types of dialects. Therefore, the central focus of Chapter 5 is the (segmental) sound systems across Arabic as a whole, with the aim of looking at different types of dialects in order to see how far there is a correlation between such factors as how many voicing series a given dialect has, and how the spreading of emphatics works in that dialect. Eventually, such work would

[80] Additionally, a preliminary analysis of some sample soundfiles of Jewish Baghdadi Arabic, which were kindly given to me by Eli Timan, show the same results. That is, in Jewish Baghdadi Arabic, *t* is clearly aspirated, whereas *ṭ* is clearly 'plain' (unaspirated) voiceless. Jewish Baghdadi is a Mesopotamian *qəltu* dialect (in Blanc's 1964 terminology) – see Chapter 5 – a dialect group which is not Bedouin-origin, but probably descended from the original sedentary dialects of Mesopotamia.

[81] The latter could be seen in terms of 'effort', as defined by Flemming (2005:10, esp. fn.5); however, this in no way means that languages necessarily prefer to exploit phones that are least effortful – it is clear that within a system saliency of certain features may be maximised, thus becoming characteristic of that sound system, but maximisation of a given feature may involve enhancing it through other mechanisms. Moreover, we should differentiate here between phonological and phonetic features; that is, a given salient aspect of a certain sound may be enhanced by combining articulatory mechanisms (e.g. jaw lowering, hence expansion of the volume of the oral cavity, may be used to enhance the saliency of pharyngeal stricture, or velic lowering, allowing more salient voicing, may be used to enhance the saliency of voiced stops, i.e. pre-nasalisation), but it is not necessarily the case that more that one phonologically manipulatable feature is involved, more that the phonological 'feature' is realised through (i.e. mapped onto) more than one articulatory feature. What is interesting, though, is how different sound systems manipulate different combinations of articulatory features (thus potentially giving a slightly different perceptual feature) in the realisation of what is normally seen as one phonological feature (theoretically canonised through the notion of 'redundancy'). This demonstrates how the phonetics–phonology interface interacts with sound *systems*, and why it is imperative that we see the sounds of a given language within the context of the overall system.

hope to go some way towards developing an integrated dialectal phonological typology of Arabic.

Overall, then, the evidence is that certain dialects of Arabic are more conservative with respect to their voicing categories, which is three-way. This three-way voicing series is common to other Semitic languages, namely the south Semitic branch, i.e. Ethiopic and Modern South Arabian languages (see Chapter 4). As we have seen, however, in these languages the voicing series corresponding to 'emphatic' is realised as ejective (i.e. glottalised). It can thus be seen that the category 'emphatic' is phonologically a voicing series in Ethiopic and Modern South Arabian languages, and that in some dialects of Arabic this voicing series is still active, but only a part of the distinctive category 'emphatic'

By contrast, there are dialects of Arabic in which the laryngeal function of 'emphatic' seems to have merged completely with the other series (i.e. they do not retain a three-way series, and have only a voiced–voiceless distinction).[82] The historical development of emphatics is discussed in Chapters 3 and 4, and this further supports the indication that Old Arabic would have had a three-way voicing contrast in the stop series, which has neutralised in some modern dialect types of Arabic.

As a final note, it should be borne in mind that the acoustic studies presented here were very different in terms of experimental methodology and types of tokens, and presumably perhaps different in terms of the criteria for measuring VOT. It is thus perhaps misleading to compare the *actual* figures between these studies, and it is more instructive to look at the *comparative* values for types of stop (e.g. the *t* vs *ṭ* trend between, say, Lebanese and Baghdadi). This is one of the reasons for presenting the data in the form of bar charts, so that the overall patterns can be seen and compared. As noted, the current work does not pretend to be a comprehensive analysis of VOT, but it does highlight the need for consistent and thorough inter-dialectal or cross-linguistic (say, across Semitic) studies (especially as regards the issue of the triads).

[82] However, it is not clear to what extent the neutralisation of the voiceless emphatic and voiceless non-emphatics has occurred (or is in the process of occurring) across the dialects of Arabic. As discussed later in this chapter, this is why a consistent and comprehensive cross-dialectal study of this feature is urgently needed.

Moving away from the synchronic angle and back to earlier Arabic, I noted in Chapter 1 that the eighth-century grammarian Sībawayh classified Arabic *ṭ* not with *t* and *k* (*mahmūs*) but with *d* (*majhūr*). It should be noted that at this time, Arabic was in the process of spreading much more widely further to the conquests and along with the spread of Arabo-Islamic culture. The Arabic varieties spoken at this time would have been increasingly diversifying, and the grammarians themselves relied on grammaticality judgements of the (Arabian) Bedouin tribes. I argue, with the evidence that we have discussed, that the *mahmūs–majhūr* distinction relates not to 'voiced–voiceless', but to 'aspirated–unaspirated'. The fact that the voiceless segments *ṭ* and *q* were classified with the voiced segments probably indicates not that they were voiced, but that they were voiceless, and that this distinction may have been somewhat neutralised word-internally and -finally, as is often observed with 'plain' voiceless stops.[83] It has indeed been observed that in (at least) some dialects of the Arabian Peninsula synchronically, emphatic *ṭ* can sound somewhat voiced.[84] I suggest that this is likely to be due to a degree of assimilation of *ṭ* word-internally (/-finally). It certainly corroborates the initial conclusions drawn here from the evidence presented.

Lastly, for comparison, and to back up the phonological representations proposed in Chapter 3, the next two sections outline the main phonetic characteristics of uvulars and pharyngeals.

2.3 Uvulars

Maddieson (1984:32) shows that the proportion of UPSID languages with uvulars is 14.8%, showing that cross-linguistically it is not the most common place of articulation for consonants. Most of the Semitic languages today have at least dorsal fricatives, but it is not always clear whether these are actually velar or uvular. For Arabic, although for some dialects the fricatives are said to be velar, they generally pattern most often as 'back' consonants. No Semitic language contrasts velar with uvular fricatives.[85] The stop notated as 'q' in Semitic is generally either a uvular stop *q* or an ejective *k'* (which may in fact be somewhat backed).[86]

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[83] For example, the English plain voiceless *d* voices intervocalically.
[84] Ingham (1982:58; p.c.).
[85] I therefore notate them throughout this thesis as *x* and *γ*.
[86] Chapter 4 details the development of such segments across Semitic.

Within Arabic, synchronically, the situation with uvulars is not so clear-cut as that with pharyngeals and emphatics, since many dialects of Arabic do not have a uvular stop and some have velar rather than uvular fricatives. For example, Cairene has two velar fricatives and the historical uvular stop is produced as a glottal stop. In other dialects, the uvular stop is voiced, and often produced as a velar, or it may have simply fronted to *k* (as in some, typically rural, Palestinian varieties), or *q* is produced as a voiced uvular trill ʀ (as in Khuzistani Arabic). Holes (2004:73)[87] notes the development of CA *q* as basically threefold, characterising 'city', 'rural' and 'Bedouin' dialects. That is, the city dialects of the east (Cairo, Jerusalem, Damascus, Beirut) realise **q* as *ʔ*; in rural Palestine **q* is realised as *k*~*ḳ*; in Bedouin(-descended) populations (central and eastern Arabia and southern Iraq, including Muslim Baghdadi) **q* is realised as *g*.[88] However, there are dialects in which *q* persists.[89]

2.3.1 Realisation of uvulars

Arabic uvulars have a similar effect on vowels as do emphatics. That is, e.g., synchronically, where the low vowel in many other environments is typically raised (to [ɛ] or [æ]) in most Arabic dialects, when following a uvular, according to Herzallah (1990:43), it is realised as [ɑ] in at least Syrian Drūz, Lebanese, northern and Jenin Palestinian, and Iraqi. In fact, this is widely reported across the dialects.

Uvular *γ*, *x*, *q* are produced with much higher constriction than pharyngeals, but more backed than velars,[90] with constriction occurring through retraction of the tongue dorsum towards the posterior wall of the oropharynx. Constriction is similar to that of the emphatics but, while in some respects they pattern phonologically as a class, uvulars do not trigger harmony to the same degree as emphatics.[91]

Ghazeli (1977) says that the uvulars *q*, *x* and *γ* are produced by an upward movement of the tongue (with constriction at the uvula), which results in a slight raising of the larynx. A backward movement results in the narrowing of the

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[87] See for more extensive discussion Johnstone (1963).
[88] In some Bedouinite dialects, **q* is palatalised in front vowel environments to palato-alveolar *ǰ* or even *dz*.
[89] See Chapter 5 for more detailed discussion.
[90] Ghazeli (1977), McCarthy (1991, 1994).
[91] There are, however, many instances in Iraqi *gilit* dialects of emphatic *ɫ* having been apparently triggered by the presence of a uvular in the word. While this appears to have fossilised, it does indicate a degree of harmonisation. See Chapter 6 for detailed discussion of Muslim Baghdadi.

oropharynx, with the narrowest constriction being between the epiglottis and the back wall of the pharynx. However, the dorsal constriction for *x* in his study is slightly further forward than for *q* and *γ*. Ghazeli (1977:59) states that backing of the front vowels is the only significant coarticulatory effect of the uvulars. However, the interesting point is that different dialects seem to treat the low vowel in the environment of uvulars differently. That is, in dialects where the low vowel *a* is fronted to [ɛ] / [æ] in non-guttural environments, it is both backed and lowered in the uvular environment, whereas in dialects where the low vowel is already central (Iraq and Jordan, amongst his informants), in the uvular environment it is only backed.

According to Zeroual (2003:1859), the uvulars in Moroccan Arabic are produced with approximation of the dorsum and the anterior part of the velum in the context iCi, and between the dorsum and the uvula in the contexts aCa and uCu.

2.3.2 Auditory and acoustic characteristics

Segments with secondary uvulo-pharyngeal articulation (i.e. Arabic-style emphatics) exhibit significantly lowered F_2 and raised F_1 transitions. In Arabic, the stop *q* has been observed in various studies to lower F_2 transitions and some researchers also discuss raised F_1 transitions.[92] McCarthy (1994:7) notes that uvular *γ* and *x* are characterised by F_2 as low as that of pharyngeals, but whereas the first formant is relatively high, it is not quite as high as for the pharyngeals.

Ladefoged & Maddieson (1996:36) note that the study of al-Ani (1970) (of Baghdadi Arabic) shows that the uvular stop lowers F_2 for a following *i* or *a*, while F_2 is slightly raised in *u* following uvular stops (they also note that it's very evident that the major energy in the burst of the stop consonant is lower for *q* than for *k*).

With regard to cross-linguistic characteristics of uvulars, Ladefoged & Maddieson (1996:36) discuss the results of their analysis of the production of uvular vs velar stops (voiceless vs ejective) by 12 speakers of K'ekchi. They observe that the major energy in the burst is lower for the uvulars than for the velars, and that for 75%

[92] Ghazeli (1977), al-Ani (1970), Card (1983), Bessell (1992), McCarthy (1994), Goad (1991), Butcher & Ahmad (1987), Shahin (2002).

of these K'ekchi speakers there is a noticeable lowering of F_2 in the following vowel.[93]

To conclude, I assume that uvulars (like emphatics) are characterised by the presence of *a*-quality (the element [A]). Velars, by contrast, are not. This will be shown in Chapter 3.

2.4 Pharyngeals

The majority of Semitic languages today have two pharyngeals, *ʕ* and *ħ*. Those that don't are (Standard Israeli) Hebrew, in which *ʕ* has merged with *ʔ* and *ħ* with *x*, Amharic, in which *ʕ* has merged with *ʔ* and *ħ* with *h*, and some dialects of Neo-Aramaic.[94] The vast majority of Arabic dialects have pharyngeals, with the exceptions of such peripheral dialects as Maltese and Cypriot and those of sub-Saharan Africa.[95] Additionally, in northern Yemeni Tihāma the voiced pharyngeal has the reflex *ʔ*.[96]

2.4.1 Realisation of pharyngeals

It is known that pharyngeals are articulated with primary pharyngeal constriction, executed by the approximation of the back wall of the pharynx and the (retracted, and possibly lowered) root of the tongue, from the epiglottis down to the larynx. Catford (1977:163) notes that 'in faucal or transverse pharyngeal articulation the part of the pharynx immediately behind the mouth is laterally compressed, so that the faucal pillars move towards each other. At the same time the larynx may be somewhat raised. This appears to be the most common articulation of the pharyngeal approximants [ʕ] and [ħ]. It is largely a sphincteric semi-closure of the oro-pharynx...' This is, according to Catford, the most common type of Arabic [ʕ]. In-depth analyses

[93] This is supported by the work on uvulars in Salish languages by Goad (1991), Bessell (1992) and Shahin (2002), and for Caucasian languages by (in particular) Kodzasov (1987).
[94] Jastrow (1997:349) notes that in many North-East Neo-Aramaic (NENA) dialects, *ħ* > *x* and *ʕ* > *ʔ* (>Ø). Fox (1997) notes that the NENA dialect of Jilu (a mountain village of Ḥakkari, south-eastern Turkey) has no pharyngeals (historical **ʕ* is simply elided, but the entire word is often 'flatted', i.e. emphatic). Garbell (1965) on Jewish NENA of north-western Iran and south-eastern Turkey shows no pharyngeals (these dialects are similar to Jilu). The Jewish NENA dialect of Arbil (Iraqi Kurdistan) has *ʕ* in most cases, although **ħ* is often *x*, although Khan (1999) notes that in Jewish Urmia (NW Iran) the pharyngeals 'have been lost' (**ʕ* is elided), but that the entire word is pharyngealised. For the standard 'lingua franca' Neo-Aramaic of the Iraqi Assyrians, Odisho (1975) has the two pharyngeals only in Arabic loans. See also Sara (1974) and Krotkoff (1982) on the Modern Chaldean of the Christians of the villages of Mangesh and Aradhin (respectively) in northern Iraqi Kurdistan.
[95] Kaye & Rosenhouse (1997:277).
[96] Watson (2002:18).

of Arabic show that in the production of ʕ, both posterior pharyngeal wall and tongue root are moved inward from their rest positions, and the larynx is raised.[97] The place of articulation with these segments is clearly the lower pharynx, as confirmed by Ghazeli's (1977) showing that the greatest constriction is below the epiglottis, at the fourth and fifth vertebrae.

Zeroual (2003) shows for Moroccan Arabic that the pharyngeals are actually realised as epiglottal ʢ and *ʜ*. There appear to be two supraglottal constrictions, firstly there is 'constriction between the tip of the epiglottis and the posterior pharyngeal wall (i.e. an epiglottopharyngeal constriction)', and secondly 'an anterior–posterior compression of the aryepiglottic sphincter'[98] (aryepiglottal constriction), which causes approximation of the base of the epiglottis and the tip of the arytenoids. Additionally, ʢ in Moroccan Arabic, according to this study, is always produced with laryngealised (creaky) voicing. Iraqi Arabic ʕ, according to Butcher & Ahmad (1987), is a voiced approximant, often with stop articulation and accompanied by creaky voice. My impression from Iraqi is that in citation form, especially word-initially and word-finally, it tends to be a stop, often epiglottalised (the latter pre-pausally), but that in more rapid speech, especially word-internally, it sounds more approximant-like, but generally extremely creaky. It is certainly produced by speakers of dialects such as Iraqi and the various dialects of the Arabian Peninsula with greater constriction than that of speakers of sedentary dialects of the Levant, for instance. al-Ani (1970) had four Iraqi informants who produced ʕ as a stop (in fact, al-Ani, 1970:62 notes that it is most commonly produced by his Iraqi informants as a voiceless stop, appearing on the spectrograms as a burst followed by 'voiced noise'), and the Iraqi informants of Butcher & Ahmad (1987) produced it as a voiced approximant with creaky voice, but word-finally the segment had a stop portion.[99]

With regard to the wide reports of creaky voice associated with pharyngeal ʕ, Laufer & Condax (1979:75) hold that 'A pharyngeal with creaky voice is produced when the epiglottis creates an even narrower constriction with the pharynx wall, and

[97] Ghazeli (1977), Card (1983), McCarthy (1991, 1994).
[98] Zeroual (2003:1859).
[99] In particular, see also the experimental work of John Esling on pharyngeals and epiglottals.

the epiglottis base touches the arytenoids with light pressure.' They thus see a physiological reason for creaky pharyngeals.[100]

McCarthy (1994) notes that in Ghazeli's (1977) spectrograms,[101] the ʕ looks like an intervocalic glide. It is my observation that ʕ in Syria (sedentary dialects, both rural and urban) is articulated intervocalically as a 'soft' pharyngeal approximant, although in initial position it is barely perceptible in normal speech and easily confused with ʔ or even word-initial *a*.[102] Al-Ani (1970:91) also notes the dialectal variance in the production of ʕ: 'For the most part... [it] seems to be a fricative except for Kuwait and Saudi Arabia, where it seems similar to the Iraqi /ᶜ/.'[103]

To conclude this section, Bessell (1992:94) summarises that:

> There are several salient details...of Arabic pharyngeals...which I outline here: (i) Arabic pharyngeals are produced with a constricted pharynx although descriptions vary on how this is achieved and the exact location of the maximal constriction; (ii) /ʕ/ is often 'creaky' and/or glottalized on release; further, [ʔ] is sometimes an allophone of /ʕ/; (iii) /ʕ/ is a voiced approximant in Iraqi (Butcher & Ahmad 1987), reported as a spirant in Palestinian (Blanc 1953), as fricative-like in Tunisian (Ghazeli 1977), a sonorant in Lebanese (Klatt & Stevens 1969)...

2.4.2 Auditory and acoustic characteristics

We have seen that most dialects of Arabic, as well as most other Semitic languages, have two pharyngeals – voiceless *ħ* and voiced ʕ. *ħ* is clearly a fricative, while ʕ is phonetically much more variable.

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 F_1 also. In fact, almost all researchers observe that

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[100] Without denying this as a trigger for creak in pharyngeal ʕ, I believe that this has been systemised (i.e. phonologised) in Semitic, in that the creaky voice associated with ejectives has become perceptually linked with the creaky voice of pharyngeals. This point is taken up again in Chapters 3 and 4.

[101] These are mostly of Tunisian speakers, although his data does relate to other dialects.

[102] Also noted by Cowell (1964).

[103] Sībawayh classes ʕ as 'between' a continuant and a stop, see al-Nassir (1993:47–8).

F_1 is high for both ʕ and *ħ*, whereas F_2 is low.[104] As we have seen, this is the typical signature of cardinal vowel 5, [ɑ].

As Ghazeli (1977:51) argues, the constriction of the laryngo-pharynx and raising of the larynx creates a very narrow shape to the pharynx, which creates the resonance pattern of relatively high F_1 and low F_2.

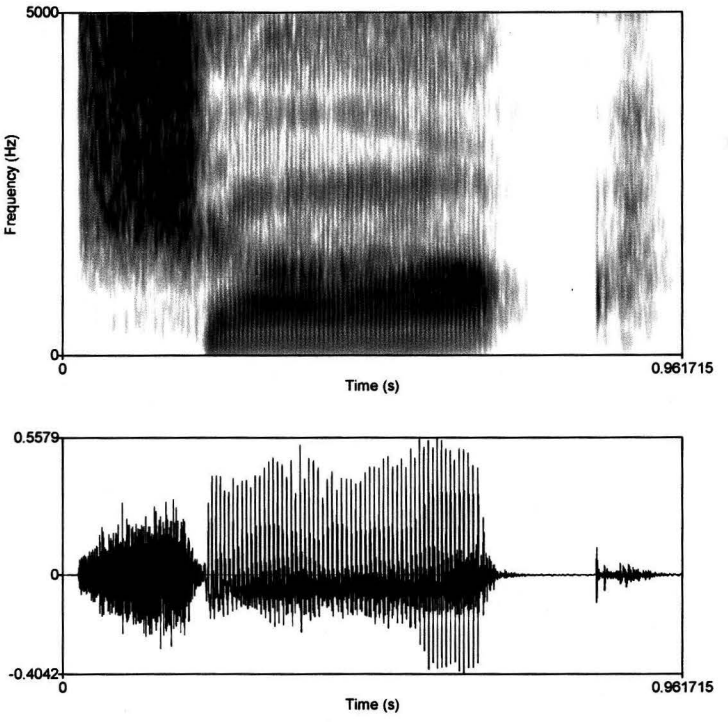
Examples are shown below[105] of the very creaky nature of word-internal ʕ in *yaʕni* 'it means', and its clear stop nature word-finally in *šāʕ* 'it spread (out)'.

[104] Delattre (1971), Bessell (1992), Butcher & Ahmad (1987), Laufer & Baer (1988), Alwan (1986), Ghazeli (1977), McCarthy (1994), Al-Halees (2005), Zawaydeh (1999). Since the completion of this chapter, Heselwood (2007), which is a detailed study of Arabic ʕ, has been published.

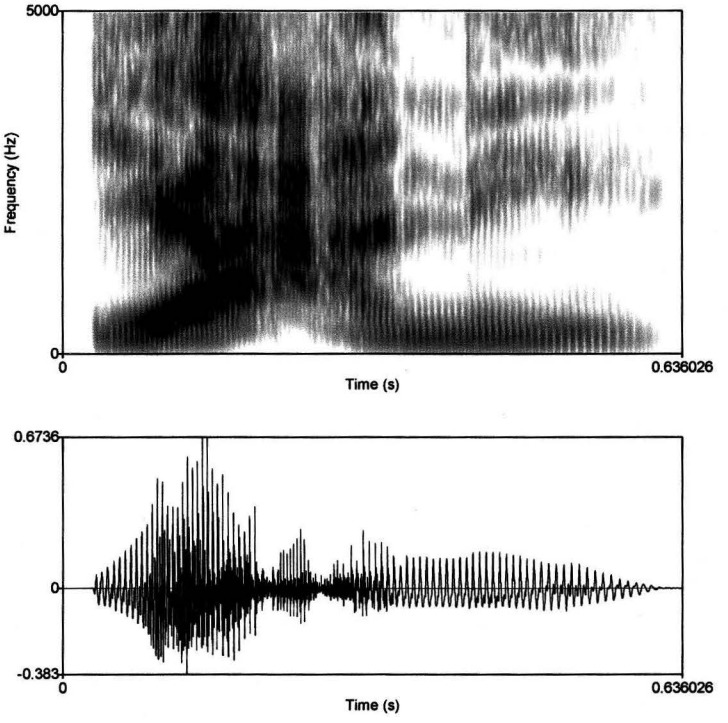
[105] As noted, this chapter is not intended as an acoustic analysis of pharyngeals; I have summarised the main points arising from the literature on the topic, to which the reader is referred.

Figure 2.30 Spectrograms and waveforms showing Iraqi (Baghdadi) Arabic word-final vs intervocalic voiced pharyngeal [ʕ]; data from the soundfiles accompanying Alkalesi (2001), spoken by an adult male

(i) Word-final [ʕ] in 'šāʕ'



(ii) Intervocalic [ʕ] in 'yaʕni'



The waveform in Figure 2.30(i) shows a clear and significant period of lack of energy during the production of ʕ, with a short period of aperiodicity leading into this stop which is perhaps indicative of some creak. The release of the stop is also clear. In 2.30(ii), however, the spectrogram shows that ʕ is characterised by irregularly spaced striations with a brief more resonant period in the middle. This instance of ʕ could be heard as very creaky.

2.5 Conclusion

This chapter has sought to investigate the phonetic realisations of 'emphatic' and the main acoustic characteristics. I have shown that the emphatic consonants of Semitic do not have the same phonetic identity across Semitic languages. In Ethiopic and (reportedly) Modern South Arabian languages, emphatics are ejectives, while in Arabic and many dialects of Neo-Aramaic they are 'backed' (among other things, pharyngealised). However, the emphatics are not uniform across the various dialects of Arabic. The evidence here is that some dialects have a three-way voicing contrast, in which the voiceless emphatics (historically *ṭ* and *q*) are the 'plain' series, having a consistently lower VOT range than the non-emphatic voiceless stops. Other dialects, by contrast, have only a two-way voicing contrast for obstruents, i.e. voiced and voiceless. This is taken into account in Chapter 3, where I investigate the phonological representations of emphatics. Additionally, in Chapter 4 I outline the historical development of emphatics and present an analysis which hinges on the evidence of voicing contrasts of emphatics in dialects of Neo-Aramaic.

Further, I have sought to show in this chapter that the 'backed' emphatics (of at least Arabic) can be characterised by *a*-quality (the element [A]). I have also outlined the phonetic correlates of the uvulars and pharyngeals, which I argue also have an *a*-quality. This is formalised in Chapter 3.

Lastly, it is clear from the preliminary work presented in this chapter that consistent and thorough pan-dialectal studies focusing on VOT of emphatic and non-emphatic stops in Arabic would be fruitful. The preliminary results presented here indicate that the dialectal variation is likely not to be arbitrary, but to relate to dialect

type (at least Bedouin-origin / Arabian types vs urban Eastern Arabic).[106] An in-depth study of this angle of emphatics across Arabic was outwith the scope of the current work, but is planned for future work. This appears crucial in the setting-up of a successful phonological dialect typology of Arabic, and is thus urgently needed.

In conclusion, it is evident that the status of 'emphatic' in Semitic is not entirely straightforward. However, it appears that the common link between all types of 'emphatic' is in laryngeal contrasts. I noted earlier that emphatics are typologically less common than ejectives. From the findings of this chapter, I suggest that this hinges on the function of glottalisation as a primary laryngeal contrast, whereas Arabic-style emphatics, although inherently encoding the laryngeal contrast, at least historically, due to the additional secondary function of the element [A], are more complex. It is perfectly reasonable to suppose that non-Semitic languages that have something akin to emphatics (i.e. pharyngealised / velarised consonants) do not have the same laryngeal contrast. Nevertheless, since secondary articulations are anyway marked, these segments are bound to be less attested cross-linguistically.

Following on from this, in Chapter 3, I look at the phonological representation of emphatics (as well as uvulars and pharyngeals).

[106] It is unclear how rural Levantine dialects pattern in this regard. This is a crucial point which it was not possible to clarify for the current work, but is planned for a forthcoming research project.

Chapter 3
The Phonological Representation of Emphatics and Gutturals

This chapter seeks to define what 'emphatic' actually means from a phonological viewpoint, thereby aiming to identify the phonological correlates of the Semitic 'emphatics'. In Chapter 2, I provided acoustic analyses of two types of emphatic: glottalised (i.e. ejective) and 'backed' (i.e. those for which the predominant articulatory target is most commonly identified as 'velarised', 'pharyngealised', or 'uvularised'). In the current chapter, I therefore provide a segmental phonological analysis of the two types of emphatic so far discussed, proposing (sub-)segmental representations within the framework of Element Theory, as laid out in Chapter 1.

The procedure of this chapter is as follows. Firstly, in §3.1 I look at phonological systems with ejectives (and 'laryngealised' segments in general), and at their phonological behaviour, in order to identify which element is involved. Having identified this as the 'edge' element [?], §3.1.1.1 then shows how this element has a dual function in phonology, playing the role of both 'manner' prime and 'laryngeal' prime. In §3.1.2, I then discuss how this manifests itself within the phonological expression, proposing an approach to phonological expressions which involves subsegmental structure. In §3.2 I discuss the case of pharyngeals, identifying the element involved in Semitic 'back' contrasts, and then I show how my proposals for subsegmental structure may be applied. In §3.3 I then investigate the phonological representation of 'backed' emphatics, before moving on in §3.4 to Semitic uvulars.

Before kicking off, it is worth reiterating at this point the use of the terms 'ejective' and 'glottalic'. An ejective is one type of segment that may be made with glottalic airstream mechanism. Thus, the term 'glottalic' is not synonymous with 'ejective', but includes it. Moreover, while laryngealised ('creaky-voiced') segments are not produced with glottalic initiation, they may be called 'glottalised'. For our purposes I class as 'glottalic' both segments produced with glottalic airstream mechanism and those which are glottalised. The reasons for considering these together will become clear through the following discussions.

3.1 The phonological representation of 'glottalic' emphatics

Overall, this section aims to identify the phonological representation of ejectives. The initial part of this section reiterates points from the discussion of ejectives in Chapter 2 in seeking to determine the acoustic cues that may be relevant. Secondly, I discuss some of the phonological evidence given in typological studies, before moving on to the representations themselves.

It was noted in Chapter 2 that, according to the literature surveyed, one of the major cues to glottalisation is the distinctiveness of the release burst (increased amplitude in comparison with non-ejective release bursts), caused by significantly increased oral pressure. However, this cannot be considered the only factor because this release burst is only as intense as the build-up of supra-glottal air pressure allows. That is, the higher the air pressure, the more salient the burst, and in turn the longer the closure (generally speaking), the higher the air pressure.[1] Thus, concomitant with the 'sharp' release burst typical of ejectives is voicing lag. Leaving aside for now the issue of so-called 'lenis' ejectives, we can therefore assume that the most salient cue of ejective segments is the intense release burst concomitant with voicing lag.

In Chapter 2, I discussed how this ejective voicing lag is not the same as the voicing lag evident with voiceless aspirates, since the duration of the aspirate lag is characterised by noise, i.e. aperiodic energy, whereas the duration of the ejective lag is characterised by a sharp and sustained drop in energy. In languages that contrast ejectives with voiceless aspirates, even where the duration of the voicing lag of both these are roughly equivalent, the perceptual distinction between the two is clearly visible in spectrograms as (what I have termed) 'stop-lag' and 'noise-lag'. Thus, a typical three-way plosive opposition is: 'noise-lag' vs 'stop-lag' vs 'no lag' (which may or may not involve voicing lead: in the case of Semitic it does seem to be voicing lead), i.e. a system containing ejectives often contrasts its stop series for voiceless aspirated–ejective–voiced.[2]

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[1] This is not taking into account the location of the oral constriction – the nearer the constriction to the larynx, the smaller the volume of the cavity in which the intra-oral air pressure builds, and therefore the shorter the time necessary to reach equivalent pressure.

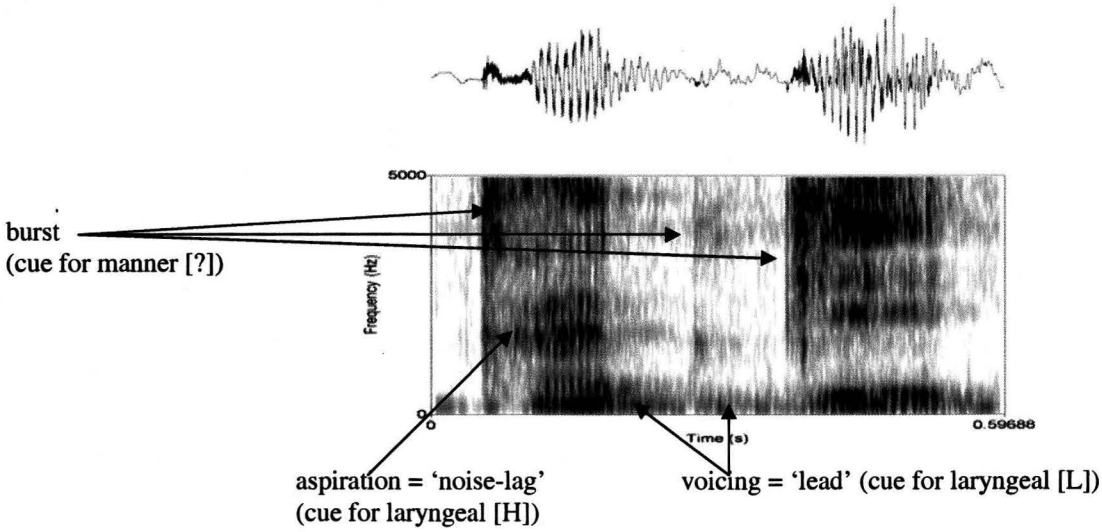
[2] The same system will often typically have an affricate series voiceless–ejective–voiced, therefore also a three-way contrast. If a language has ejective fricatives, it also typically contrasts voiced–voiceless–ejective, although the ejective fricative is often phonetically affricated. Investigation of individual languages is necessary to determine whether an ejective affricate patterns phonologically with stops or fricatives. The status of pulmonic affricates is also not entirely clear, and itself a controversial area. See e.g. Steriade (1994), Burquest & Payne (1993), Hyman (1975).

The cue to the presence of the 'edge' element [?][3] is an abrupt and sustained drop in overall amplitude, which is exactly what we find in the acoustic pattern of ejectives, both before and after the release of the oral constriction. They are thus characterised by a double-burst (visible on the spectrogram as a 'double-edge'). Therefore, just as noise-lag characterises the acoustic pattern of voiceless aspirates, segments characterised by the presence of the 'stiff' element [H], stop-lag characterises the acoustic pattern of ejectives, segments characterised by the presence of the 'edge' element [?]. These cues (as well as 'lead', typical of [L]) can be seen in the following spectrograms:

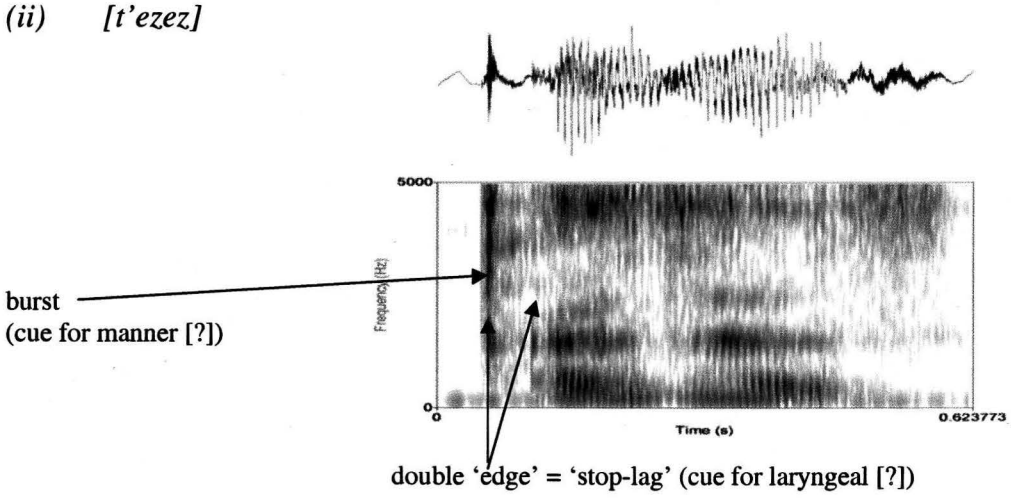
[3] As per the scheme of elements presented in Chapter 1 (§1.1.1), above.

Figure 3.1 *Spectrograms (with accompanying waveforms) of five Tigrinya words showing the acoustic cues characteristic of the elements [H] [L] [?]; data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*

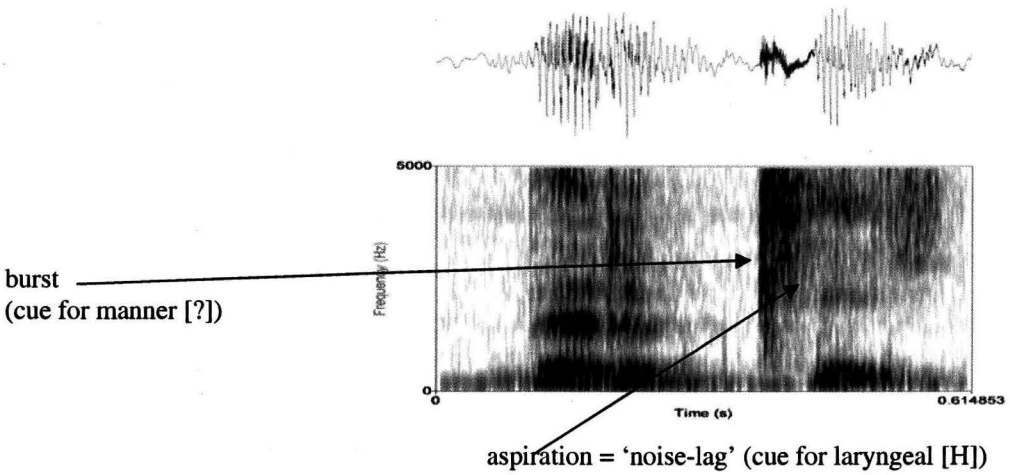
(i) *[t^{h}ebgi]*



(ii) *[t'ezez]*



(iii) *[berk^{h}i]*



voiceless labial stop *p* has the representation [U.?], then how is the ejective labial *p'* represented differently?[5]

3.1.1 The role of [?] in phonological expressions

3.1.1.1 The dual role of [?]

In this section I discuss how [?] plays two roles in segmental representations, analogously with [L] and [H]. I argue that each of the elements [?], [L] and [H] has both a laryngeal and a manner function in phonological expressions.

It seems typical in sound systems with ejectives that they are contrasted with voiceless aspirates (often in addition to 'plain' voiceless and / or voiced stops).[6] Languages that neutralise laryngeal contrasts in certain positions seem to neutralise the ejectives and the voiceless aspirates to 'plain', indicating firstly that ejective release behaves phonologically as a primary laryngeal contrast, and secondly that ejectives are 'laryngeally modified' plain stops, not 'laryngeally modified' voiceless aspirates. Thus, while the elements [L] and [H] are now generally considered to have a 'laryngeal' function in addition to a 'manner' function,[7] it seems that there is another element that may also behave as a laryngeal element: [?]. This is to be expected, since in isolation it is realised as a glottal stop, which may be compared with the element [H], which in isolation is realised as a (voiceless) glottal fricative.[8] In this way, both these glottal elements may contribute a 'laryngeal' role to a phonological expression as well as being able to contribute a 'manner' role.

In essence, then, there are two (related) arguments here: firstly, that [?] may behave as a 'laryngeal' element and secondly that [?] therefore has two roles to play in phonological expressions. In this section I deal with the first of these arguments (providing evidence of the 'laryngeal' role of [?]), and in the following sections I deal

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[5] Fallon (2002) uses the feature [constricted glottis] ([cg]), in a feature-geometric model, for ejectives.

[6] See Fallon (2002); Steriade (1997) and references therein; also Yu (2004), who proposes an alternative theoretical approach.

[7] As dicussed in Chapter 1, [L] has the 'laryngeal' role of voicing and the 'manner' role of nasality, whereas [H] has the 'laryngeal' role of aspiration and the 'manner' role of frication. On the merging of [L] and [N], see Ploch (1999), Nasukawa (2005), Botma (2004). The proposal that [H] and [h] should be merged is usually attributed to Jonathan Kaye, see Ploch (1999). As noted, however, the merging of [H] and [h] is not always upheld by researchers following the Harris school of thought, e.g. Nasukawa & Backley (2005).

[8] [L] in isolation is not so easy to define, although see Ploch (1999), Botma (2004) (also Nasukawa, 2005, who merges [L] and [N] into [N]). [L] in isolation would be either an archisegmental nasal or a voiced velar fricative γ. Any phonologically significant distinction would normally be made through appeal to headedness.

with the second of these arguments, discussing the implication of the dual role played by [?] on our view of phonological expressions, and determining how this dual role actually works within the expression.

First, since the independent manifestation of the element [?] involves closed vocal cords and raised larynx, the vocal folds must be stiff. In this way, we can contrast 'stiff-but-open' (the manifestation of [H]) with 'stiff-but-closed' (the manifestation of [?]).

Evidence for [?] behaving as a 'laryngeal' element (in addition to its 'manner' role) appears to be widespread in languages that have ejectives. Various typological studies[9] show that it is cross-linguistically common for many languages that have a three-way opposition of voiced, voiceless (aspirated) and ejective plosives to exhibit laryngeal neutralisation in certain contexts, whereby when the laryngeal contrast neutralises, all stops lenite to 'plain'. This can be seen, for example, in Klamath (Penutian) medial obstruent neutralisation, where both ejectives and aspirates are neutralised to plain voiceless segments before another obstruent or a creaky or breathy sonorant (Klamath has underlying plain voiceless, voiceless aspirated and ejective stops / affricates and 'plain' (voiced), voiceless and creaky sonorants):[10]

(1)	a.	/l̥ep'/	'be flat'
		l̥epl̥ep'a	'becomes flat'
		l̥epl̥epl'i	'flat'
	b.	/mp^{h}et'/	'float'
		mp^{h}et'i:qi	'floats up'
		mp^{h}etplanč'a	'floats downstream'
	c.	/p^{h}eč^{h}/	'foot'
		p^{h}eč^{h}wa	'puts a foot into water'
		p^{h}ečk'wa	'puts a foot across'
		p^{h}ečl̥a	'puts a foot inside'
	d.	/sʔap/	'tell, say'

[9] See in particular Fallon (2002), which is a detailed study of the phonetics and phonology of ejectives, and thus has a good typological survey and an extremely comprehensive bibliography; see also Steriade (1997), which focuses on laryngeal neutralisation and contains some interesting case studies.
[10] Data from Blevins (1993:246), also discussed by Fallon (2002:82–6).

s?apa		'tells, says'
s?aptki		'wants someone to tell'

However, in Klamath all word-final stops and affricates are neutralised to aspirates:

(2)	a.	/n'ep^h/	→	[n'ep^h]	'hand'
	b.	/nč'ek'/	→	[nč'ek^h]	'in little bits'
	c.	/nkak/	→	[nkak^h]	'species of turtle'

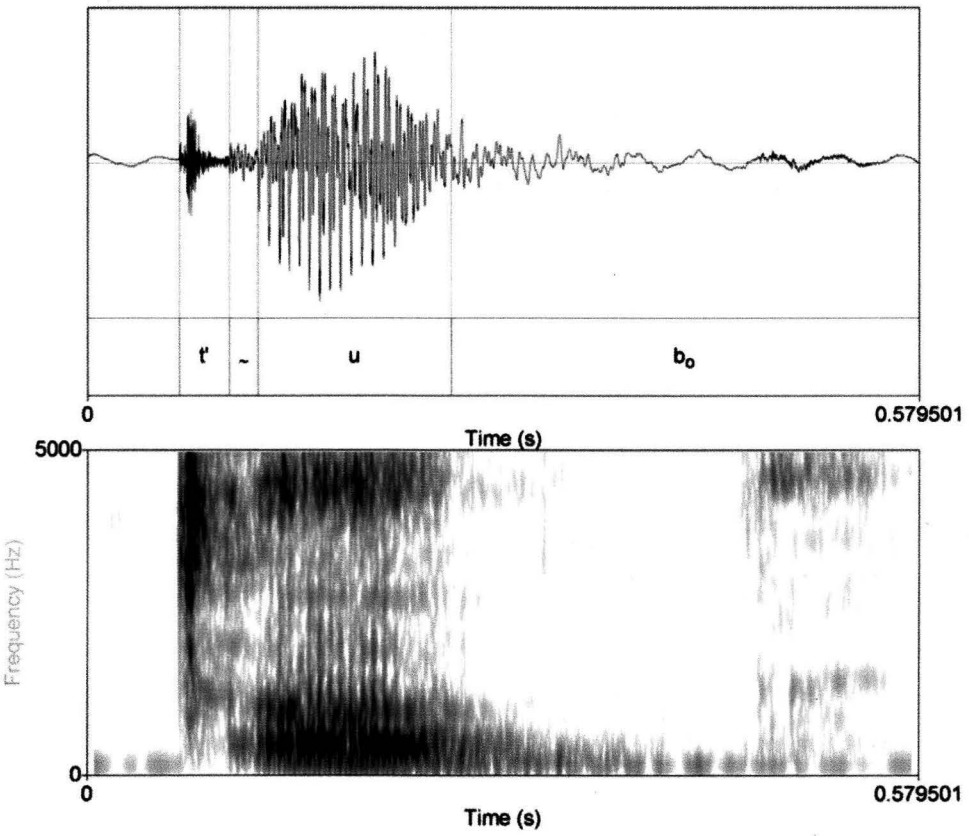
The data above show that ejectiveness patterns as a laryngeal contrast, and that the element responsible for this behaves in ejectives, but not in non-ejectives, as a 'laryngeal' element. Moreover, they also show that [?] is independently the element involved in ejective representations. That is, it could be proposed that since [H] in its 'laryngeal' role results in VOT lag, it could be responsible for the VOT lag found not only in voiceless aspirates, but also in ejectives, i.e. that ejectives have not only the [?] element, but also the [H] element. However, if that were the case, one would expect (2b) above to be realised as *[nč'ek']. The fact that it is not indicates that there is no [H] element present in the phonological segment *k'*. Therefore, it is more accurate to characterise [?] and [H] as having the articulatory targets of 'stiff-but-closed' and 'stiff-but-open', respectively, than of just 'closed' and 'stiff'.

We could also look to diachronic processes to find evidence of ejectives neutralising to plain voiceless (not voiceless aspirated) segments. For instance, Fallon (2002:111) observes that 'in cases of permanent feature loss, ejectives are merged with the voiceless series (e.g. Fort Resolution Chipewyan, Stoney Dakota, and Udi).' Also, Suárez (1973) hypothesises that the ejectives of Macro-Pano-Tacanan have merged with plain voiceless stops in Proto-Panoan, Proto-Tacanan, Yuracare and Moseten, where Tehuelche has retained the ejective series.

More evidence that it is indeed [?] alone that (while wearing its 'laryngeal' hat) behaves as the 'glottalic element' is to be found in the phenomenon of creaky voice. It is sometimes supposed that the two phenomena don't co-occur in the same

language;[11] however, we saw in Chapter 2 that ejectives are indeed often followed by a vowel with creaky onset. From the Tigrinya data, the waveform of the word *t'ub* in Figure 3.2, following, clearly shows a period of creaky vowel onset before the vowel becomes modal.

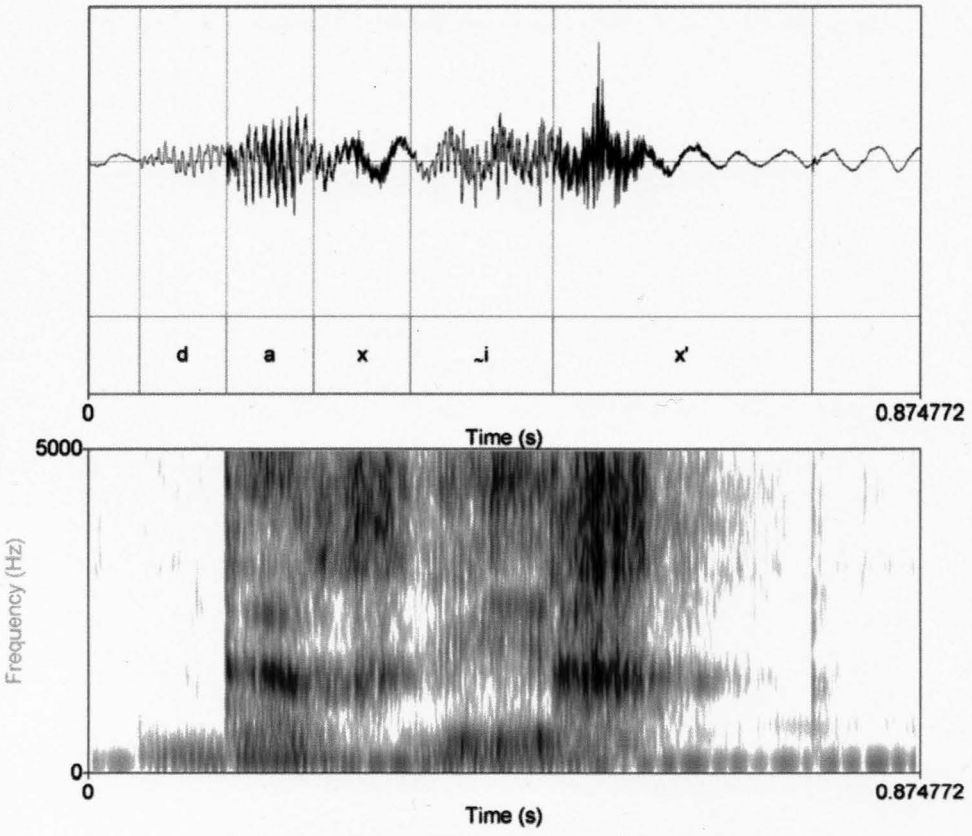
Figure 3.2 *Spectrogram and waveform showing creaky vowel onset in Tigrinya /t'ub/ [t'ṵb̥]; data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*



Moreover, the waveform in Figure 3.3 below of the word *dak'ik'* shows that the vowel between the two ejectives is creaky for its entire duration, which can be compared with the modal-voiced vowel following the initial *d*. Since both velar ejectives in this word, being post-vocalic, are spirantised,[12] it could be argued that the particularly noticeable creakiness of the inter-ejective vowel *i* (lasting for its duration) in this token serves to enhance the perception of the two velars as glottalic.

[11] An interesting summary of responses to a question on ejectives and creaky voice on LinguistList 11.8 (11 January, 2000) ('Sum: Q:10.1720: Phonetics/Ejectives/Laryngealization') can be viewed at: http://www.sfs.nphil.uni-tuebingen.de/linguist/issues/11/11-8.html.
[12] As noted in Chapter 2.

Figure 3.3 *Spectrogram and waveform showing modal and creaky vowel in Tigrinya /dak'ik'/ [daxix'] – on the waveform, modal [a] is regular, as compared with the irregularity for the duration of [i]; data from the archive of SOAS Phonetics Laboratory, spoken by an adult male*



Therefore, I argue that ejectives and creaky voice are in fact the same phenomenon manifested in two different types of segment. Firstly, creaky voice necessarily requires some sort of voicing (either spontaneous, i.e. non-contrastive, or active, i.e. contrastive), whereas ejectives are never phonologically voiced.[13] Some notes concerning creaky voice are in order here. Firstly, Hayward (2000:223–4) distinguishes two types of what is often called creaky voice, noting that one type may be achieved by holding the vocal cords more closely together than for modal voice, resulting in 'a rather more tense quality, which we shall refer to...as *pressed voice*, though the term *creaky voice* is more frequently used.' She then notes the confusion over terminology (creaky voice vs laryngealisation vs glottalised phonation), suggesting that

[13] Ladefoged & Maddieson (1996:80) also note this: 'We do not know of any linguistic use of voiced ejectives'.

> *pressed* is a better designation since *creaky voice* and *laryngealisation* may also imply the presence of irregularity like that found in low-pitched *creak*...while *pressed* suggests only a greater degree of vocal fold adduction. It thus allows for a further distinction between presence or absence of irregularity.

Thus, *pressed* refers to tense or more adducted vocal cords, whereas *creaky* refers to 'the more constricted type (closer to glottal stop).' Notably, the more constricted type of creaky voice is achieved by the partial closure of the glottis, along with the slackness of the remaining part of the glottis allowing vibration. Creaky voice therefore seems to be most commonly found as a contrasting phonation type in sonorants. Where it is found in oral stops, it seems to be the release and the onset of the following vowel which are creaky. Creaky voice may therefore be thought of as the sonorant counterpart to ejectives.[14] That is, where there is voicing (whether spontaneous or active), the element [?] in this function correlates with creak or laryngealisation, whereas where there is no voicing [?] correlates with ejective release.

I have already shown how creaky voice is often induced by ejectives, but since I am claiming that the element that correlates with 'ejective' is the 'edge' element [?], what of the relationship between glottal stops and creakiness? Since I claim that there is an intrinsic relationship between ejectives and creakiness and that both are represented phonologically by [?], then we may logically suppose that there is a relationship between glottal stops and creakiness. Indeed, this is found. For instance, Ladefoged & Maddieson (1996:74–5) note that in some languages 'glottal stops function more as a variation in phonation type'. They cite the case of Huatla Mazatec, where the glottal stop alternates freely between glottal stop realisation and laryngealisation of the following vowel. They also cite as an example the case of Jalapa Mazatec, where 'the realization is usually entirely as creaky voice on an

[14] Two further notes should be made here. Firstly, it is outwith the scope of this thesis to investigate the phenomenon of creaky vowels. Therefore, the assumption that they contain [?] is made as a parallel with ejectives and sonorant consonants. The matter remains for further investigation. Secondly, the distinction made by Hayward (2000) between pressed and creaky is based on phonetic investigations. How far this may or may not be relevant to phonology also remains a matter of further investigation, viz. whether a single language contrasts the two types. (Without further investigation), however, I suspect that this is a question of language-specific phonetic mapping, i.e. that phonologically both are due to the presence of [?]. Nevertheless, it may be that there are indeed phonologically two types of 'creaky voice', the tense / adducted version being the manifestation of [H], and the irregular type being the manifestation of [?]. The Mpi data in Ladefoged & Maddieson (1996:316) shows 'modal' vs 'stiff' voice interacting with six tonal contrasts to give twelve possible vowel contrasts for each vocalic resonance quality, indicating that [?] interacts with the 'tone' elements [L] and [H]. See Ladefoged (1983) on such phonation types. See Esling (2003), also Ladefoged & Maddieson (1996:47–66).

associated vowel'. Moreover, Ladefoged & Maddieson (1996:74–5) note that most commonly,

> glottal stops are apt to fall short of complete closure, especially in intervocalic positions. In place of a true stop, a very compressed form of creaky voice or some less extreme form of stiff phonation may be imposed on the vocalic stream.

To sum up, then, the element [?] clearly has a laryngeal function. In addition to its manner function, where it correlates with 'plosiveness', in its 'laryngeal' role it correlates with glottalic release and laryngealisation.

The issue of implosives, while strictly outside the scope of this thesis, is relevant to the theoretical claims that I make here. It is not unusual for languages with ejectives additionally to contrast them phonologically with implosives. For example, Uduk (Nilo-Saharan) has the following five contrasts:[15]

(3)				
	baʔ	'to be something'	b	[U.?.L]
	pàl	'to try'	p	[U.?]
	pʰàlal	'centipede'	pʰ	[U.?.H]
	p'àcʰàɗ	'fermented'	p'	[U.?]
	ɓàʔ	'back of neck'	ɓ	[U.?.L]

Moreover, Sindhi (Indo-Iranian) has five phonation contrasts in its stops, like Uduk, but in Sindhi, instead of the ejective that we find in Uduk, we find breathy voice. Therefore in Sindhi the implosive contrasts with breathy voice (the latter having both [H] and [L] in its representation),[16] demonstrating that implosion is not the realisation of [H] and [L]:[17]

(4)				
	bənu	'forest'	b	[U.?.L]
	pənu	'leaf'	p	[U.?]
	pʰənu̱	'snake hood'	pʰ	[U.?.H]
	bʰənənu̱	'lamentation'	bʰ	[U.?.H.L]
	ɓəni	'field'	ɓ	[U.?.L]

[15] Data from Ladefoged & Maddieson (1996:82).
[16] See Harris (1994:135).
[17] Data from Ladefoged & Maddieson (1996:83).

The Uduk and Sindhi data above indicate the likelihood of implosion as being, in fact, the realisation of some 'extra manipulation' of [?] and [L], at least in these languages.[18] The fact that there are languages that contrast voiced, voiceless, aspirated, ejective and implosive obstruents shows that all of these categories are potentially phonologically contrastive. I suggest (since further study is far beyond the scope of this thesis) that 'phonological implosives' are similar to ejectives, except that they are also voiced. Both ejectives and implosives are non-pulmonic (egressive and ingressive glottalic, respectively). Ladefoged (2001:133) notes that implosives are made by lowering the larynx 'so that they suck air in'. By moving the larynx downwards, oral air pressure is decreased, so that when the oral closure is released air is sucked into the oral cavity. As noted, implosives are voiced (unlike ejectives).[19] With implosives, the lowering of the larynx also causes low pitch.[20]

A final point to be discussed here is the issue of ejective fricatives. In Figure 3.3 I showed an example of Tigrinya post-vocalic spirantisation (as discussed in Chapter 2). It needs explicitly stating that Tigrinya [x'] (from *k'*) is distinct from spirantised [x] resulting from k^h. Creaky voice is also evident in Tigrinya following lexical (phonemic) ejective fricatives, e.g. *s'*. Moreover, the common affrication of ejective fricatives (e.g. *s'* → [ts']) shows further evidence of the presence of [?] in ejective fricatives as well as stops.

3.1.1.2 Ejectives are not phonologically 'plain'

While it may be claimed that phonological representations cross-linguistically differ for what appear to be the same phones, it still affects our view that ejectives have the element [?] (in its laryngeal role). That is, the evidence of languages which do have the problematic contrast reflects on our view of ejective representation across languages. For instance, in Ladefoged & Cho's (2001) study of eighteen languages,

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[18] It has been suggested that there are voiceless implosives. Maddieson (1984:115), in noting that voiceless implosives do occur, states that the only language in his UPSID-based survey to contrast voiced and voiceless implosives is Igbo. The phonemic inventory he gives for Igbo shows that the only 'laryngealised' consonants in this language are *ɓ*, $p^<$, and $t^<$ (in his transcription). One would be tempted to suggest that the 'voiceless implosives' $p^<$ and $t^<$ are therefore phonologically ejectives.

[19] Ladefoged (2001:133) notes that 'when the vocal folds are pulled downwards...they leak a bit, and get set into vibration by the air that is passing between them...Most of the languages that have implosives produce them as voiced sounds, although it is possible to make them with the vocal folds tightly together so that they are voiceless'.

[20] I suggest that implosives are most likely to have a phonological representation with [L] as 'manner' and [?] as 'laryngeal', effectively (in terms of phonological representation) like a glottalised nasal.

those which contrast k^h, k' and k are: Apache, Hupa, Navajo and Tlingit. The average VOT for the 'plain voiceless' k in these languages ranges from just under 30ms to around 45ms, meaning that k in these languages cannot possibly be thought to be phonologically voiced (i.e. to contain [L] in the representation). Languages which also contrast these three segments with g include the Daghestanian languages Khinalug[21] and Lezgian,[22] and the UPSID survey[23] has the following languages which contrast k^h, k', k and g: Yuchi, Mazahua, Otomi[24] and Hamer.[25]

In this way, although the most common contrast in systems with ejectives seems to be like that of the Ethio-Semitic languages, i.e. (voiceless) aspirated–ejective–voiced, thus k^h, k', g, for which it could be argued that the ejective series is effectively the 'plain' voiceless series, there are many languages which do indeed contrast ejectives with 'plain' voiceless stops. Moreover, a three-way contrast which appears to have no 'plain' series may often be preferred precisely because the stop series are maximally contrastive;[26] under this view, the ejectives don't seem to behave as the 'plain' series anyway – this may be considered analogous with a typical three-way vowel system where the three vowels are normally peripheral (and schwa appears only in neutralising positions).

Therefore, any theory which holds that phonological expressions are important, and which seeks to investigate phonological representations, needs to be able to build ejectives into phonological expressions. The argument just presented shows that it cannot be said that ejectives just function as the 'plain' stop series.

This argument is further strengthened when one looks at the case of ejective fricatives. Clearly, as previously shown, glottalised fricatives have [?] in their representation. They are therefore not a 'plain' (laryngeally unspecified) series. Since glottalised fricatives do not consitute a 'plain' series, it would be inconsistent, if not illogical, to claim that in systems such as Ethio-Semitic (which have both stop and

[21] AKA Xinalug (usually considered a marginal member of the Lezgic branch). In addition, Khinalug also has a 'tense' series (as do the majority of Daghestanian languages). See Kibrik (1994a, 1994b).
[22] AKA Lezgi (of the Lezgic branch). Unusually, this language does not have the tense series. See Haspelmath (1993).
[23] See Maddieson (1984). Note that the database only comprises 317 languages.
[24] Otomi additionally has a laryngealised (creaky) voiced series.
[25] In fact, the voiced member of this series is implosive.
[26] See the case of Maidu, which contrasts the following stop series: aspirated, ejective and implosive, as compared with Swahili, which contrasts aspirated with 'plain' voiceless and implosive. Maddieson (1984:372,296).

fricative ejectives) the ejective stops are a 'plain' series, while the ejective fricatives are laryngeally specified. This would be tantamount to claiming that glottalisation has two separate functions within a given sound system, where in the case of glottalised obstruents (as in Semitic) these laryngeal contrasts are clearly parallel.

In other words, Semitic languages with ejectives have three-way fricative series (e.g. *s*, *s'*, *z*). If *s'* is represented with an additional [?] element, then we are saying that ejectives in such a sound system are not plain.

Overall, it is clear that in seeking to identify the representation of ejectives the focus should be on the element [?]. The obvious solution would be to propose that [?] is the head of an expression which is realised as ejective, thus manifesting its full 'edge' characteristics. This immediately runs aground on various theoretical points, however, and this is the subject of discussion in §3.1.2, to which we now move.

3.1.2 The role of 'laryngeal' [?] in phonological expressions

This section aims to explore how [?] fits into phonological expressions and how the phonology distinguishes its 'laryngeal' role from its 'manner' role. To that end, I therefore start by discussing the notion of headedness.

The only clear definition of headedness is given by Harris (1994:105), who states that within element-type frameworks, 'fusion involves some kind of asymmetric relation between the elements of a compound...the phonetic manifestation of a compound reflects the preponderance of one element over another'. Moreover, Harris (1994) and Harris & Lindsey (1995) state that as the head of an expression, an element manifests its *full* characteristics: 'As a head [it] is free to assert the full elemental pattern it displays in isolation...When [it] occurs as a dependent, the full effect of its elemental pattern is attenuated'.[27] This view of headedness is what I term the 'external' view.[28] Under this view, since ejectives seem to display the full acoustic characteristics of a glottal stop, in addition to the characteristics of a stop segment, one might therefore surmise that ejectives are represented by an expression headed by the element [?]. In this way, the acoustic characteristic of [?] being 'edge' is

[27] Harris (1994:126).
[28] I should also note that while this 'external' view of headedness is very clear in the case of vocalic representations, it is not always so clear in the case of consonantal representations.

maximised in ejectives. However, while I adopt the Harrisian view of elements as representing (or mapping directly onto) sound signal patterns, I have also adopted the view (normally associated with the Revised Theory of Elements) that the elements [L] and [H] have two functions ('manner' and 'laryngeal'). The arguments that follow therefore reflect this view.

The alternative view of headedness is what I term the 'internal' view, since the arguments relating to headedness are here motivated by theory-internal factors. For example, it has been proposed[29] that nasal consonants are headless. The reasoning behind such proposals lies in certain phonotactic constraints; for instance, English nasals are not permitted in branching onsets, or liquids never constitute the initial member of a branching onset, but are happy to be in 'coda' position or to be the second member of a branching onset (thus, e.g., **lbue*, but *blue* and *bulbous*). In the framework of GP, both the post-nuclear rhyme (i.e. 'coda') and the second part of a branching onset must be licensed by the onset head (i.e. in *blue*, the initial part of the branching onset, that dominating the expression *b*, must license its dependent, that dominating the expression *l*). In order to be able to license, there must be a governing relation whereby the onset head governs its complement (thus the position dominating *b* governs the position dominating *l*), or whereby a post-nuclear rhyme ('coda') is governed (and thus licensed) by a following onset (so in *bulbous*, the position dominating *b* governs the position dominating *l*).[30] The relevant point here concerns what it is in the phonology that actually controls these phonotactic constraints in the first place. Under this ('internal') version of the theory, the answer to that is usually held to be the notion of headedness. A 'good' governor in an onset is headed, whereas a 'good' governee is headless.[31] Therefore, liquids are good governees, but not good governors. This means that where there is a governing relation, liquids may only be in the dependent, or governee, position, and thus liquids may be found in non-branching

[29] Jonathan Kaye (these proposals not published, but taught over a number of years at SOAS: Monik Charette, p.c.).

[30] This is the view espoused by Jonathan Kaye after the notion of 'charm' was abandoned. Previously, elements were said to be specified with a charm value, with governing segments (positively) 'charmed' and governees 'charmless' (if the governor is not charmed, then it must be more complex than its governee). See Kaye *et al.* (1990), Charette (1991).

[31] Under the 'external' view, John Harris sees it as a question of complexity, whereby 'the melodic expression occupying the governing position must be at least as complex as the expression occupying the governee' (complexity generally relating to the number of fused elements in an expression) (Harris, 1994:170).

onsets (which is not a governor position), or in post-nuclear rhymes or the onset complement, but liquids do not occur, for instance, as the first member of a branching onset.

In tandem with this 'internal' view of headedness, it is often maintained that phonological representations have no basis in phonetics,[32] and therefore that headedness is a function of (more abstract) phonological systems only. Thus, in order to determine the headedness of any given segment, the overall phonology of the language must be investigated. Therefore, specific phonological representations are not universal. While I concur with the notion that phonological segments function within sound systems and not in isolation, this overall view means that headedness is essentially a theoretical device, with arguments for headedness based on theoretical considerations only.

Having looked at both interpretations of the notion of headedness, I now show why ejectives are problematic for the standard view of phonological expressions.

3.1.2.1 Theory-internal problems with the representation of ejectives

In this section, I discuss the various roles that ejectives could potentially play in phonological expressions, and show how these possibilities cannot hold. For ease of reading, I have broken the various arguments down into sections.

(i) The representation of ejectives under the 'external' view of headedness

Under the 'external' view of headedness, one would expect that [?] in its laryngeal role is head of an expression, as previously noted. However, one would then logically have to suppose that voiceless aspirates are headed by the [H] element, that voiced stops are headed by the [L] element, and, presumably, that plain voiceless stops must be headless. This in itself is problematic, since it would imply that the most salient characteristic of an obstruent is its voicing contrast, rather than its resonance or manner characteristics. Moreover, it predicts that voiceless aspirated stops and voiceless fricatives function as a class to the exclusion of other fricatives and stops

[32] See e.g. Kaye (1989:42–9), Ploch (1999). A distinction must be drawn between articulatory and acoustic bases. These two authors reject both, although many of the arguments explicitly reject the articulatory bases while not really discussing the acoustic bases.

(both being headed by [H], so that, say, a voiceless coronal fricative would be represented as [H,R] and a voiceless aspirated coronal stop as [H,?,R], compared with an ejective coronal stop [?,R] and an ejective coronal fricative [?,H,R]).

In this sense, the proposal that [?] is the head of the expression implies that ejectives are primarily glottals, with secondarily modifying characteristics (resonance, manner). The evidence from the language systems that we have looked at, however, is that 'glottalic' functions within the sound system as a modifying laryngeal contrast, in the same way as 'voiced' or 'aspirated'. I thus assume that [?] is not head in ejectives.

(ii) The representation of coronals

We run into further problems with the representation of ejectives when we look at coronals. However, two approaches to the theory of elements need explication. The first approach is that of Harris (1994) and Harris & Lindsey (1995), while the second is that of Kaye.[33] There are two aspects of these two approaches that need explication: the representation of fricatives, and the issue of headedness.

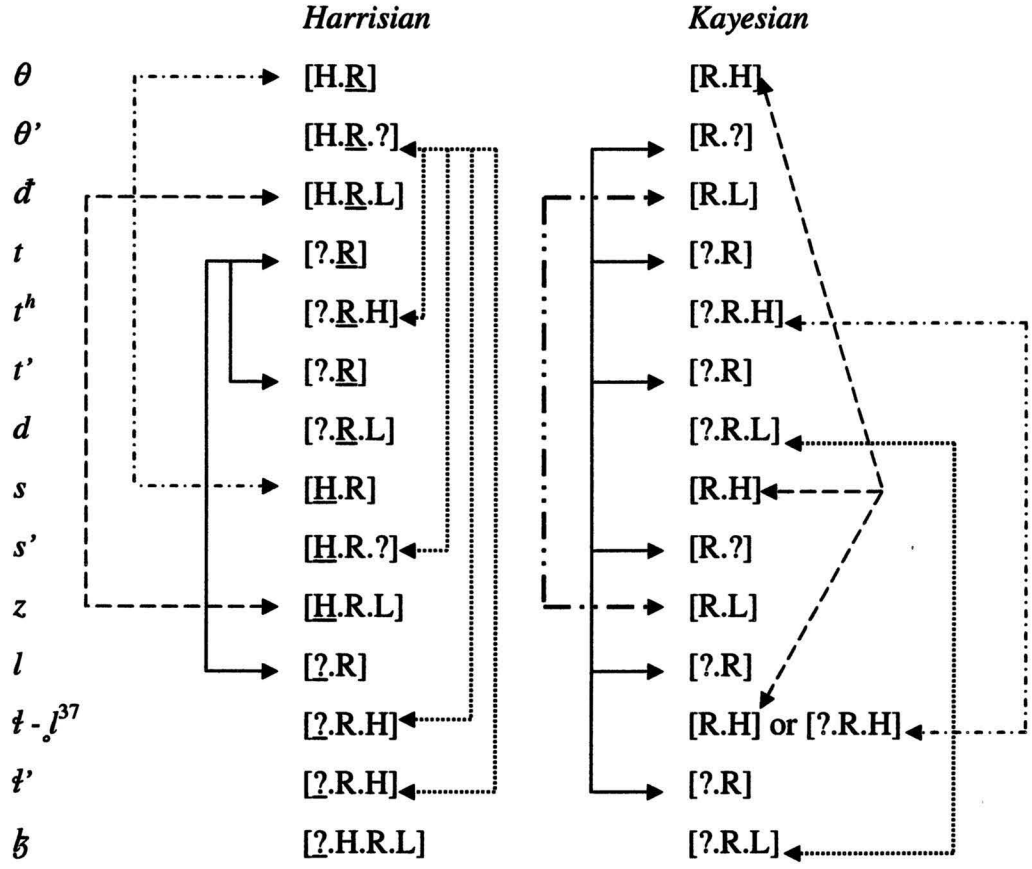
Firstly, there are two ways of looking at fricatives. According to the approach of Harris (1994), *all* fricatives contain the 'noise' element [h]. Therefore, in a 'reduced element' approach whereby the function of what was formerly [h] is merged with [H], all fricatives contain [H]. Thus, voiced and voiceless fricatives, in addition presumably to ejective fricatives, would contain [H]. The difference between strident and non-strident fricatives is deemed to be one of headedness (whereby strident fricatives are headed by [H]), as seen in the representations in Figure 3.4, following. The second approach (Revised Element Theory) holds that voiced fricatives do not (necessarily) contain [H]. Extrapolating from this, we could suppose that under this approach, ejective fricatives would also not necessarily contain [H]. In Figure 3.4, below, I give possible representations using an adaptation of the Harris (1994) scheme (i.e. 'merged' [H]). For convenience, however, these representations also retain Harris' coronal element [R],[34] and for purposes of comparison I adapt Kaye's original

[33] Monik Charette (p.c.).

[34] I discuss later how coronals are represented without [R]. It is shown here for convenience, since I have not yet discussed structure. Without [R], the representations in (5) would overlap even more. Note also that I do not support the merging of the functions of [A] and [R], i.e. that [A] = coronal.

representations[35] so that [R] is given where he would have [A]. (Note that elements are given for convenience in the order: 'manner'.'resonance'.'laryngeal'.)[36] For clarity, I indicate representations containing the same elements with arrows (for the Harrisian representations, the head of the expression is underlined; I have not marked headedness in the Kayesian representations, as that is discussed shortly).

Figure 3.4 *Sample segmental representations extrapolated to ejectives as per the scheme employed by Harris (1994) (adapted for consistency) and in comparison with Kaye (by tradition), for which headedness is not shown, but discussed below (adapted for consistency)*



[35] Monik Charette, p.c. It must also be noted that Kaye (p.c.) has held that ejectives do not need any special representation because they do not phonologically contrast (that is, with 'plain' or implosive). The evidence given in this chapter, however, goes against this view.

[36] Although for ejective stops, since an element is either present or not present (i.e. it doesn't occur 'twice'), I have given the [?] element as the first member of the expression.

[37] As Ladefoged & Maddieson (1996:199) point out, languages are not known to minimally contrast voiceless lateral approximants and fricatives, indicating that they probably have the same phonological representation. However, we may view the transcriptions ɬ and l̥ as not necessarily arbitrary. That is, transcription may be used to reflect a segment's systemic value rather than its IPA value (for instance, Arabic *q* may be systemically transcribed as <k> – see Chapter 4). Therefore, even though the representation of ɬ and l̥ may appear identical, in different sound systems they may well have different (systemic) functions.

In the following discussion, I omit the strident vs non-strident contrast, as that is explicitly dealt with by both Harris and Kaye in terms of headedness. Therefore, as seen in Figure 3.4, under the Harrisian view, the segments *t*, *t'* and *l* all contain the elements [?.R], and the segments t^h, *s'*, ɬ (or ɭ̥), ɬ' and *θ'* all contain the elements [?.R.H]. According to Harris (1994:125), coronal stops are headed by [R], while laterals are headed by [?]. For the first set of segments, proposing that one of the expressions is headless would contrive enough different expressions to cover the relevant segments (although this would seem contrived rather than empiricially motivated). However, for the second set of segments, there are five segments which may be phonologically distinct, yet only four possible representations.

Moving on to the Kayesian view, I should note that I have not denoted headedness in Figure 3.4 since there are two slightly differing schemes attributed to Kaye. In the first scheme, stops are headed by the 'laryngeal' element (my interpretation of this being that 'plain' voiceless stops must be headless), while strident fricatives are headless. This would mean ejectives being headed by [?]. Under the second scheme attributed to Kaye, obstruents are headed by the resonance element, whereas fricatives are unheaded in some languages, and in other languages headed by [H] if voiceless and [L] if voiced. Under both these schemes, liquids, nasals and velars are headless.

The contrasts between *d* and ʤ, between ɖ and *z*, and between t^h and ɬ (or ɭ̥) (if the latter, as a lateral, is deemed to have the element [?]) could be derived by headedness.

The contrast between *s*, *θ* and ɬ (or ɭ̥) (if the latter is deemed as a fricative not to have [?]), the expressions correlating with which all contain [R.H], could also be argued to be one of headedness. The two alternatives for *s* and *θ*, according to the two schemes, are either: *s* = [R.H] and *θ* = [R.H] (which I term 'Kaye 1'); or: *s* = [R.H] or [R.H] and *θ* = [R.H] (which I term 'Kaye 2').

Therefore, ɬ (or ɭ̥) under Kaye 1 would have to be [R.H] and under Kaye 2 either [R.H] or [R.H]. In this way, the contrast could again be derived, although again it does seem somewhat contrived.

However, it is very clear from Figure 3.4 above that the real problem is with the segments *t*, *t'*, *s'*, *l* and *ɬ'*, which all have exactly the same elements, [R.?]. Whichever of the two Kayesian views of headedness is adopted, there would simply not be enough isomers available for the number of segments. Now in the Modern South Arabian languages, the segments *t'*, *s'*, *l* and *ɬ'* are contrastive,[38] and must therefore have distinct phonological representations.

(iii) The representation of velars

It is also clear that whichever version of headedness one adopts, the usual, essentially linear, view of the segment is apparently too restrictive to be able to represent the difference between a plain velar stop *k*, represented as [?] or [?] (depending on whether one represents velars as headless segments, or segments which simply have no defining resonance characteristic), a glottal stop *ʔ*, represented as either [?] or [?], and a velar ejective *k'*, also under the 'linear' view represented as [?] or [?]. It could be argued that this may not be a problem for Semitic languages, which tend to have the (stop) contrast: C^h – C' (and a corresponding voiced member), meaning that the velars could be represented as: k^h [?.H], *k'* [?] *g* [?.L], with headedness being used to differentiate between *k'* [?] and *ʔ* [?]. However, as discussed in §3.1.1.2, one runs into problems with the 'ejectives are phonologically plain' hypothesis when looking at languages that do have a phonological contrast between a 'plain' velar stop *k*, an ejective velar stop *k'* and a glottal stop *ʔ*. Out of the ten languages[39] noted in §3.1.1.2 to have a contrast between k^h, *k* and *k'*, the only one not to have a glottal stop *ʔ* in its inventory is Hamer.

Moreover, the patterning of fricatives also goes against this view. That is, since the evidence is that ejective fricatives contain the element [?], the 'ejectives are phonologically plain' hypothesis cannot be maintained when in fricatives the 'phonologically plain' series must, if anything, be the voiceless series.

[38] See Lonnet & Simeone-Senelle (1997).
[39] These were Apache, Hupa, Navajo, Tlingit, Khinalug, Lezgian, Yuchi, Mazahua, Otomi and Hamer.

(iv) The problem of fricatives

I noted in Chapter 2 that ejective fricatives are often (although not always) phonetically affricated (e.g. *s'* → [ts']). Also, in §3.1.1.1, Figure 3.2 of this chapter, I showed that Tigrinya *k'* is post-vocalically realised as [x'] (and not *[x]).

However, problems are encountered when trying to identify the representation of ejective fricatives, since segments that contain both [H] and [?] are normally presumed to be aspirated stops. Even though, as seen above, we could suppose that *s* is represented as [?.H.R], it would be hard to see how this would pattern as a fricative (given that we would suppose under the above hypothesis that a voiceless coronal fricative is represented as [H.R] and a voiced coronal fricative as [L.H.R]). Despite the fact that ejective fricatives are often described as affricated,[40] this is not always the case, and I argue that these segments are often only phonetically affricated, and thus phonologically fricatives. Moreover, although ejective stops are far more frequent cross-linguistically than ejective fricatives or affricates, and although the presence of both affricate and fricative ejectives always implies the presence of glottalic stops, there are languages that do have ejective fricatives. Maddieson (1984:109) states that 12.6% of the UPSID languages in his survey have ejective affricates, and 3.2% have ejective fricatives. 70% of the languages with ejective fricatives also have ejective affricates. The ejective fricatives are most commonly *s'* and *ʃ'*, but labials, retroflexes, palatals, velars, uvulars and laterals are also found, contrasting with other ejective fricatives and also with ejective affricates and stops.

To sum up the discussion of the problems encountered when trying to use element-based representations of the segment, it seems that the theory is simply too restrictive. However, since I have provided strong evidence for the involvement of the element [?] in glottalic representations, and since it would be arbitrary to start assuming new elements, I think we need to examine the view of the segment thus far presented. That is, the view of the structure of phonological expressions has so far been essentially linear; therefore, it may be this 'linear' view of the segment which is

[40] As discussed, the preponderance of ejective affricates over fricatives is very often, presumably, phonetic. I.e., what produces the characteristic 'popping' sound of ejectives is the high intra-oral air pressure created by complete oral constriction and raising of the larynx with the vocal folds tightly adducted. The incomplete closure inherent in fricatives (for turbulent airflow) prevents enough build-up of pressure for the characteristically sharp burst of the ejective release and its markedly rapid decay. In order to facilitate enough build-up of air pressure the oral constriction is made tighter, if not actually completed. Thus, what may phonologically be a fricative ejective may be phonetically affricated.

erroneous. In the next sections I explore alternative possibilities, primarily arising (for me) firstly through the observation that certain types of segments don't appear to fuse fully (e.g. *f* is more fused than p^h) and secondly through the question of what exactly an affricate is (since it has always struck me that the difference between e.g. t^h and *ts* [under this view perhaps more properly t^s] is simply one of the resonance quality (which maps onto the articulatory category place of articulation) spreading into the aspirate portion, i.e. $^h \rightarrow {}^s$).

3.1.2.2 Ejectives as consonant clusters?

Having concluded that ejectives are *not* [ʔ]-headed, and moreover that the answer to our quest (to understand the representation of ejectives) may lie in the structure of phonological expressions, I now turn to the issue of how ejectives *are* represented.

A point which has so far not been explored relates to the question of whether an ejective could really be a sequence of /Cʔ/ (that is, e.g., whether *k'* could phonologically be /kʔ/). Distributional constraints in languages that have ejectives, as well as processes such as those seen in (1) and (2) in Klamath, are argued to disprove this suggestion in many cases. Moreover, we would then be forced to suppose that voiceless aspirates are /Ch/ sequences, rather than one segment /C^h/. However, as noted in Botma (2004:23–25), there don't appear to be languages that contrast *within an onset, nucleus or coda* a laryngeal segment and the corresponding laryngeal modification. That is, we don't find linguistically significant contrasts like */th/ ~ /t^h/ or */tʔ/ ~ /t'/ within an onset (where, for instance, a word-initial sequence of [th] is found, either it does not actually contrast with [t^h] in this position, or it is a sequence of two onsets with an intervening empty nucleus).

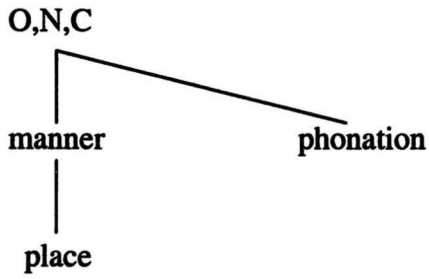
This, among other reasons, leads Botma (in an Element-Based Dependency framework) to follow Kehrein (2002) in assuming that 'the distribution of laryngeal distinctions is regulated by subsyllabic rather than by segmental positions.'[41] In other words, the 'phonation component' is directly dominated in this framework by an onset, a nucleus, or a coda. Botma thus represents segments as follows:[42]

---

[41] Botma (2004:23).

[42] Note that he assumes a 'direct link between syllable structure and contrastive feature specifications' meaning that 'there is no longer a level which corresponds to that of the segment', which is, for him, 'a move towards a non-segmental phonology' (Botma, 2004:24).

Figure 3.5 The scheme of segmental representation of Botma (2004)



This view of phonological segments is essentially different from the view of Element Theory as used in Government Phonology in several fundamental ways. However, the insight offered us by this structural separation of the various functions of the elements not only answers the questions I posed above concerning the lesser degree of fusion of p^h than *f*, and the issue of affricates such as t^s being only one step away from aspirate stops (in this case t^h), but it may also answer the question of how ejectives are represented. The following section therefore explores this idea further.

3.1.3 The structure of segmental expressions

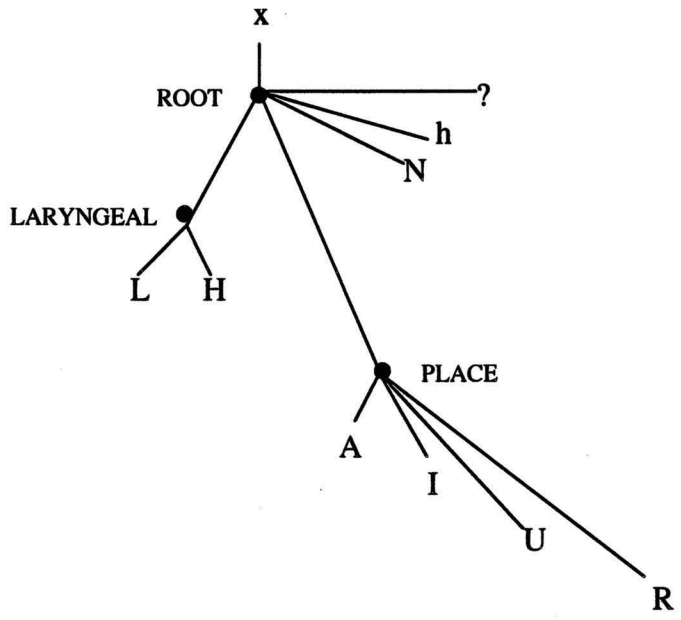
I should begin this section by noting that while I have arrived at the following proposals by working through problems such as those outlined in §3.1.2.1, proposals involving a 'contour' view of segmental structure are not new. I have already noted that this is the view advanced by Element-Based Dependency, but there are also those working in Government Phonology who have been led to similar conclusions. For instance, investigations into Korean consonants led Heo (1994) to propose that segments are formed of a contour, with a separate phonation component.[43]

The discussions in the previous sections have led us to the question: is it possible that ejectives are segments that are not fully fused? This naturally also leads us to pose exactly the same question for aspirates; and if it is possible that these two types of laryngeal contrast are not fully fused, then we are forced also to question (contrastively) voiced obstruents. In other words, perhaps the elements responsible for contrastive laryngeal specifications are somehow separate, linking into a different

[43] Since finishing this chapter, I have found that Scheer (2003) also proposes contour segments for affricates and aspirated stops, although with a somewhat different use of elements from that argued for in this thesis.

node. Questioning the structure of the segment in this way leads back to the much earlier idea that phonological primes are organised into some kind of geometry.[44] Within the framework of elements, this idea was formalised by Harris (1994), who proposes the following melodic geometry:[45]

Figure 3.6 The melodic geometry of Harris (1994)



This can be used as a base model, but the revisions to the theory of elements incorporated into the current framework necessitate some modification. This relates primarily to the use of seven elements (where the Harrisian model uses nine), whereby the function of [h] is subsumed under [H] and that of [N] subsumed under [L] (as discussed in Chapter 1). We can thus see segmental structure as comprising maximally three nodes onto which the elements themselves attach:

[44] For the major work on segment structure within the framework of features (Feature Geometry), see Sagey (1986), also McCarthy (1988) and Halle (1992); for the major work in this framework applied to Semitic, see McCarthy (1994).

[45] Harris (1994:129); I have added [H] and [L] for clarity. Note that Harris (1990:262–4) discusses the 'breaking' of phonological expressions (which feeds lenitory processes), whereby an expression undergoes a reduction in fusion (i.e. decomposition without element loss). The model I propose below is compatible with his analysis, but carries his model one step further. It also accounts neatly for the loss of aspiration [H] in the lenited (tapped or glottalled) segments, since the ROOT node in my model is maximally binary branching. The breaking (i.e. splitting into two branches of a contour) of the expression, whereby [?] is no longer fused with [R], means that the 'offshoot' MOD node containing [H] is not interpretable since it would require fusion with the 'breakaway' branch linked to [?], or it would result in an illicit triple branch (triploid).

Figure 3.7 *Subsegmental structure showing the contributing function to an expression of the various nodes*

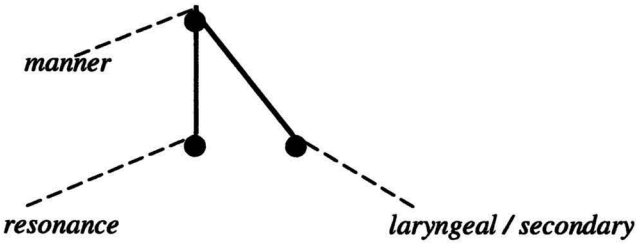


Figure 3.7 shows the contributing *function* of the elements linking into the nodes (but doesn't label the nodes themselves). The main body ('core') of the expression above is composed of the two nodes into which the resonance elements and the manner/laryngeal elements link (i.e. the latter when linked to the node labelled 'manner' are interpreted in their 'manner' role). Elements linking into the 'offshoot' node are interpreted in their 'laryngeal' role (in the case of [?], [H], [L]).[46,47]

This type of representation deals with questions such as (for example): what makes a segment p^h not *f*? Both [?] and [H] are present, but in the former [H] acts as a 'laryngeal' element while in the latter contributing a more 'fundamental' role as 'manner'. While the 'laryngeal' vs 'manner' function could be derived by headedness, bearing in mind the problems outlined above, this 'manner' / 'laryngeal' distinction is, I think, more likely to be due to contour shape in the structure of the segment. In other words, the segment p^h is not fully fused. If the 'aspiration' is fused with the segment, then *f* results, with the [H] element contributing its 'manner' function. It would seem that nodes generally, as will be seen in the representations following in Figure 3.8, prefer to have only one element attached (i.e. not to branch into more than one

[46] Note that representations are somewhat limited when shown in two-dimensional diagrams. I represent the 'offshoot' node to the right simply for convenience; this is not related to articulatory timing. Therefore, the 'core' of the expression does not necessarily precede the 'offshoot' node temporally. Thus, despite the fact that [L] in this role tends to be interpreted temporally as pre-voicing, it links to this node as do [H] and [?]. The temporal interpretation of an element seems to be one of those language-specific phonetic interpretations which is unlikely to be reflected in subsegmental structure *per se*. In this view, it would thus be argued that phenomena such as pre-nasalisation (in Greek loanwords, for instance) and pre-aspiration (e.g. Icelandic) are language-specific temporal phonetic interpretations of phonological representations often interpreted as 'voiced' and 'voiceless aspirated', respectively.

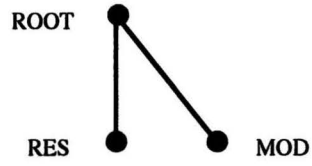
[47] One may wish to employ this node to represent secondary articulations, especially for languages (e.g. Caucasian) with complex sets of secondary articulations. This is outside the scope of this thesis. As seen in Chapter 6, this is not the case for Arabic. Moreover, Semitic languages with labialised velars, e.g. k^w, would have [U] attached to the resonance node. This possibility is therefore not investigated further here.

element), and thus the linking of [H] to this node (as in the spirantisation process p^h → *f*) 'knocks out' [?] (i.e. [?] is delinked).[48]

The node at the top of the structure (and thus in a sense a 'mother' node) I think is more accurately characterisable as the ROOT node (as per Harris, 1994). This node can be seen as being somehow most fundamental to the identity of a segment. Elements attaching to this node are interpreted as what we would roughly call 'manner'.

The ROOT node usually[49] projects downwards into the RESONANCE node (or RES), to which the resonance elements attach. As noted, I consider this to be the 'core' of the expression, with elements attached to these two nodes together giving a segment its essential QUALITY characteristic. The ROOT node can then project into an 'offshoot', which I shall call the MODIFIER node (or MOD), since elements attaching to this node seem to do so in a modifying capacity (i.e. laryngeal / phonation modification). Obstruents considered 'plain' (e.g. 'plain' voiceless stops) have no such modification. In this way, segment structure always has QUALITY, but does not necessarily have modification of this. The template for this subsegmental structure is therefore as follows.

Figure 3.8 Subsegmental structure showing the nodes to which elements link



What should also be noted from this structure is that the ROOT node maps directly onto a skeletal point. This makes it a quasi-contour segment in that the 'core' (QUALITY) of the expression and the 'offshoot' (MOD node) are not entirely fused.

With the above in mind, I now move on to outline the approach of Nasukawa & Backley (2005) (henceforth N&B) and examine the way in which the major insights built into their model could be adopted to develop the model I presented above.

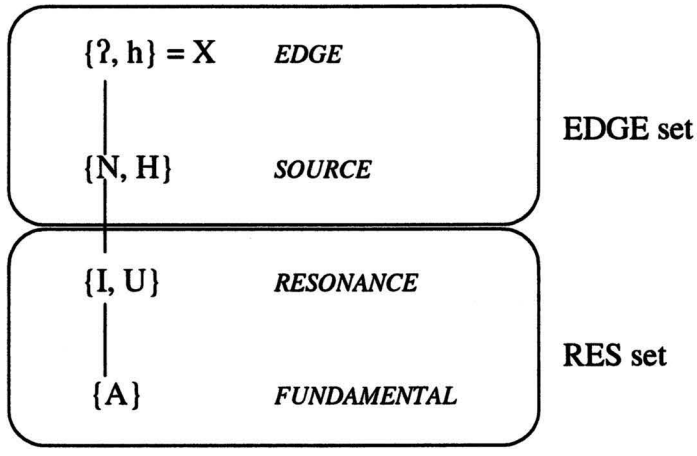
[48] There may be a parameter concerning the linking of mutiple elements to one node (or indeed a parameter militating against bare nodes). See Chapter 6 for discussion of this in Arabic.
[49] The exception to this, as will be seen, is (placeless) laryngeals.

The first insight specifically built into the N&B model is that of the C–V dichotomy. That is, 'consonants and vowels are fundamentally different, both in their acoustic properties and also their linguistic function'.[50] Therefore, they propose that the inventory of elements is naturally grouped into two sets (each of which contributes its own type of acoustic information to the speech signal); the 'resonance' set (RES) comprises the elements [A I U], and the EDGE set comprises [? H N h].[51] At the risk of oversimplifying somewhat, these two groups further subdivide, so that the EDGE set comprises *EDGE* (elements [? h]) and *SOURCE* (elements [N H]), and the RES set comprises *RESONANCE* (elements [I U]) and *FUNDAMENTAL* (element [A]). Moreover, they propose that consonantal structures are the reverse of vocalic structures. Therefore, in non-nuclear positions EDGE dominates RES, whereas in nuclear positions RES dominates EDGE:

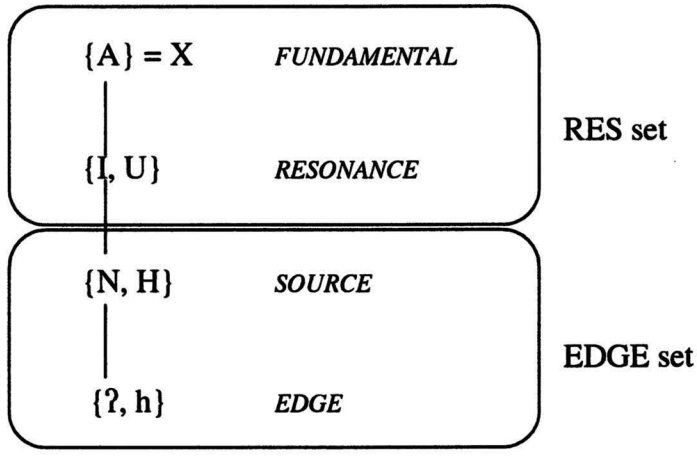
[50] Nasukawa & Backley (2005:82).
[51] N&B do not merge the elements [h] and [H]. Also, they use the element [N] where I use [L] (the latter the usual element used under Revised Element Theory).

Figure 3.9 The revised element geometry of Nasukawa & Backley (2005)

(i) Non-nuclear positions



(ii) Nuclear positions



N&B note that this approach is intended to constrain the fusion operation, while formally incorporating the C–V dichotomy. In this model, when the structure is linked to a non-nuclear position (with EDGE thus dominating RES), bare *FUNDAMENTAL* is interpreted as velarity in consonants, while a simpler structure terminating in bare *RESONANCE* is interpreted as coronality. In this way, there is no [R] element in such a model.[52]

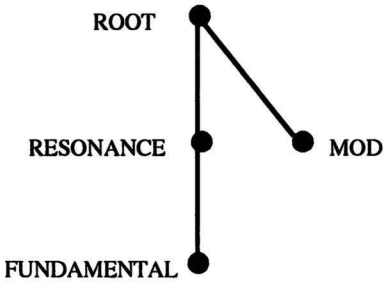
There are two aspects of this approach that I believe would benefit the model of segmental structure that I proposed above in Figure 3.8: firstly, the reversed structures incorporating the C–V dichotomy, and secondly the structural deriving of

[52] This has its roots in Backley (1993, 1998), who argues against the existence of an [R] element.

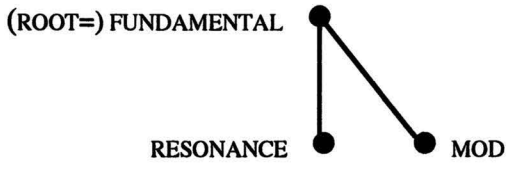
coronals (making the [R] element obsolete). If the structures I have proposed were further broken down, the structure would then be as in Figure 3.10, following. Note that the MOD node, elements attached to which are interpreted as secondarily modifying characteristics, is 'optional', i.e. it is not present in all structures.

Figure 3.10 Subsegmental structure – Bellem (2007)

(i) non-nuclear positions

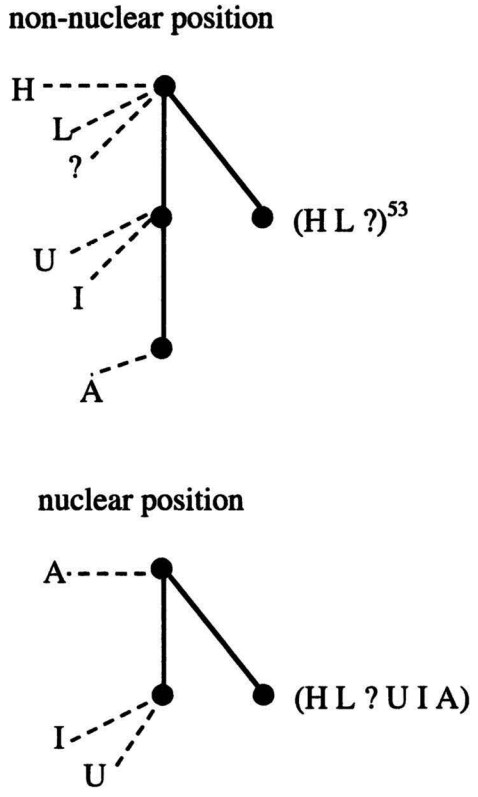


(ii) nuclear positions



Therefore, the elements which could link to each of the nodes above are as follows:

Figure 3.11 Subsegmental structure (Bellem, 2007) showing to which nodes elements potentially attach



A comment here on the structure of vocalic representations is in order.[54] Firstly, following N&B, bare nodes in the 'core' (QUALITY) of the expression are interpreted as schwa-type vowels: bare FUNDAMENTAL is interpreted as 'a non-high central vowel such as [ʌ] or [ə], while bare RESONANCE is interpreted as the high central vowel [ɨ].'[55] Secondly, where elements attach[56] to MOD, they have one of two functions. Firstly (in the case of [H L ?]), they are interpreted as 'laryngeal', thus yielding tonal contrasts (including laryngealisation, which also sometimes interacts with tone).[57] Secondly (in the case of [U I A]), they are interpreted as a diphthongal

[53] As noted, it may be that there are languages which utilise the MOD node in secondary articulations, such that resonance elements may link here. This is not the case for Arabic (see Chapter 6) and is outside the scope of this thesis.

[54] One could also think of *a* as the 'ultimate vowel', in that it is maximally open, which is fundamentally incompatible with consonants. This, too, is how we could see the lack of *a*~ʔ alternations (as noted) in comparison with the high vowels and glides (and such structural representations formalise this).

[55] Nasukawa & Backley (2005:86). They cite languages with two central vowels such as (Ethiopic) Ennemor Gurage.

[56] In N&B's framework elements are either active or inactive. Thus, where I have elements 'linking' to nodes, they have elements being active under a given node. This is not compatible with the framework I propose because it would not be possible for elements to spread into another node in the same expression (or to be shared by two nodes). Presumably, in N&B's framework this would violate some restriction that elements are activated only once in each phonological expression.

[57] For instance, the Tibeto-Burmese language Mpi, as discussed by Ladefoged (1983:353), has 'six tones, each of which may occur with a plain or laryngealized vowel, so that the same segments, /si/,

off-glide, which is where vocalic representations are usually considered to be branching.[58]

Moreover, such a structure would also explain why nasalised vowels cross-linguistically are observed to prefer to be low (in fact, to contain [A]), which is commonly observed for French, Romagnol dialects and Brazilian Portuguese among other languages.[59] That is, in vowels with an 'offshoot' MOD in their structure, it may be that the FUNDAMENTAL node (which in vowels is essentially the ROOT node) cannot remain bare, and thus [A] must be linked in order to support (or act as head for) MOD.

Additionally, in the same vein, this structure may explain certain pharyngeal interactions with tone.[60] Many Asian languages have a 'register' distinction that normally relates predominantly to pitch. However, in the Mon Khmer languages there are varying realisations of this register distinction. In Rengao, the first register correlates modal voice and higher pitch with voiceless onsets and RTR vowels, whereas the second register correlates breathy voice and lower pitch with voiced onsets and ATR vowels.[61] I suggest[62] that perhaps where the second register has [L] linked to MOD, the first register has this MOD offshoot but terminating in a bare node. This means that [A] either needs linking to FUNDAMENTAL in order to 'support' the MOD offshoot (in the case of vowels not lexically containing [A]), or (in the case of vowels with lexical [A]) the [A] element becomes the head of the expression.[63]

Finally, as per Figure 3.11, there is a fundamental difference in geometry in expressions linked to nuclear as opposed to non-nuclear positions. However, the overall shape of the structure is generally the same (but with the function of the respective nodes varying slightly). Such structures may explain the observation that consonants containing the [A] element are cross-linguistically marked, if we were to

---

have 12 different meanings'. Additionally, languages such as Vietnamese have been shown to have both breathiness and creakiness involved in the tonal system – see Pham (2003). Also on tone and [?] interactions in the Chin language Zahao (Laizo), see Yip (2002). See also Esling (2003).

[58] See e.g. Kaye (1989:125–39).

[59] See Ploch (1999) for discussion of what he terms 'the height myth'.

[60] Thanks to Moira Yip for pointing this angle out to me.

[61] Yip (2002:32).

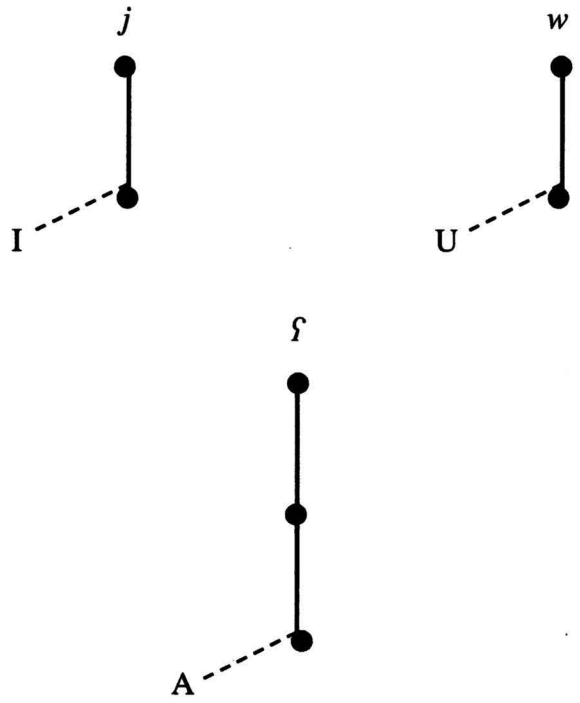
[62] With the caveat that this of course would need more careful investigation.

[63] Note that it does not appear to be a tense–lax distinction that could be analysed as a headed–headless distinction. That is, the register 1 vowels are [e_i o_u ɛ ɔ a], and (corresponding) register 2 vowels are [i u e o ə]. Thus, clearly, either [A] is added or it becomes dominant. In register 2, schwa [ə] is an empty expression and thus can't be headed.

suppose that languages tend to prefer (all other things being equal)[64] simpler structures. Thus, many languages perhaps do not allow (i.e. license) [A] to link to a representation (into the FUNDAMENTAL node) where the dominating RESONANCE node is bare. Moreover, it would provide an explanation for the observation that the low vowel does not seem to correlate with a pharyngeal approximant in parallel with the high vowels and the glides *w* and *j*.[65] That is, the high vowels *i* and *u* have exactly the same structural shape as the glides *y* and *w*, whereas the low vowel *a* does not have the same structure as a pharyngeal approximant (the transcription of which would presumably be ʕ, see the discussion in §3.2, following):

Figure 3.12 Representations showing the difference between glides and vowels

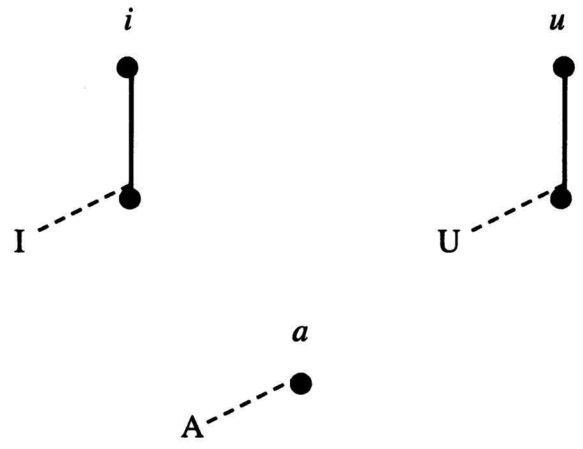
(i) (Non-nuclear) approximants / glides



[64] Here I make appeal to the idea that the overall shape of individual sound systems arises from the resolution of the conflicting pressures to which they are subject, determined on a language-specific basis, and is what makes sound systems unique. This is formalised by Flemming (2004, *passim*).

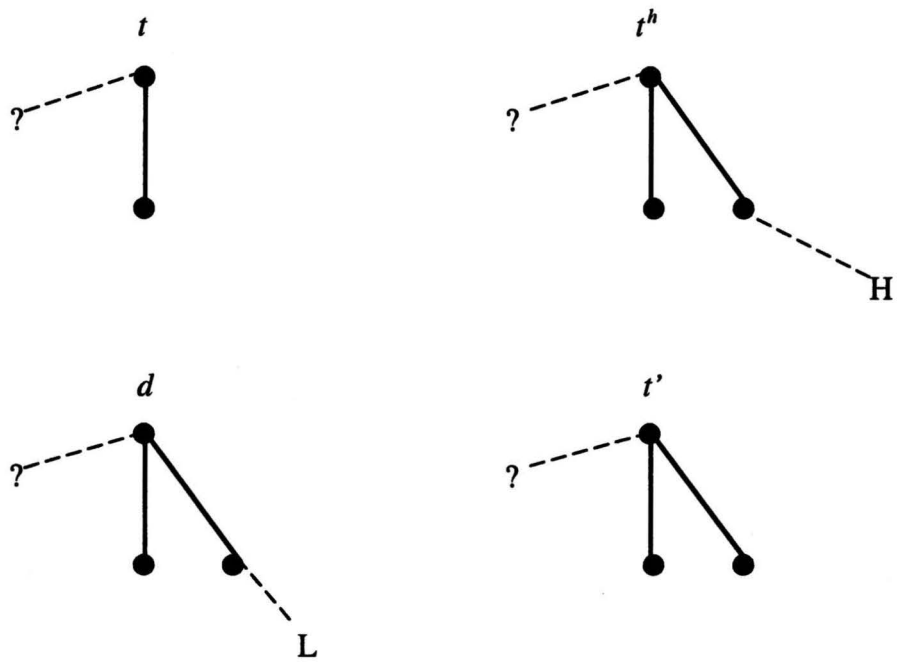
[65] For instance, it is clear that in Arabic, consonantal [I], i.e. *j*, alternates with vocalic [i], as in the word (normally transcribed as) *fīl* 'elephant', which in Arabic is written as فيل, i.e. F^{i}YL, and the root of which is clearly F-Y-L, as evidenced by the plural form *fiyala* فيلة F^{i}Y^{a}L^{a}, where the expression [I] is clearly consonantal. This same alternation is seen for [U] between *w* and *u*, but never between *a* and ʕ.

(ii) (Nuclear) vowels



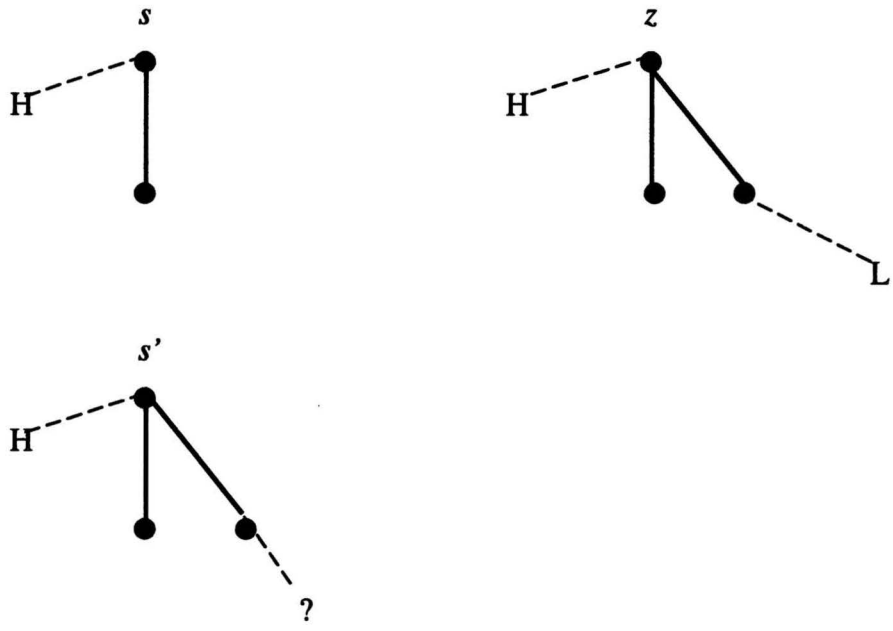
To wind up, then, the evidence so far is that phonological representations have an inherent structure. The remainder of this section gives potential representations for some basic types of consonants. However, these do not necessarily hold of all languages, since phonological segments participate within an overall sound system, which varies cross-linguistically. For example, I argue in Chapter 6 that languages like Arabic have phonologically palatal(ised) coronals. The representations given here, then, are to exemplify the arguments up to this point, and language-specific modifications will be discussed where relevant. Additionally, in the present section I do not further discuss, or show, headedness, because any evidence for this has not yet been presented, and also because this too presumably is language-specific to a certain degree. Headedness will be shown later.

Figure 3.13 The representation of coronal stops



In the representations given above, it may be seen that what distinguishes an ejective *t'* from a plain voiceless *t* is that there is an offshoot (MOD) node projecting from the ROOT. This means that the element [?] (since this is the element linked into the 'mother' ROOT node) is interpreted not just as 'manner' but also as 'laryngeal modifier', hence an ejective stop. How strongly this is interpreted is a matter of (language-specific) phonetic mapping. Therefore, a language may interpret this as a 'fortis' ejective or as a 'lenis' ejective. The delinking of this empty node would result in lenition whereby the ejective becomes 'plain' voiceless.

Figure 3.14 The representation of coronal sibilants

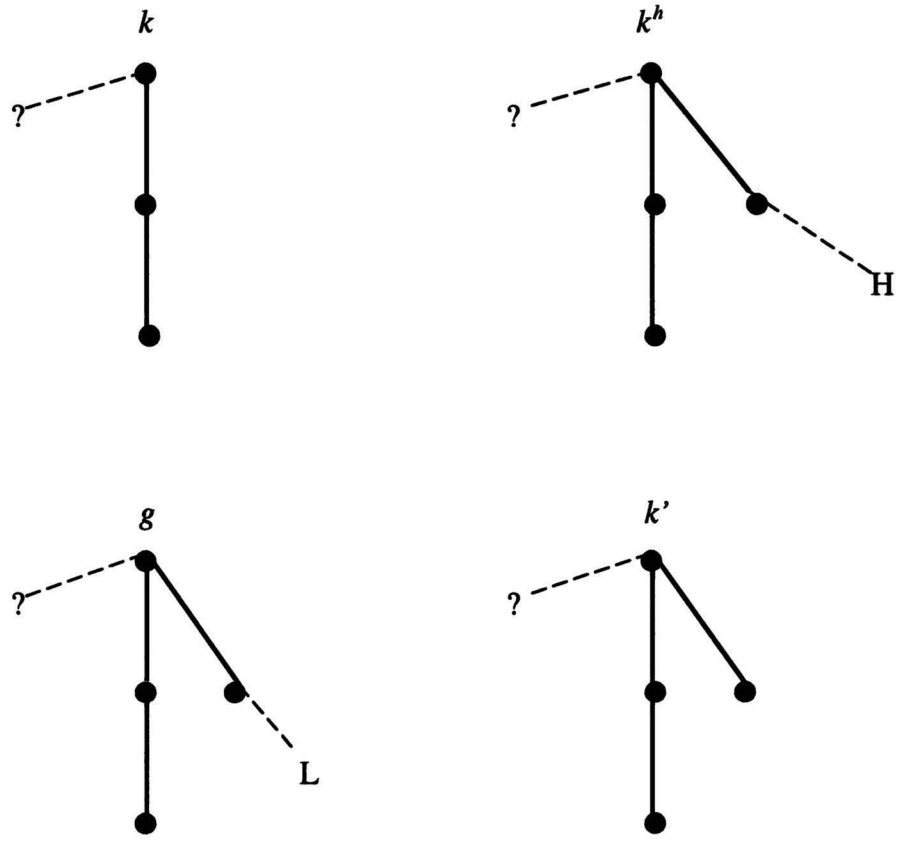


The representations of the coronal non-sibilant fricatives (θ, $\eth$, θ') would have essentially the same structure as the sibilants in Figure 3.14, the difference being one of headedness (Harris, for instance has [H] as the head of sibilant fricatives but [R] as the head of the non-sibilant series).[66]

Harris (1994) has a 'neutral' element [@] present in all representations, but manifesting its presence only when head. This element, when head of a consonantal expression, is interpreted as velar. In a framework without this element, 'neutral' is manifest as headlessness (in the case of vowels) or just as the lack of a resonance element (in the case of velars, which in fact means that some velars are considered unheaded expressions). However, in the N&B-style framework adopted, velars arise through structural interpretation. In this approach, the last 'offshoot' of the expression terminates in a FUNDAMENTAL node. When this 'offshoot' is present, but with no element linked to it (in other words, when the expression has a bare FUNDAMENTAL node), the expression is interpreted as velar. This gives us the following representations for the velar stop series:

[66] Headedness of these segments (for at least Arabic) is discussed and shown later.

Figure 3.15 The representation of velar stops



Lastly, I conclude this sub-section by giving the representations of labial stops and palatals.[67] Pharyngeals, (Arabic) coronal emphatics, and uvulars are discussed in §3.2, following, and further in Chapters 4 and 6.

[67] The palatals represented here are assumed to be phonologically stops, although cross-linguistically they may most often be phonetically realised as palato-alveolar affricates. This is not to say that there aren't languages in which such segments aren't phonologically affricates. This is outside the scope of this thesis, although due to the structural representations adopted here, further research is warranted. For now, I assume that resonance quality is interpreted also in MOD.

Figure 3.16 The representation of labial stops

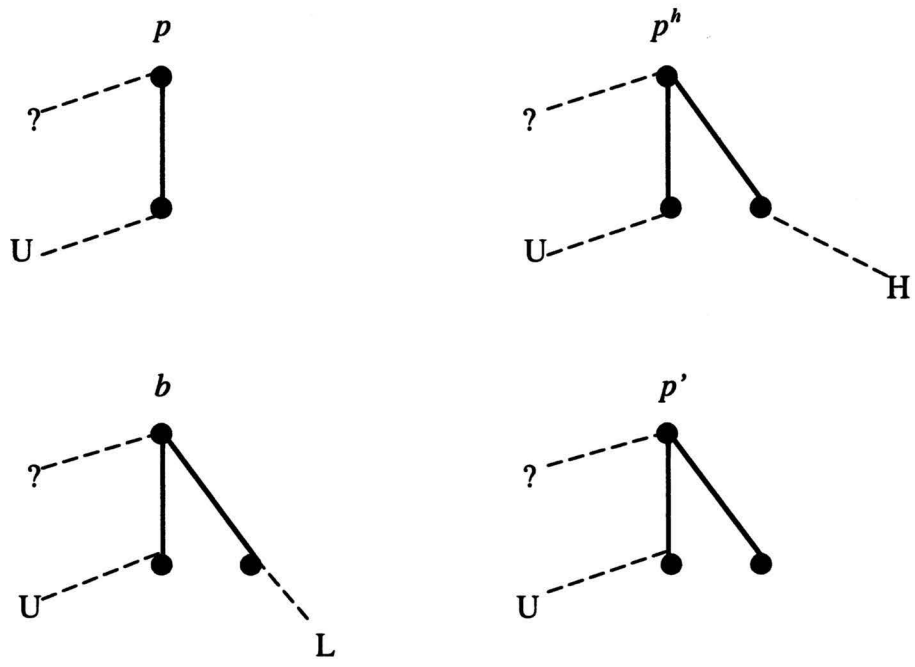
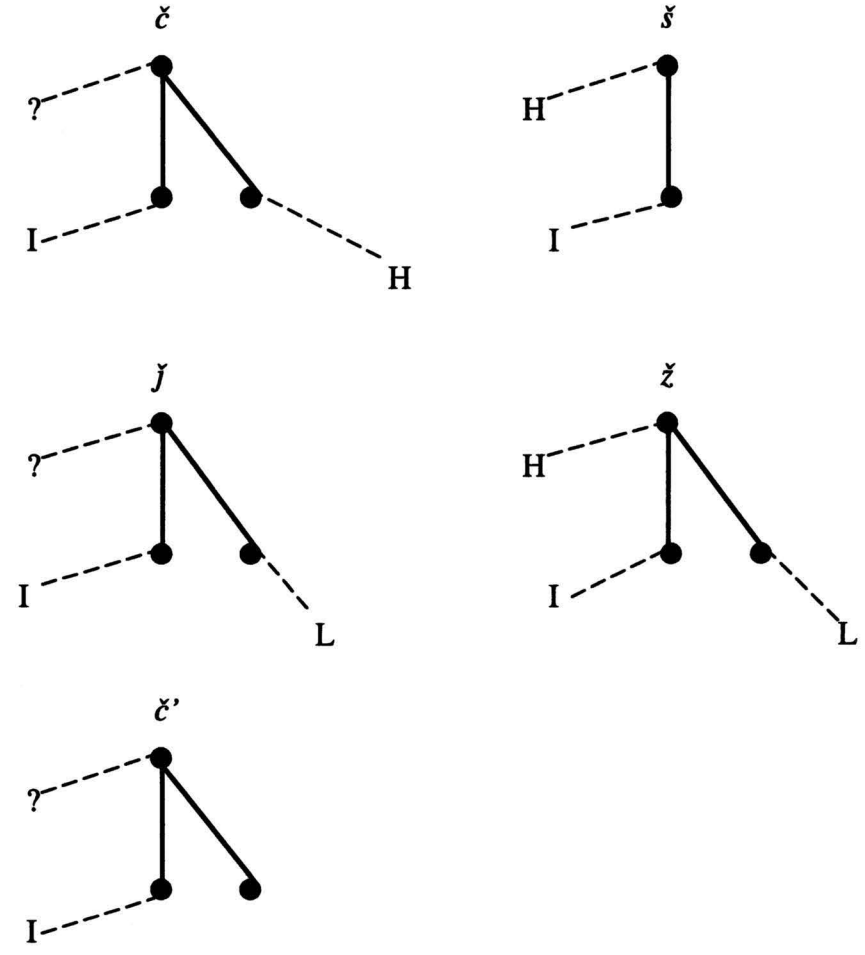


Figure 3.17 The representation of palatals



3.1.4 Conclusion

To conclude §3.1, I recap the main findings and proposals. At the beginning of this section, I discussed the evidence leading to the conclusion that 'glottalicness' is an interpretation of the element [?]. From this, it is clear that this element plays two roles in phonological expressions: 'manner' and 'laryngeal'. This supports the proposals of other researchers who have concluded that the elements [L] and [H] also have two functions, effectively 'manner' and 'laryngeal', since all three of these elements clearly have a dual role. The question is therefore how this is exploited in phonological expressions. I noted that the distinction between the two roles (for the elements [L] and [H]) has been derived by headedness by researchers in the school of Kaye. However, it is very clear that the [?] element cannot function in this way.[68] This further supports the view that phonological expressions are not linear but have an internal structure.

Based on the insights of researchers working in both feature-geometric and element-geometric models, I assumed consonantal representations consisting of a (QUALITY) 'core' which may be further modified. The 'core' consists of the ROOT node (='manner') and two RESONANCE nodes (='place'): RES (elements [I] and [U], yielding palatals, labials, and, if bare, coronals) and FUND (element [A], yielding pharyngeals, and, if bare, velars). The ROOT node may project an 'offshoot' terminating in the MOD node. All elements may link to this node, receiving interpretation in their secondary resonance or laryngeal function.

What is crucial for the purpose of this chapter is that in this model ejective stops have the structure of a 'plain' stop, but with the ROOT node projecting into bare MOD. Therefore, the [?] element attached to the ROOT node (thus having interpretation in its 'manner' capacity) also receives interpretation in its 'laryngeal' capacity (being projected as it were into the MOD node).

The last point to be made here concerns the systemic status of ejectives. Why do some languages with a three-way stop series contrast e.g. p^h and b with p' rather than p? That is, if p' takes the place in the system normally taken by p, could p' actually be the 'plain' series? This may certainly be the case for some languages,[69] but,

[68] There are researchers who derive 'stop' manner structurally. However, in my view the evidence given in §3.1 of this chapter shows that this may be very difficult to maintain. See Jensen (1994).
[69] See e.g. the argument of Monaka (2001) that ejectives in Shekgalagari function as the 'plain' series.

firstly, we have seen above that there are indeed languages that contrast ejective stops with plain stops, and, secondly, this would appear to be a case of maximising the distinctiveness of a contrast.[70] For example, it is well noted that vowel systems tend to prefer to maintain maximally salient distances between their members (based on the resonance patterns). Therefore a three-term system will have *i–a–u* (rather than, say, *i–ɪ–i̞*). This type of patterning with ejectives has presumably the same purpose. That is, in a system with a three-way contrast in its stop series, a voiced stop would be likely to have some voicing lead, and a voiceless aspirated stop to have some voicing lag. If there is a plain stop with roughly zero VOT, then the voicing contrast may not be particularly great between, say, the voiced and plain members of the series. Moreover, there may be positions in which this contrast is masked (for instance in certain types of consonant cluster, or intervocalically, where the plain stop is likely to be partially voiced). Thus, the perceptual contrast between the three types of stop may be maximised or enhanced by being categorised as 'no-lag' vs 'noise-lag' vs 'stop-lag', which would be a more salient contrast than the perceptual zones of voicing (which effectively could be categorised as 'minus-lag' vs 'not-much-lag' vs 'lag' in a three-term system).

Leaving behind the issue of glottalics, I move on now to the issue of Arabic-style ('backed') emphatics. However, the representation of emphatics is intrinsically linked to the representation of pharyngeals. In Chapter 4, where I investigate the historical development of emphatics in Semitic, I argue that the original Semitic emphatics were in fact glottalic, with Arabic-style 'backed' emphatics developing from these, and that the pharyngeals have a crucial role to play in this development. Therefore, understanding the identity of 'pharyngeal' is a prerequisite to understanding the identity of Arabic-style 'backed' emphatics. For this reason, §3.2 investigates the representation of Semitic pharyngeals, with Arabic-style 'backed' emphatics in §3.3 and uvulars in §3.4.

[70] In the sense of Edward Flemming, who encodes this directly into his adaptation of Optimality Theory. See Flemming (2002, 2005).

3.2 The phonological representation of Semitic pharyngeals

In this section I investigate the phonological representation of the pharyngeals in Semitic languages, with the aim of identifying the phonological 'pharyngeal' character. I start by recapping the phonetic evidence given in Chapter 2, and then look at phonological evidence. Finally, I propose phonological representations using the structural model proposed in §3.1, above.

Most dialects of Arabic have the voiceless pharyngeal fricative *ħ* and the voiced pharyngeal *ʕ*,[71] as do most varieties of Neo-Aramaic, Hebrew, many Ethio-Semitic languages and the South Arabian languages.[72] These two pharyngeals are thus a typically Semitic feature. The identity of *ʕ* has caused some problem in the literature, since although it is usually assumed to be a voiced fricative (i.e. the voiced counterpart to *ħ*), it is variously described additionally as a stop or an approximant. The medieval grammarian Sībawayh[73] describes Arabic *ʕ* as 'between' a continuant and a stop.

In Chapter 2 I discussed how in Arabic dialects such as Syrian, *ʕ* is typically approximant-like (showing what I argue is a lenitory process, i.e. vocalisation),[74] whereas in dialects like Iraqi it is most often realised as a stop,[75] word-internally if not stopped at least very creaky, and word-finally most often an epiglottal stop, especially in careful speech. I showed spectrograms of Baghdad Iraqi *ʕ* from Alkalesi (2001) where word-initial *ʕ* is a stop, distinguished perceptually from glottal *ʔ* predominantly by the quality of the following vowel (e.g. ʕ[ɑ] vs ʔ[a]).

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[71] The exceptions are: Nigerian and Juba Arabic and Ki-Nubi. In Cypriot, Maltese and Chadian Arabic they are rare (Kaye & Rosenhouse, 1997:277). Also, in northern Yemeni Tihama the reflex of **ʕ* is *ʔ* (Watson, 2002:18).

[72] In varieties of Neo-Aramaic which don't have a segmental manifestation of *ʕ*, there is clear evidence of historical **ʕ* which is manifest supra-segmentally. Oriental (Mizrahi) Hebrew retains the pharyngeals, although in Modern Israeli Hebrew **ʕ* has merged with *ʔ* and **ħ* with *x* (see §4). In some Ethio-Semitic languages (e.g. Amharic) the pharyngeals have merged with the laryngeals, a clear case of lenition. In MSA Mehri, *ʕ* is observed to be very weak in the dialect of Yemen, and not to occur in that of Oman (Janet Watson, p.c.).

[73] See Semaan (1968), al-Nassir (1993), Bakalla (1981).

[74] McCarthy (1994) notes that in Ghazeli's (1977) spectrograms, the *ʕ* looks like an intervocalic glide. I should note that in Syrian Arabic, word-initial *ʕ* is barely perceptible. This is also noted by Cowell (1964). On the lenition trajectory, vocalisation, where obstruent weakens to resonant, is the last stage before deletion. 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'.

[75] 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.

The resonance characteristics of both ʕ and ħ, as seen in spectrograms, and as reported very widely in the literature, are raised F_1 and lowered F_2.[76] This is exactly the profile of the element [A], which clearly plays a role in the identity of the pharyngeals. In the following section, I therefore investigate the phonological evidence, and in §3.2.2 I discuss the actual representations of ʕ and ħ.

3.2.1 Phonological evidence of 'pharyngeal' [A]

There is abundant evidence across Semitic of pharyngeal vowel-lowering. While this has been noted cross-linguistically outside of Semitic, I focus here on Semitic since it is the systemic function of Semitic pharyngeals which is relevant.[77]

One example of pharyngeals containing [A] may be found in Cairene Arabic, where pharyngeals cause lowering of vowels through the spreading of [A]-quality. Observe the following data:[78]

(5)	a.	*tiʕmil*	[tɛʕmil]	'she does, makes'
		ṭiliʕ	[ṭɪlɛʕ]	'he went up'
		iħna	[ɛħnɐ]	'we'
	b.	*yikuħħ*	[yikoħħ]	'he coughs'
		ħubb	[ħobb]	'love'
		ʕumar	[ʕomar]	'Omar'

(5a) shows that *i* is lowered to [ɛ] before a syllable-final pharyngeal,[79] consistent with the spreading of [A]. (5b) shows that *u* is realised as [o] when either following or preceding a pharyngeal, again consistent with the spreading of [A]. Bearing in mind that I argue that Arabic syllable structure is CV only, it seems that the pharyngeal

[76] According to El-Haleese (1985), the raised F_1 of the pharyngeals proper is important in distinguishing them perceptually from other gutturals.

[77] It is evident that this systemic function is very important. One reason for focusing only on Semitic here is, as I argue, the role of pharyngeals in historically triggering the 'backing' sound change in emphatics. Moreover, pharyngeals play a different role in the sound systems of non-Semitic languages. For instance, the Caucasian languages are well known for their sometimes huge array of uvulars and pharyngeals. However, in the North-East Caucasian (Daghestanian) languages, pharyngeals clearly pattern with palatals in processes of (what I term) palato-pharyngealisation. See Bellem (2005).

[78] Watson (2002:271) citing Woidich (1999:27–8), Kaye (1997:193) citing Harrell (1957:72–3).

[79] Watson (2002:271) does not indicate what happens to *i* when it occurs to the right of a pharyngeal. Furthermore, there are no examples of what happens with an intervocalic pharyngeal (i.e. to demonstrate whether it is only the vowel to the right that is lowered, or both adjacent vowels). However, see the Baghdadi data in Chapter 6, where a medial pharyngeal clearly induces *a* in V_1 of verbs (where otherwise *i* is found), and where a medial coronal has triggered *i*, this is lowered by an initial ʕ to [ɛ].

spreads [A] into the following nucleus if that nucleus is realised. When the nucleus after the pharyngeal is not realised,[80] [A] spreads into the preceding nucleus instead, thus also serving as an acoustic cue for the pharyngeal.

Lowering is attested across the dialects of Arabic. In (Muslim Baghdad) Iraqi Arabic for instance, the 2PS masculine and 1PP independent pronouns ('you (m.s.)' and 'we') are *inta* and *iḥna*, realised as [ɪntə] and [ɛḥnə] respectively. The realisation of *iḥna* as [ɛḥnə] shows the spreading of [A] from the pharyngeal. Moreover, this shows that it is not simply vowel-laxing, as the 2PS masculine *inta* is realised with a lax initial vowel [ɪntə] in exactly the same context.

We also find Arabic dialects in which pharyngeals trigger *a* where a default vowel *i* would otherwise be found. The following data, from the al-Ristāq dialect of Omani Arabic, shows selected forms from the imperfective paradigm of the verb *yiktib* 'he writes' compared with the same paradigm of the verb *yiqḥam* 'he descends', which demonstrate vowel–zero alternations:[81]

(6)	*ʔaktib*	'I write'	*ʔaqḥam*	'I descend'
	yiktib	'he writes'	*yiqḥam*	'he descends'
	ykitbu	'they (m) write'	*yqaḥmu*	'they (m) descend'
	ykitban	'they (f) write'	*yqaḥman*	'they (f) descend'

The data show that the default vowel is *i*, except after a pharyngeal or uvular, when it is *a*, indicating that [A] spreads from the pharyngeal or uvular into the empty nucleus, obviating the need for the default [I] to link to the phonetically interpretable position.

Again in Arabic, we find that in the (*qəltu*) dialect of Rabīᶜa[82] the colour words are of the form VCCaC (*əfᶜal*),[83] where the initial V is normally *ə*, e.g. *əswad* 'black'.[84] In guttural (and emphatic) environments, however, the initial V is *a*, e.g. *aḥmar* 'red'. Also in this dialect, *i* occurs word-finally only after non-gutturals (and

[80] Meaning that the pharyngeal is in what is more traditionally seen as 'coda' position.
[81] Prochazka (1981:24).
[82] A small town in the province of Mosul in north-western Iraq, just inside the border with Syria. The Mesopotamian dialects are known as *qəltu* and *gilit*, which is discussed in Chapter 5. The dialect discussed here is that spoken by the sedentary (Sunni) population of Rabīᶜa (Abu-Haidar, 2004:1–2).
[83] Abu-Haidar (2004).
[84] As discussed in Chapter 1, in element-based theories, *ə* has been shown to be the phonetic realisation of a phonologically empty expression (i.e. there are no elements linked to this position in the string). See among others Harris (1994, 1997) on lenition and neutralisation, Charette (1991) on schwa and Charette & Göksel (1998) on Turkish vowel harmony.

non-emphatics),[85] i.e. the feminine singular ending *-i* → [a] after gutturals and emphatics. Compare (7a & b):

(7)	a.	*sani*	'year'
		nəʤmāyi	'star'
		ħəlwi	'pretty (f.s.)'
		wəħdi	'one (f.s.)'
		xāli	'maternal aunt'
	b.	*xərqa*	'rag'
		balaħa	'date, palm-tree'
		ṭaqṭaqa	'noise'

What we see in the above data is that the pharyngeals (along with the uvulars and emphatics) condition *a* where otherwise we find *i* or *ə*.[86]

We also find that in Tiberian Hebrew the pharyngeals condition short *a* (transcribed in the data as 'ă'):[87]

(8)	a.	singular	plural	
		melek	*məla:ki:m*	'king'
		se:per	*səpa:ri:m*	'book'
	b.	*ħeder*	*ħăda:ri:m*	'room'
		ʕe:der	*ʕăda:ri:m*	'flock'

The Hebrew data show that V_1 is reduced to schwa *ə* in the plural form, but that following a pharyngeal this is realised as [a]. Since schwa is analysed in element-based theories as the realisation of a nucleus devoid of lexical content (i.e. an empty expression), the only analysis possible here is that the pharyngeals spread [A] into the empty nucleus.

[85] This includes also *r*, e.g. *səyyāra* 'car', *manāra* 'minaret', *karra* 'once'.
[86] Note that in Rabīᶜa Arabic, the short vowels are: medially *a* and *ə*, finally *a*, *i*, *u*. This indicates that *i* and *u* have merged (to *ə*) word-medially.
[87] McCarthy (1994:209).

More evidence of pharyngeals containing [A] may be found in Ethio-Semitic. For instance in both Tigre and Tigrinya, *ħ* and *ʕ* lower a following *ə* to *a*,[88] the *a*-quality presumably having spread from the preceding pharyngeal:[89]

(9) a. Tigrinya

səbərə	'he broke'	*ħasəbə*	'he thought'
ləmmənə	'he begged'	*ʕaddəgə*	'he bought'

b. Tigre

sələk	'wire'	*ħabəl*	'rope'
bəʔəs	'husband'	*faħam*	'charcoal'
səbrə	'he broke'	*ħalbə*	'he milked'

Tigre also has an interesting process of neutralisation, whereby [ʔ] and [ʕ] in words containing a pharyngeal or an ejective (emphatic) are said to be in free variation.[90] Observe the following data:

(10)

ʔaddəħa	~	*ʕaddəħa*	'noon'
ʔarqaj[91]	~	*ʕarqaj*	'bed'
ʔaṭa:l	~	*ʕaṭa:l*	'goats'

Thus, what can be seen in the data is that there is a degree of neutralisation between the laryngeals and the pharyngeals in words containing ejectives or pharyngeals. Bearing in mind that these forms are apparently in free variation, it seems that there is optional spreading of the MOD node (linked to [A]) from pharyngeals and ejectives, showing again that pharyngeals have [A], but also that they may pattern with laryngeal *ʔ*. In other words, this analysis would show *ʕ* as being effectively a pharyngeal stop or glottalised pharyngeal stop in this language.

In summary, it is clear from both acoustic and phonological evidence that the pharyngeals are characterised by the presence of [A]. However, there seems to be a

[88] Rose (1996:92–3) discusses how in Tigrinya this occurs with pharyngeals and laryngeals, whereas in Tigre it occurs with pharyngeals and ejectives. For an early element-analysis of Tigre, see Kaye *et al.* (1985).
[89] Data from Palmer (1962) and Rose (1996), who cites (for Tigre) Palmer (1956) and Kaye *et al.* (1985), and (for Tigrinya) Berhane (1991).
[90] Leslau (1945:155–7), Raz (1983:5), also noted in McCarthy (1994:224).
[91] The velar ejective *k'* (= systemic <ḳ>) is traditionally transliterated as 'q'.

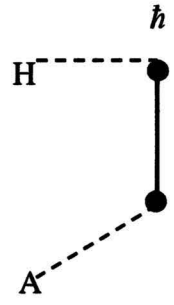
degree of variation with the voiced pharyngeal ʕ, since it appears sometimes to be an approximant and sometimes a stop. This is both inter- and intra-dialectal, as will become clear in §3.2.2, following, in which I look at representations.

3.2.2 The role of [A] in the representation of pharyngeals

It is clear that both the pharyngeals have the element [A] in their phonological representation. There is general consensus that the voiceless *ħ* is a fricative, but the voiced ʕ is sometimes an approximant and sometimes a stop,[92] as seen in the phonetic evidence presented, but also apparent phonologically.

To take the less complicated case first, it follows that the expression realised as *ħ* contains [A.H]. As seen previously, I assume that in fricatives, [H], as 'manner', links to the ROOT node, as follows:

Figure 3.18 The representation of pharyngeal ħ



A point to be made explicit here concerns my representation of pharyngeal *ħ* (also ʕ, as will be seen presently) as primarily a pharyngeal, rather than as a pharyngealised glottal (or an 'emphatic' glottal). Indeed, the pharyngeals are often seen as 'emphatic laryngeals', or pharyngealised counterparts to laryngeal *h* and *ʔ*.[93] That this is not the case (for Semitic) may be argued from various angles.

[92] Ladefoged & Maddieson (1996:168) state that they agree with the sentiment of Catford (1977) that Semitic pharyngeals are 'often wrongly described as fricatives', noting that 'there is audible local turbulence in the sound that Catford symbolizes as ħ, but, as he notes, it is very seldom apparent in what he symbolizes as ʕ.' However, it is clear that *ħ* is not a stop, and it is voiceless. It is also clearly an obstruent. Note the spectrograms in Chapter 2 showing that there is intense aperiodic energy in the acoustic pattern of *ħ*, noted also by Butcher & Ahmad (1987:162), among others.

[93] This assumption is commonly made for the various Caucasian languages which have pharyngeals. Here, however, I argue that this is indeed likely to be the case, since the 'pharyngeals' pattern as pharyngealised laryngeals, and uvulars often pattern as 'phonological pharyngeals'. See Bellem (2005).

Firstly, Arabic *h* in emphatic environments (which I transcribe in the data as *ḥ*) does not become *ħ*.[94] This is not to say that *ħ* could never lenite to *h*, merely that if the voiceless pharyngeal fricative *ħ* were actually a pharyngealised (or emphatic) glottal phonologically (or systemically), then one would expect *h* → *ħ* in an emphatic environment (where the laryngeal does not block the spread of the emphatic property, of course). Observe the following data from San^{c}ani Arabic:[95]

(11) *ḍaṛaḅ-hā* 'he hit her'
maṛaḍ-ḥā 'her illness'

The *ḥ* of *maṛaḍ-ḥā* 'her illness', where the emphatic property has spread to the right edge of the feminine possessive suffix, is not a pharyngeal fricative. The emphatic property having spread into the suffix is cued only by the quality of the following vowel (low back *ā* which I indicate as emphatic by use of the subscript dot). If the Arabic pharyngeal were a pharyngealised glottal, then one would expect **maṛaḍ-ħā*. While there is clearly a correlation in lexical roots between emphatics and pharyngeals,[96] synchronically, Arabic laryngeal *h* does not become pharyngeal *ħ* in emphatic environments. Since the same is true also of *ʔ* (i.e. that synchronically in emphatic environments it does not become ʕ), I therefore argue that the Arabic pharyngeals are indeed primary pharyngeals (and not pharyngealised, or emphatic, glottals).

Another argument against pharyngeals being 'pharyngealised' or 'emphatic' glottals is that this assumption leads to the supposition that in languages with glottalic ejectives (for instance, South Arabian), the reflexes of the pharyngeals should actually be *ʔ'* and *h'* (i.e. systemic <ʔ> and <ḥ>). Alternatively, one would predict that all Semitic languages have 'backed' and not 'glottalic' emphatics, which is not borne out

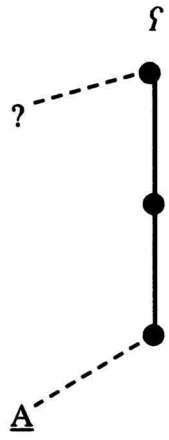
[94] As noted in my transliteration scheme, the traditional transliteration of the voiceless pharyngeal fricative is indeed *ḥ*. This is potentially misleading, since I argue that systemically *ḥ* would be a pharyngealised (or emphatic) glottal. Therefore, I reserve *ḥ* for the transcription of the (Arabic) glottal fricative *h* in an emphatic environment, and use *ħ* for the voiceless pharyngeal fricative.
[95] From Watson (2002:281).
[96] Morpheme Structure Constraints, or Root Co-Occurrence Restrictions, evidenced across Semitic, mean that certain classes of consonants tend to avoid occurring together in lexical roots. The table in McCarthy (1994: 204), showing co-occurrence of consonants in Classical Arabic (based on a statistical analysis of verbal roots in Wehr (1971)), shows that in lexical roots there is a markedly low co-occurrence of emphatics (especially *q*) with laryngeals (as compared with the co-occurrence of emphatics with pharyngeals) while non-emphatics occur roughly equally with both laryngeals and pharyngeals. Nevertheless, emphatics do occur with laryngeals. This perhaps indicates a historical spreading process.

by the empirical evidence. Indeed, if ʕ were an emphatic, then one would expect to find the triad <h, ʔ, ʔ̣> (where the segment ʕ is systemically <ʔ̣>). However, what we find is two glottals and two pharyngeals. There is thus no reason for ʕ to line up in the system as an emphatic. Furthermore, the emphatic triads are noticeably obstruents, where *h* and *ʔ* tend not to pattern as typical obstruents (glottals in many languages are argued to be placeless). Moreover if the pharyngeals were the emphatic counterparts to the glottals, then the system would have no 'primary' pharyngeals, or segments which were fundamentally pharyngeals, thus leading us to question why the emphatics in languages like Arabic and some Neo-Aramaic became 'pharyngealised' in the first place. That is, the emphatics clearly pattern with the pharyngeals (as I argue in §3.3, following), yet (as I argued above) the pharyngeals do not behave *as* emphatics. Thus, they are primarily pharyngeals (i.e. with [A] linked to the primary RES node). Moreover, I assume that in primary pharyngeals, [A] is head of the expression, thus *ħ* is [A.H].

The exact representation of the voiced pharyngeal ʕ is a more complicated issue than that of *ħ* and appears subject to dialectal variation. In what follows, I argue that the manifestation of simplex [A] in a non-nuclear position is the pharyngeal approximant ʕ, as in some dialects of Arabic.[97] However, as discussed in the previous section, there is evidence that ʕ may differ from one dialect to another in Arabic, which is discussed presently. In the meantime, in parallel with *ħ*, I suggest that early (and / or pre-)Semitic ʕ is represented as follows in Figure 3.19, with [?] linked to the ROOT node. The reason for this representation (rather than [?] linked to MOD) will become clear during the course of the following discussion.

[97] Although [A] as a simplex expression is voiced, it is not active voicing, as is present in voiced obstruents. Rather, voicing in sonorants is a secondary spontaneous effect (see Harris, 1994a:135–6).

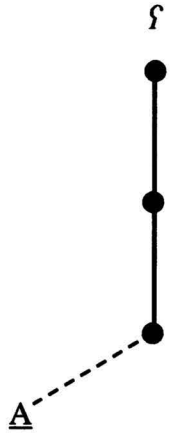
Figure 3.19 The representation of early (or pre-) Semitic pharyngeal ʕ



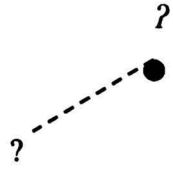
It follows from this that lenition results in either a glottal stop (as in Akkadian, as discussed in Chapter 4, or Amharic) or a pharyngeal approximant (as we may initially assume for Arabic dialects like Syrian). This is shown in Figure 3.20.

Figure 3.20 The representations of the lenited glottal and voiced pharyngeal

(i) (Lenited) pharyngeal approximant ʕ



(ii) (Lenited) glottal stop ʔ



Having given these representations, the discussion kicks off with dialectal variation in the realisation of the pharyngeal ʕ. Firstly, it has been noted in the

literature that the voiced pharyngeal is often produced as an epiglottal.[98] Edmondson *et al.* (2005:382) call ħ a 'pharyngeal fricative' and ʕ a 'voiced resonant', acknowledging that 'different dialects of Arabic have different phonetic realizations of the "voiced resonant",' namely a voiced approximant or an epiglottal-pharyngeal stop. Laufer & Baer (1988) describe the ʕ of both Arabic and Oriental Hebrew as entirely epiglottal (and not involving the tongue),[99] and Zeroual (2002, 2003) concludes for Moroccan Arabic that it is an approximant with some trilling of the aryepiglottal folds in 'prosodically emphatic situations'.[100] Esling (1996,1999) also notes a common correlation between what is normally supposed to be a voiced pharyngeal ʕ and varying degrees of epiglottal articulation.[101]

However, in looking at the phonological representation of this segment in Semitic, there are two factors to be considered. Firstly, this epiglottal realisation is often noted to be somewhat allophonic or unstable and not completely systematic across all Semitic language varieties. Secondly, what is the evidence for 'epiglottal' as a phonological feature? No Semitic language contrasts epiglottal and 'plain' pharyngeal as a linguistically significant feature. In Arabic, for instance, many varieties commonly produce ʕ as an approximant with no reports of epiglottalisation (as in Syrian, for instance). Ladefoged & Maddieson (1996:169) argue that the conclusion of Laufer & Baer (1988) that Hebrew and (Palestinian) Arabic ʕ is epiglottal and *not* pharyngeal 'may be somewhat of an over-statement in that a more recent x-ray study by Boff Dkhissi (1983) concludes that the movement of the epiglottis is not independent from that of the root of the tongue; rather the two elements work together in forming the constriction'. Moreover, where ʕ is known to be often produced with a degree of epiglottalisation, this appears to be contextually determined. That is, it is more apparent in careful speech, or citation forms, and in prosodically strong positions (intervocalically and post-tonically, for instance, it is

[98] In many (at least North-East / Daghestanian) Caucasian languages the voiceless pharyngeal is also produced as an epiglottal. In these languages, this may well have been systemised. Because of the different role of these segments within the Caucasian sound systems, I do not discuss them further here. See Kodzasov (1987), Bellem (2005).

[99] Laufer & Condax (1979) actually note that ʕ has several allophones in Hebrew, ranging from a voiced fricative to a voiceless stop, to creak, and to a glide. Here, they say that it actively involves the epiglottis and pharyngeal wall, not the tongue.

[100] See also Heselwood (2007), which has appeared since completing this chapter.

[101] In fact, for many NE Caucasian languages, Kodzasov (1987) adopts the term 'epiglottalisation' and 'epiglotto-pharyngealisation', thus implying its secondary role. This correlates with what I have termed 'palato-pharyngealisation' as it patterns phonologically with both palatals and pharyngeals.

much less likely). This is the case in Iraqi and Moroccan Arabic. Additionally, according to the intuitions of speakers themselves, ʕ lines up with the voiceless pharyngeal ħ, which has never, to my knowledge, been reported to have epiglottalisation in Semitic languages.[102]

Additionally, Laufer & Condax (1979) view the creakiness with which pharyngeal ʕ is often produced as an involuntary and spontaneous effect of epiglottal retraction. That is, the retraction of the epiglottis means that it

> also goes at the same time down far enough to touch the arytenoids...; it touches, or if folded and retracted further, pushes on the tops of the arytenoids... This pushing on the arytenoids presumably disturbs the fine adjustment needed for voicing and produces an involuntary glottal stop or, if not a stop, then glottalized voice (creak).[103]

This argument, however, rests upon the assumption that the target of this articulatory gesture is primarily epiglottal retraction, therefore implying that this gesture maps onto a phonological feature which is inherently [epiglottal]. If this argument is flipped, we could equally well assume that the target of the gesture is actually the glottalisation (i.e. stop and / or creaky voice), which I have shown is the manifestation of the element [?], and that it is the epiglottal involvement which is spontaneous.

In light of the arguments above, it therefore follows that while ʕ may indeed often be epiglottalised, this feature is not phonological but phonetic, and simply serves to enhance perception. That is, in languages where ʕ often seems to be realised as a stop (especially word-finally), its epiglottal realisation serves to differentiate it perceptually from ʔ. As argued above, however, the pharyngeals are primary pharyngeals and *not* 'pharyngealised' or 'emphatic' glottals.

We are back then to the question of whether ʕ is phonologically an approximant or a stop. That is, although we can roughly consider ħ as a voiceless pharyngeal, and ʕ as a voiced pharyngeal, this does not tell us what the phonological representation of ʕ is. Moreover, is ʕ really voiced? That is, if it is an approximant, the voicing is spontaneous, rather than active, meaning that [L] is not phonologically distinctive (or 'active'). Also, if ʕ is phonologically a stop, then is it actually voiced or simply 'plain' voiceless? In either case, [L] may not play an active role. According to

[102] Again, this contrasts with NE Caucasian languages, which often do have epiglottal *H*.
[103] Laufer & Condax (1979:73).

al-Ani (1970:62–3), the most common allophone of ʕ in Iraqi Arabic is a ('plain') voiceless stop (which may in intervocalic position appear 'as a glide continuation of the preceding and following vowel formants'). Intervocalic voicing would then be expected if the segment were 'plain' voiceless. It thus follows that reports of creaky voice in Iraqi (see Butcher & Ahmad, 1987) are due to ʕ intervocalically picking up voicing, typical of 'plain' stops, indicating that [?] links to ROOT not MOD.[104]

That ʕ is not a (voiced) fricative may be argued on several counts,[105] among which that if it were phonologically a fricative it would always be voiced but would be unlikely to fortify to a stop, analogously with the other fricatives in Semitic. Thus, in languages (or dialects) where ʕ is normally assumed to be a voiced fricative, I argue that it is more strictly a voiced continuant.

Tying together the preceding arguments, and moving on to the representation of pharyngeal ʕ, it seems likely that there are differing representations in different Semitic languages / varieties. Firstly, I propose for common Semitic,[106] i.e. the early or original Semitic ʕ, a pharyngeal stop with [?] linked to ROOT. The argument for this runs as follows. The pharyngeals have never been part of the triadic system,[107] *per se*. If they were, one would expect to have (had) voiced, voiceless (aspirated) and glottalised emphatics, which no-one has proposed or evidenced. It is thus more likely that, as in the glottals, the laryngeal–manner element in the pharyngeals is actually attached to the ROOT node. These are the representations given in Figures 3.18–19.

The reason for assuming that the pharyngeal ʕ must at least historically have been a phonological stop now becomes clear: when [L] is attached to the ROOT node it is interpreted in its 'manner' function, and thus contributes nasality. To my knowledge such segments (i.e. pharyngeal nasals) do not exist.[108] Thus, the

[104] Van der Hulst (1995:106) notes that creaky voice is commonly represented as a combination of glottalisation plus oral voice (i.e. [?.L]). Butcher & Ahmad's (1987) spectrograms show ʕ as voiced, as is mostly claimed in the traditional 'grammar' literature.

[105] I noted previously that Edmondson *et al.* (2005) argue that ʕ is a voiced resonant. Also, Ladefoged & Maddieson (1996:168) note that Semitic ʕ is rarely a fricative (phonetically), concurring with J.C. Catford's remark that they are 'often wrongly described as fricatives' and noting his description of them as approximants.

[106] See also Chapter 4, where I discuss the sound system of Proto-Semitic (or historical common Semitic).

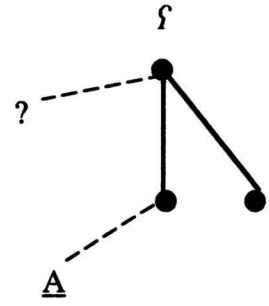
[107] The system of triads is discussed in Chapter 4, where I present the arguments for early Semitic emphatics as primarily ejectives, rather than primarily 'backed'.

[108] The International Phonetic Association judges them articulatorily impossible.

pharyngeals *ħ* and *ʕ* are manifestations of [A] with either of the two possible elements attached to ROOT (since [L] does not attach here in conjunction with [A] in RES).

It seems very likely that the dialects of Arabic, for instance, in which *ʕ* is realised most often as a stop have the same representation as that given in Figure 3.19, above. However, this may not be the same for other Semitic languages. In §3.2.1, I discussed the optional *ʔ*~*ʕ* alternation in Tigre showing *ʕ* as a (glottalised) pharyngeal stop. Since the Ethio-Semitic and Modern South Arabian languages have ejectives, it seems more than likely that Figure 3.21 below is the phonological representation of *ʕ* in these languages. Many Ethiopic languages spirantise stops in certain positions, but spirantised ejectives retain glottalisation, indicating the de-linking of [?] from ROOT, although it remains interpreted in MOD. This spirantisation occurs also with the pharyngeal stop, intervocalically.[109] This representation is:

Figure 3.21 The representation of glottalised pharyngeal stop ʕ



To sum up, then, in this section I have argued that the pharyngeals are indeed primarily pharyngeals, and not 'emphatic' or 'pharyngealised' glottals. I have proposed that the representation of *ħ* is [A.H], and that *ʕ* has varying representations

These representations naturally show lenitory processes as the loss of any of these elements, or the simplification of structure, leading to either approximant *ʕ*, vocalic *a* or glottal stop *ʔ*. As we have seen, these are indeed attested in Arabic, with word-initial *ʕ* preceding *a* in dialects like Damascene being barely perceptible (having effectively merged with the vowel), and word-initial *ʕ* in Iraqi Arabic being

[109] In Amharic, pharyngeals have lenited to plain glottals, which also backs up this representation (i.e. in Amharic, the structure of laryngeal expressions contains neither the RES node nor the MOD node, and [?] or [H] are interpreted in ROOT).

effectively *ʔ*, with only the difference of the following vowel remaining (and word-finally, where there is no following vowel, it is distinctly epiglottal).

In §3.1, I proposed that the reason for pharyngeal *ʕ* not equating with vocalic *a*, although in dialects of Arabic where *ʕ* is an approximant this may be expected, may be due to the phonological representation of *ʕ* and *a* having different structures. That is, the RESONANCE node dominates a FUNDAMENTAL node, which thus differentiates the glides *j* and *w*, which equate with *i* and *u*, and have the same structure.

Finally, I should also note here that since I argue that the differing realisation of *ʕ* is not merely accidental and not entirely phonetic, and that *ʕ* actually has different phonological representations in different languages / dialects, it follows that this must play a part in the overall sound system of a given language variety. That is, this phenomenon is not to be seen in isolation, but correlates with other salient properties of the sound system. Therefore, *ʕ*-variation can be considered one of the dialect classificatory features (part of the set of phonological variables) used in Chapter 5.

Having now seen that 'pharyngeal' equates to the manifestation of consonantal [A], I shall now show how Arabic-style 'backed' emphatics are represented.

3.3 The phonological representation of 'backed' emphatics

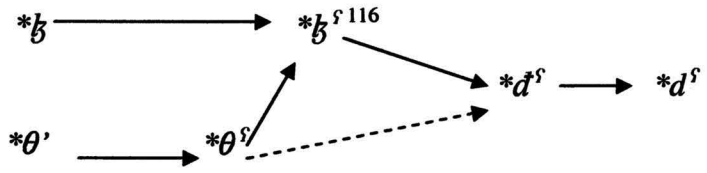
In this section I discuss the phonological representation of the 'backed' emphatics. These are well attested in Arabic, as well as in certain dialects of Neo-Aramaic. I start by discussing the attested emphatic segments (noting the primacy of 'coronal') and recap the phonetic evidence presented in Chapter 2. I then look at the empirical evidence for the involvement of [A] in the emphatic contrast. Finally, I propose phonological representations on a par with those for which I have already argued.

Firstly, in Old Arabic there are widely believed to have been four coronal emphatics: **ṣ *ṭ *ḍ *ḏ́*.[110] While *ṣ* and *ṭ* are retained in all dialects that have emphatics,[111] the reflex of **ḍ* and **ḏ́* is overwhelmingly either (merged) *ḍ* or (merged) *ḏ́* (~ *ẓ*). The exception is that some dialects of Yemen (and perhaps Asir in Saudi Arabia) have an interdental fricative reflex of **ḏ́*, and **ḍ* is generally a backed

[110] The development of these emphatics from common (or Proto-)Semitic is discussed in detail in Chapter 4.
[111] Almost all dialects of Arabic have emphatics. Those that don't are Cypriot, Maltese, Chadian, some Nigerian, Juba and Ki-Nubi (Kaye & Rosenhouse, 1997:275).

lateral.[112] It is commonly assumed that in Classical Arabic these two emphatics were distinct. However, the evidence is that by the time of Classical Arabic,[113] for most dialects there were no distinct segments *ḍ* and *ḍ̠*.[114] The segment transliterated as *ḍ* (ض) corresponds to the reflex of Proto-Semitic **ɮˤ*, and *ḍ̠* (ظ) to **θˤ* (i.e. [θ']).[115] The likelihood is thus that there was a trajectory of development in pre-historic Arabic:

Figure 3.22 The trajectory of Arabic ḍ *and* ð̣



According to this trajectory, in most early (pre-historic) Arabic dialects, **θˤ* (systemically <θ̣>) merged with (pre-existing) **ɮˤ* (although the earlier stage appears to have fossilised in some Arabic). It is conceivable that there may also have been dialects in which both segments merged to **ð̠ˤ*. The emphatic lateral fricative lost its laterality in most dialects, becoming an interdental fricative. Some Arabic dialects have fossilised at this stage of development (al-Wer, 2004:22–3 calls this Type II), while in other dialects a further shift saw the loss of all the interdentals in favour of stops (~ sibilants).

Most dialects of Arabic today, then, have the three emphatics: *ṣ ṭ ḍ ~ ḍ̠*. In addition, many dialects have what seems to be an emphatic *ɾ̣* and, marginally, *l̩*.[117, 118]

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[112] I am grateful to Janet Watson for pointing this out to me.

[113] I use the term here to refer to the form that became standardised through the canonisation of the Qur'an and as evidenced also through the works of the medieval grammarians. However, as will become clear, Classical Arabic is to some extent an idealised form which probably never had an exact historical parallel. In other words, what was assumed to be 'pure' Arabic was based on the writing system and the traditions, which themselves incorporated dialectal variation.

[114] See al-Wer (2004), who discusses this issue in detail. Note, however, that there remain some dialects of Arabic (in the southern Peninsula) in which these segments are distinct (generally, **ḍ* is a backed lateral, while **ḍ̠* is a fricative, usually voiceless), indicating that the earliest Arabic indeed had a distinction between them (Janet Watson, p.c.). Nevertheless, it is doubtful that this distinction remained in the majority of dialects, including the Arabic canonised as 'Classical Arabic'.

[115] The Proto-Semitic system and its development is the subject of Chapter 4.

[116] See Chapter 4 for my argument that this segment was already backed in Proto-Semitic.

[117] Apparently emphatic *ɾ̣* is not uncommon, and there are many examples of minimal pairs in many dialects (see Younes, 1994). However, as a coronal, this is not surprising. Regarding the coronal *l̩*, Ferguson (1956:107) notes that 'The emphatic *l̩* occurs in three kinds of situations...(A) in certain forms of the word for God, (B) in the neighborhood of other emphatic consonants, and (C) in other unpredictable items, sometimes loanwords, sometimes inherited Arabic vocabulary." Ferguson notes the following minimal pairs for 'God'-words: CA *walḷaahu* 'and God' *wallaahu* 'he appointed him'; CA *walḷaahi* 'by God', *wallaahii* 'and the one who amuses'; Syrian Arabic *ʔaḷḷa* 'God', *ʔalla* 'he told her'; most dialects *waḷḷa* 'by God', *walla* 'he appointed'. Note that Ferguson does not show the vowel transcription, but I can confirm that in the words with *l̩* the emphatic variant of the vowel is used, but

The Neo-Aramaic emphatics vary. In some (North East Neo-Aramaic) dialects it is analysed as a purely prosodic feature, whereas the Jewish North-East Neo-Aramaic of Arbil has segmental emphatics *ṭ ṣ ḍ ẓ*.[119] In Modern Chaldean (Christian East Neo-Aramaic) the emphatics are *ṭ ḷ č̣ ǰ̣ ṣ ẓ ṛ*,[120] and the Western Neo-Aramaic of Maᶜlūla has *ṭ ḳ ḏ̣ ṣ ẓ*.[121] The phonetic characteristics are similar to those discussed for Arabic (see Chapter 2 and below), with the exception of some dialects which retain glottalisation, as discussed.

The Arabic emphatics, as noted in Chapter 2, are known to have a number of articulatory targets, which may vary somewhat inter-dialectally. However, we could generally summarise that the particularly resonant quality of emphatics is achieved through increasing the volume of the oral cavity. This oral-cavity increase is generally achieved through (secondary) pharyngeal constriction,[122] which may be enhanced by jaw-lowering and lip protrusion. Acoustically, emphatics are characterised by significantly lowered F_1 and slightly raised F_2 transitions, exactly the pattern of the [A] element. However, there are dialects (e.g. Iraqi and Yemeni) in which emphatics are known to interact with labials, and in which the 'emphatic' quality appears to relate primarily to F_2-lowering, which is characteristic of both the [A] and the [U] elements. This is discussed further in Chapters 5 and 6 in relation to these dialects.

It should be noted that part of the problem in the analysis of Arabic emphatics is the (traditional) implication that 'emphatic' has the same systemic role across the dialects. My hypothesis is that 'emphatic' clearly does not have the same role across the dialects of Arabic (any more than it has the same role across the various Semitic languages). Therefore, any analysis of emphatics has to be able to take this on board since emphatics are a product of a sound system and must therefore be looked at

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not in the words with 'plain' *l*. Additionally, we see: Iraqi Arabic *xalḷi* 'my vinegar', *xalli* 'leave, let' and *xaaḷi* 'my uncle', *xaali* 'empty, deserted' (Ferguson's transcriptions). Again, as a coronal, this is not surprising, although I suggest that its status as a 'primary' emphatic is marginal possibly because *ḍ* in Classical Arabic is considered to have been some kind of lateral articulation, thus CA **ḍ/ḷ* → modern *ḍ* (in some dialects merged with *ẓ*). For these Iraqi alternations it appears that historically, uvular *x* has spread [A] into *l*, but note the morphemic boundaries, a point discussed in Chapters 5–6.

[118] In addition to the so-called 'primary' (i.e. lexical) emphatics, other segments are said to become emphatic in certain contexts, most commonly *ṇ ḅ f̣ ẉ ḷ ṛ ḳ*. However, I refute the assumption that labials or velars become 'emphatic' in parallel with coronals. See Chapters 5 and 6 for discussion.

[119] Khan (1999).

[120] Krotkoff (1982) in his description of the dialect of Aradhin near Amadia (north-west Iraq), which concurs with the account of Modern Mandaic given by Malone (1978), although Sara (1974) in his description of the Modern Chaldean of Mangesh (northern Iraq) gives *ḷ ṛ ṭ ḍ ṣ*.

[121] Jastrow (1997).

[122] As discussed in Chapter 2, different researchers have given different articulatory terms for this (e.g. 'velarisation', 'pharyngealisation', 'uvularisation'). I argued that such terms are misleading.

within a context. This is the objective of Chapters 5–6, where I look at the behaviour of Arabic emphatics in different dialects in the context of the overall sound system.

With this in mind, it should be reiterated here that 'emphatic' in earlier Semitic was a laryngeal contrast, and thus a property of the obstruent system. It is notable that the so-called 'primary' emphatics of Arabic, the coronals *ṣ ṭ ḍ ~ ḏ́*, are indeed obstruents, while the emphatics that are marginally 'primary' (i.e. those about which there has been some dispute, but which most researchers would now agree are often 'primary' emphatics in the *Neuarabische Sprachen*) are the sonorants *ḷ* and *ṛ*. This is evidence of the changing function (and 'meaning') of 'emphatic' within the sound system. If 'emphatic' is no longer a voicing contrast, then it no longer needs to be a characteristic only of obstruents. In this way, we can trace the historic change of the role of emphatics in the sound system of Arabic whereby sonorants also develop a lexical emphatic / non-emphatic contrast. In this section, I therefore focus on the representation of the coronal emphatics (the uvular is discussed in §3.4, following).

3.3.1 Phonological evidence of 'emphatic' [A]

Variation in pronominal suffixes shows the presence of [A] in emphatics. For instance, in the Shiᶜi Bahrain dialect of Farīq al-Maxāriqa, the 3PS masculine suffix *-i* is normally realised as [ə], but after emphatics as [a].[123] Also, in (general) Shiᶜi Bahrain Arabic and the Omani dialect of al-Ristāq the 3PS feminine suffix *-he* is realised as [ha] after emphatic consonants.[124]

In Rural Palestinian Arabic the feminine suffix (normally *-i*) is realised as [a] after pharyngeals, but after emphatics as [ɑ]:[125]

(12)	[baṭṭɑ]	'a duck'
	[furṣɑ]	'a chance'
	[buuẓɑ]	'ice cream'

[123] Prochazka (1981:43); Farīq al-Maxāriqa is a quarter in Manama. This dialect of Shiᶜi Bahrain differs from the Samāhij and Dirāz (Shiᶜi Bahrain) dialects in this respect, since in the latter this suffix is realised as -[u] after emphatics (this labialisation is discussed further in Chapter 6). Note that Holes (1983) further divides Shiᶜi Bahrain into village and town dialects (the latter pertaining to Manama) – this distinction is clear in the variant realisations of the 3PS masculine pronominal, where the -[a] realisation characterises the Shiᶜi Bahrain town dialect (of Manama) and the -[u] realisation characterises the Shiᶜi Bahrain village dialect(s).
[124] Prochazka (1981:43).
[125] Herzallah (1990:59).

In the dialect of Levantine Arabic spoken in Damascus, the feminine suffix is normally [e],[126] but after emphatics it is realised as [ɐ]:[127]

(13) a. *madrase* 'school'
kbīre 'big (fem)'
šərke 'society'
b. *ʔəṣṣa* 'story'
xayyāṭa 'seamstress'
ʕarīḍa 'wide (fem)'

In *gilit* Iraqi, long *ē* (which arises from **ay* or is found in loans) is palatalised, but not after emphatics, uvulars or pharyngeals.[128] Thus:

(14)	a.	**zayn*	*zēn*	[ziɛn] ~ [zʲɛn]	'good'
		**ħusayn*	*ħsēn*	[ħsiɛn] ~ [ħsʲɛn]	'Hussain'
		**dayn*	*dēn*	[diɛn] ~ [dʲɛn]	'debt'
		**bayt*	*bēt*	[biɛt] ~ [bʲɛt]	'house'
		**bayḍ*	*bēḍ̌*	[biɛð̌] ~ [bʲɛð̌][129]	'eggs'
		**iθnayn*	*θnēn*	[θniɛn] ~ [θnʲɛn]	'two'
	b.	**xayr*	*xēr*	[xɛ:r]	'good'
		**ṣayf*	*ṣēf*	[ṣɛ:f]	'summer'
		**ɣayr*	*ɣēr*	[ɣɛ:r]	'other (than)'
		**qaħħayt*	*gaħħēt*	[gaħħɛ:t]	'I coughed'

The last set of data here is from Mardin Arabic.[130] The data show instances of (long) *ē* (< *ī*) and *ō* (< *ū*) next to emphatics:

(15) a. *yṣēṛ* 'he becomes'
yṭēṛ 'he flies'

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[126] In Chapter 5, I argue that this is phonological *i*.
[127] More strictly speaking, after gutturals it is [a] and after emphatics [ɑ]. Data from Cowell (1964), his transcription retained.
[128] Blanc (1964:34) states that it is typical not just of Muslim Baghdadi, but also Jewish and Christian (the latter two are *qəltu* dialects). He notes it as 'a composite sound with [i]-like on-glide that gives the effect now of a rising diphthong [ⁱɛ], now of a falling diphthong [iᵉ]'. Ingham (1982:79–80) gives this feature as one of the isoglosses distinguishing the North East Arabian dialect group into Arabian and Mesopotamian (with [ɪə]~[ɪɛ] characteristic of Mesopotamia and [ɛ:] or [ei] defining the Arabian type).
[129] The palatalisation here indicates that the initial *b* is not emphatic. This is discussed in Chapter 6.
[130] This is a *qəltu* Mesopotamian dialect spoken in the Turkish city of Mardin. Data from Grigore (2007:77). These vowels are lowered not just by emphatics, but also by *q ɣ x ħ ʕ*.

	yḍēʕ	'he gets lost'
	ṣēγa	'form; manner'
b.	*ṭyōṛ*	'bird'
	ṣaṇṇōṛ	'cat'
	maqṭōʕ	'cut (m.s.)'
	ballōṭ	'chestnut'

Grigore (2007:77) also notes that 'Dans tous les cas signalés ci-dessus, les voyelles /ē/ et /ō/ sont seulement des allophones des voyelles /ī/ et /ū/ avec lesquelles elles alternent, parfois librement: *yṣēṛ–yṣīṛ*; *yṛōħ–yṛūħ*.'

The emphatics in Arabic thus clearly show evidence of the presence of [A].[131]

3.3.2 The role of [A] in the representation of 'backed' emphatics

In Chapter 2 I showed that emphatics are characterised by transitions with raised F_1 and lowered F_2. If the emphatics had an [U] element, one would expect to see not only a significantly lowered F_2 transition, but also no F_1 raising. That is, where the profile of cardinal vowel [ɑ] is raised F_1 and lowered F_2 (i.e. merging of the two formants in the low–mid zone of frequency), the profile of cardinal vowel [u] is low F_1 and low F_2 (i.e. approximation of the two formants in the lowest frequency zone). Where the coronals may generally be said to show a slightly raised F_1 (due to the raising of the tongue tip), comparisons of samples such as *darb* vs *ḍarb* (for Muslim Baghdadi, for example) clearly show not just lowered F_2, but also noticeably slightly raised F_1 in *ḍarb*, which can only be due to the timbre of emphatic *ḍ*.

Secondly, it is striking that in all the data given for various dialects arguing for 'secondary' emphatics such as *ḅ ṛ ṃ ḷ* (where they do not occur in the environment of 'primary' emphatics), these consonants always (and only) occur next to (back) *a* or *ā*. Examples are *ḅāḅa* (< *bābā*) 'Daddy', *ṛās* 'head', *ṃayy* 'water' (< OA *mā'*), *aḷḷah* 'God' (< OA *allāh*). Such examples of 'marginal' emphatics never occur next to *u ū*.

[131] There is evidence of labialisation (i.e. the triggering of [U]) with emphatics in some dialects. This is discussed further in Chapters 5 and 6, since it does not affect the representations that I give here. That is, the [U]-triggering effect occurs to varying degrees in different dialects, and is somewhat dependent on the vowel system (specifically the status of *i* and *u*). Thus, where a high vowel is 'specified', it is realised as *i* [I] in non-emphatic (or non-guttural) environments and *u* [U] with emphatics. This keeps the high vowels distinct from the low vowel and serves to demarcate 'front' from 'back' environments.

Additionally, even for dialects that have some sort of labialisation (such as MB, as will be seen presently), while the *ā* in examples like *ḅāḅa* is clearly low and back, it is not rounded, which would be expected if the emphatic property were *u*-quality.[132]

'Backed' (coronal) emphatics are therefore characterised by the presence of the element [A]. However, they are primarily coronals, and pattern with coronals in such processes as definite-article assimilation (where pharyngeals and uvulars don't participate), meaning that [A] is present as a secondary characteristic (contributing secondary resonance quality), and is not head of the phonological expression.

I now move on to the representations that I propose for the coronal obstruents of Arabic, although this is a little premature because the evidence of vowel backing / fronting that I present in Chapter 6 leads me to conclude that coronals in such languages (with a salient 'front'–'back' contrast) are characterised by the presence of [I]. The representations below have thus not yet been fully evidenced, so I ask the reader to bear with them until we reach Chapter 6.

I assume headedness, shown by underlining the head, as follows. Harris (1994:126) says: 'As a head [an element]...is free to assert the full elemental pattern it displays in isolation', i.e. headedness corresponds to saliency. Therefore, I assume that palatals are [I]-headed, while labials are [U]-headed (I argued above that pharyngeals are [A]-headed).[133] I shall take the stance that (denti-alveolar) coronals are manner-headed (e.g. a coronal stop is headed by [ʔ]), with interdentals being distinguished by headlessness. This also means that [I] in coronals is a secondary characteristic (as opposed to the palatals).[134] By analogy with the coronals, I assume also that the velars (and thus the uvulars) are manner-headed.

One further point needs reiterating. I argued earlier that on the basis of laryngeal contrasts (and the systemic role of emphatics), Arabic dialects can be roughly classified as 'conservative' and 'innovative'. In the trajectory of development of the obstruent system, voiceless emphatics merge with the voiceless non-emphatics

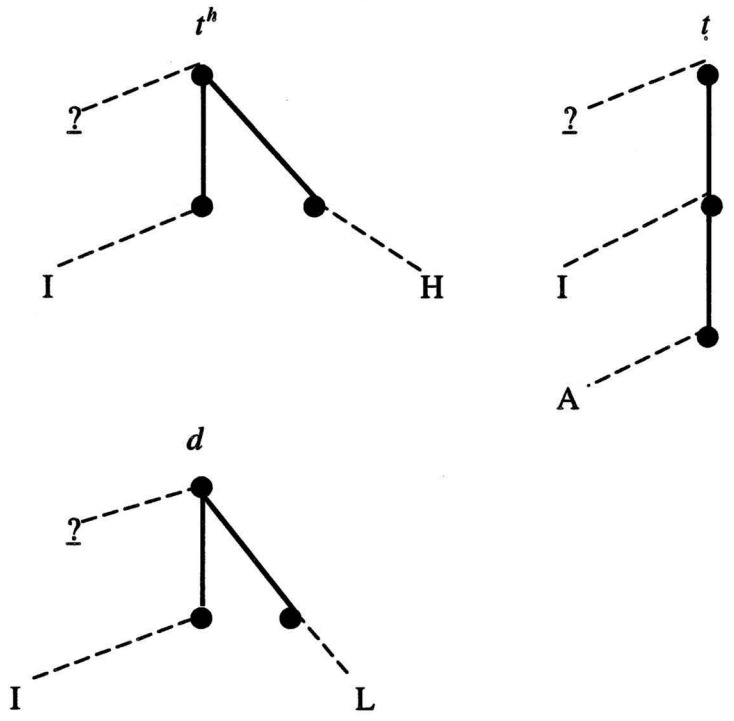
[132] This was made very clear to me on one occasion in hearing some Iraqi friends (MB) joking around, where one affected a fake Persian accent by rounding his *ā* vowels, which were produced as [ɒ:], e.g. [jɒ: bɒ:bɒ] for *yā bāba* 'oh Daddy'. This was instantly recognised by the others as mimicking a 'Persian accent', and contrasts with the ('back') unrounded emphatic *a* – *ā* produced in MB.

[133] Generally, the schemes of representations attributed to Jonathan Kaye also assume headedness of the resonance element in these obstruent classes.

[134] This means that *s š θ*, which would otherwise have an identical representation, are differentiated by headedness (*s* = [I.H], *š* = [I.H], *θ* = [I.H]).

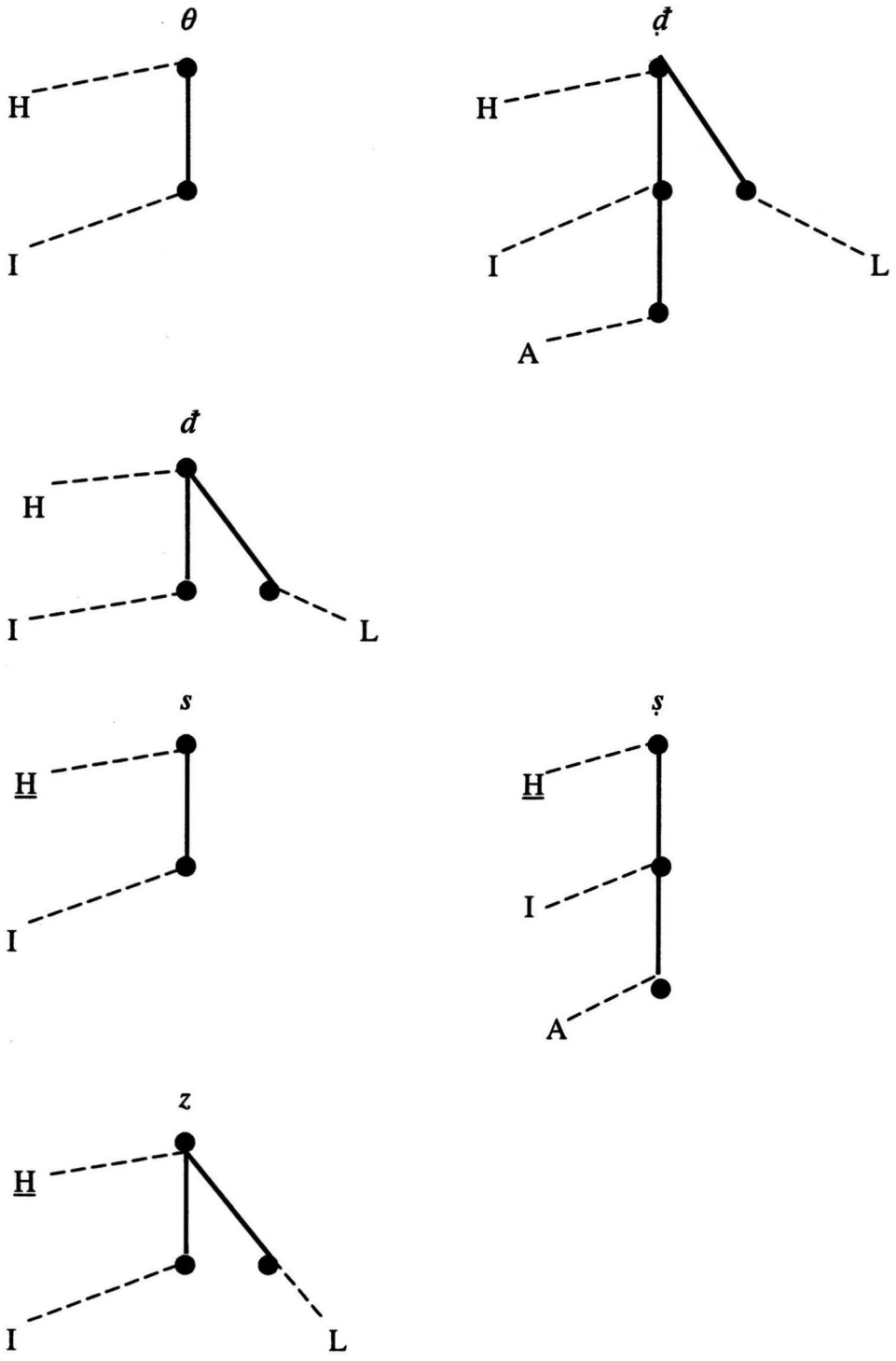
in terms of laryngeal contrast. This is what is seen in urban dialects such as Cairene (in which obstruents are either voiced – with [L] – or 'plain' voiceless), and the difference then is in the presence or lack of [A]. Such dialects are, in terms of 'emphatic', more innovative. In the Arabic dialects with a three-way laryngeal contrast, the voiceless emphatic stops are not true counterparts of the voiceless non-emphatics in that the emphatic / non-emphatic contrast is not minimal. Here, voiceless emphatics have [A] and no laryngeal element and voiced emphatics have [A] and [L]. These dialect types are, in terms of the role of emphatics, the more conservative type. The coronal stops of conservative-type dialects thus have the representations:

Figure 3.23 The representation of coronal stops in 'conservative' Arabic dialects



In most of the conservative-type dialects, the voiced coronal emphatics are realised as (merged) *ḍ̄*, an interdental fricative. The fricative series is thus:

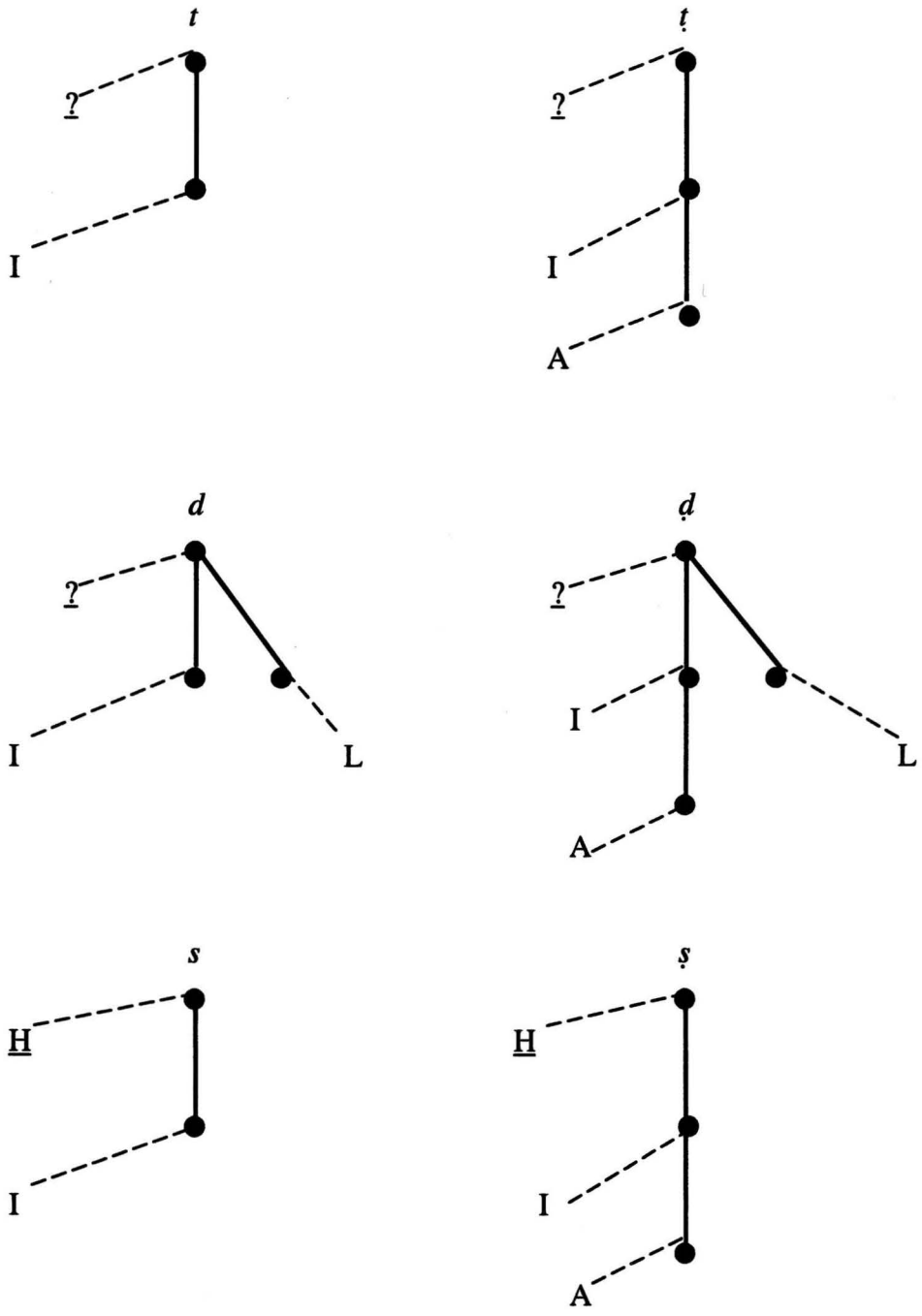
Figure 3.24 The representation of coronal fricatives in 'conservative' dialects[135]

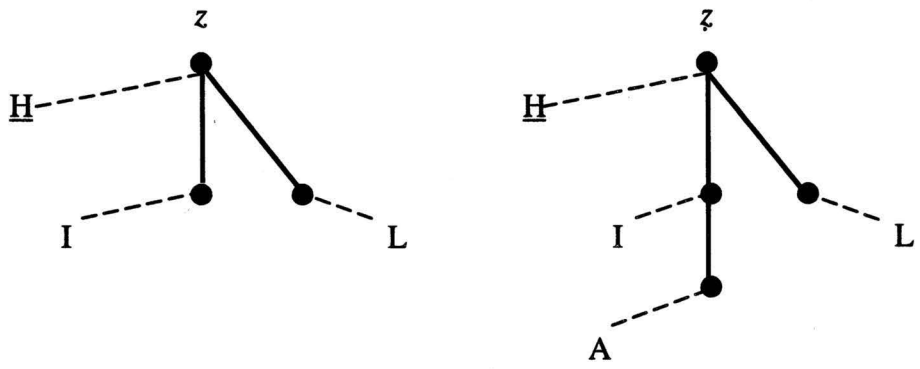


[135] Watson (2002:40), in a feature-geometric framework, has a tertiary [dorsal] feature for the interdentals (it is a secondary feature of palatoalveolars). She notes (fn.14) that a similar view, but in an element/particle-based approach, is per Broadbent (1999), who has interdentals with dependent [I] (palatoalveolars have [I] with equal status to the coronal element, which in her framework is [A]).

Finally, in the innovative-type dialects, where the interdentals are likely to have merged with the stops, and where the voicing series is generally two-way (with the voiceless series being unspecified), the representations are:

Figure 3.25 The representation of coronal obstruents in 'innovative' dialects





I do not discuss the liquids in this chapter, as they are potentially more complicated, and because they are not part of the 'emphatic' system of Semitic generally, but interact with emphatics only in languages like Arabic which have 'backed' emphatics. The representation of liquids is discussed in Chapter 6. I therefore move now to uvulars.

3.4 The phonological representation of uvulars

In this section I discuss the issue of uvulars within Semitic, since the uvular stop *q* (in Semitic languages which have it) behaves systemically as <k̲>.[136] I then recap the phonetic evidence presented in Chapter 2. In §3.4.1 I provide empirical evidence for the presence of [A] in uvulars, and in §3.4.2 I look at phonological representation.

Since Arabic has received the most attention in the literature, I shall start here by discussing the uvulars in Arabic. In addition to the velar *k*, Old Arabic is said to have had the dorsals *q*, *γ* and *x*. The first is a voiceless uvular stop and the other two voiced and voiceless dorsal fricatives, respectively. All three of these segments were classified by the medieval grammarian Sībawayh as *mustaᶜliya* ('elevated'),[137] along with the four emphatics *ṣ ṭ ḍ ḏ̣* (the latter being additionally *muṭbaq*). This indicates that in medieval Arabic the dorsal fricatives were considered phonetically and phonologically to be uvular.[138]

[136] The relevance of this is discussed further in Chapter 4.
[137] See al-Nassir (1993:51). He notes further that Ibn Jinnī (d.1002CE) also classifies these same as *mustaᶜliya*, which he opposes to *munxafiḍa* ([lit. 'lowered'] associated with the vowel *i*).
[138] I should reiterate at this point that *q* was also classified by Sībawayh as *majhūr* (along with *ṭ* and the voiced consonants). I have argued that this equates to 'without aspiration' rather than 'voiced', and that *q* was phonologically 'plain' voiceless (although it may intervocalically pick up ambient voicing at the phonetic level).

In Arabic dialects today, uvular *q* has various reflexes.[139] There are dialects in which it is indeed realised as *q*. In many dialects (generally Bedouin / Bedouin-origin) it is realised as voiced *g*, which although phonetically velar behaves often as a uvular / emphatic (in *gilit* Iraqi, for instance, as discussed in Chapters 5–6). Moreover, in some of these dialects the *g* reflex may front (generally in palatal environments) to *ǰ* (e.g. south *gilit* Iraqi and areas of the Arabian Peninsula) or to *dz* (mostly areas of the Arabian Peninsula). There are additionally a few dialects that have a *č* reflex (some rural Palestinian).[140] In many urban dialects the reflex of *q* is *ʔ*, as in the city dialects of the Levant and Lower Egypt. Between this, there are (generally rural Levantine) dialects in which the reflex is velar *k* (reflecting the loss of its emphatic quality). Lastly, Khuzistani Arabic (south-west Iran) has *γ* (historical *q* having merged in this dialect with etymological *γ*).[141] Rarely, a further variant is glottalised (i.e. ejective), as in the Zabīd dialect of North Yemen, which has *k'*.[142] There are also some additional sporadic variants, e.g. *x* (some Iraqi lexemes) and *ħ* (Jugari Arabic of Uzbekistan).[143]

There is known to be at least some degree of correlation between reflexes of uvular *q* and reflexes of velar *k*. Historically, the eastern dialects can be roughly divided on this basis into 'urban', 'rural' (*fallāḥī*), and three types of Bedouin / nomadic (or 'Bedouin-origin') dialects. Generally, the following can be seen:[144]

(16)			
	Bedouin 1	*q* → *g*	*k* → *č* (palatal context)
	Bedouin 2	*q* → *g* (→ *ǰ* palatal context)	*k* → *č* (palatal context)
	Bedouin 3	*q* → *g* (→ *dz* palatal context)	*k* → *ts* (palatal context)
	Rural	*q* → *k*	*k* → *č*
	Urban	*q* → *ʔ*	*k* = *k*

[139] For a good overview of the reflexes of *q* and their distribution, see Kaye & Rosenhouse (1997:270–3 & Table 14.2), Behnstedt & Woidich (2005:ch's 6–7, maps 12–14,16), Taine-Cheikh (1998) and Bahloul (2007). See also Blanc (1969).

[140] Bahloul (2007). To my knowledge, this has not been reported elsewhere in the literature, but I have been told by Syrians that this is an occasional reflex in parts of the (rural) north of (what was) Palestine, and villages in the Golan Heights (although I did not hear this reflex from speakers from the major city of the Golan, Quneitra). It seems that this pertains to a small number of *fallāḥī* (mostly) Palestinian dialects. Bahloul (2007:258) says that the *č* reflex of **q* is found 'in some villages south of the West Bank...[and] within the rural (Fallāhīn) communities [of Palestine]'. This point would benefit from fieldwork in the area.

[141] See Ingham (1974) for discussion of this.

[142] As detailed in Prochazka (1987:58–9). This dialect also has *t'* < **ṭ*. I am grateful to Janet Watson for bringing this to my attention.

[143] Kaye & Rosenhouse (1997:271).

[144] This summary adapted from Holes (2004:74); see also Holes (1991).

Other Semitic languages with uvulars include the following varieties of Neo-Aramaic: Jewish North-East Neo-Aramaic, Assyrian (Nestorian Iraqi koine) and Eastern Neo-Aramaic of Ṭuroyo (most of which have in addition to the stop *q* two uvular fricatives).

Modern Hebrew (generally, Israeli) tends mostly to realise the equivalent of *q* (e.g. the pronunciation of the letter 'qof' or 'qop' ק) as velar *k*. However, in Oriental Hebrew (AKA Mizrahi), ק is realised either as [g] or [q] (the former apparently common in the speech of Yemeni Hebrew, and the latter in the speech of Iraqi and other Oriental Jews).[145] In Israeli Hebrew, the dorsal continuants are velar (the voiced one being actually a rhotic, and the cognate of Semitic *γ* being the velar stop *g*).

The South Semitic languages, although they often have pharyngeals, generally do not have uvulars. However, in these languages the emphatics are glottalic rather than 'backed', so that the velar ejective *k'* (which has the systemic value <ḳ>) is generally the South Semitic equivalence of the uvular *q* of most Central Semitic languages. Generally, the transliteration 'q' is used in comparative Semitics for the velar ejective (equating to the systemic value <ḳ>).

Having said this, the ejective *k'* of Tigrinya is noticeably backed in realisation, and actually sounds rather uvular (i.e. [q']). When spirantised post-vocalically, it still sounds uvular (i.e. [χ']).[146]

The case of the Semitic dorsal fricatives is thus an interesting one. That is, if the uvular stop *q* is systemically <ḳ>, being an emphatic and thus uvular in languages with 'backed' emphatics, then why do the dorsal fricatives *γ* and *x* behave very often as uvulars rather than velars? Sībawayh, for instance, classified medieval Arabic *γ* and *x* along with *q* and the ('backed') emphatics. In Arabic dialects of today, the vowel *a* following these dorsals does not undergo raising to *e* / *æ* as it does following

[145] See Laufer & Baer (1988) on Israeli Hebrew, Zuckermann (2005) on the sound system of Israeli Hebrew as essentially like that of Yiddish, thus European not Semitic. It is said that the Yemenite Jews have preserved the 'original' Hebrew pronunciation. However, it is unclear to what extent the pronunciation of Oriental Hebrew actually reflects the sound system of the dominant superstratum language (i.e. most often either a dialect of Arabic or Neo-Aramaic). Thus, e.g. the voiced reflex *g* of Yemeni Hebrew may actually reflect those dialects of Yemeni Arabic which have *g* as a reflex of OA **q*. Soundfiles of apparently Yemeni Hebrew (although I suspect enunciated by a speaker of Ashkenazi Israeli Hebrew) are available online at: http://sagavyah.tripod.com.ALEFBET.html.

[146] See Figure 3.3, above.

velars and coronals. Moreover, in dialects such as Iraqi *gilit*, *γ* actively participates in emphatic domains.[147]

In a nutshell, we can say that the dorsal continuants are sometimes velar and sometimes uvular. Some Arabic dialects have velar continuants in non-emphatic domains and uvular continuants in emphatic domains (at least phonologically). Outside this, where the dorsal continuants behave as uvulars (rather than velars), I suggest that they underwent the same process of 'backing' as did the emphatics, and contributed towards the increasingly salient 'guttural' nature of these languages. The change is therefore *evolutive*,[148] but to be seen in the context of the overall sound system, and thus not arbitrary or spontaneous.

As discussed in Chapter 2, uvulars are produced with dorso-pharyngeal constriction, and the locus of constriction is much higher than that of (true) pharyngeals, but further back than that of velars. The voiceless continuant *x* is often produced with a constriction further forward than that of *γ* and *q*, and in some dialects it is more likely to be treated as velar than the other uvulars (e.g. in some dialects *a* is less backed / lowered after *x* than after *γ* or *q*). Acoustically, uvulars are characterised by significantly lowered F_2 transitions, although there is no consenses over the status of F_1 transitions.[149] This, then, indicates the presence of [A], but not as strongly as in pharyngeals.

3.4.1 Phonological evidence of 'uvular' [A]

Evidence of uvulars containing the element [A] may be seen in countless data. In §3.2.1, I noted some data from al-Ristāq Omani Arabic where the epenthetic vowel in imperfect verb paradigms is [i], except after pharyngeals and uvulars, when it is [a]. As further examples, we find the following. In Najdi Arabic, the dorsal continuants *γ* and *x*[150] condition the short vowel *a* in positions where otherwise *i* or *u* are found:[151]

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[147] This is shown in Chapter 6.
[148] As distinct from *adaptive*, in the sense of Cadora (1992:1), quoting Anderson (1972:12).
[149] As noted in §3.2, El-Haleese (1985) concludes that F_1 is significantly higher in pharyngeals than in uvulars. Some researchers, however, do report raised F_1 in uvulars (see Chapter 2).
[150] This is true of the whole class of gutturals, also as in many other dialects. Therefore, this applies not just to the dorsal continuants, but also to the pharyngeals and *h*.
[151] Ingham (1994:18–19).

(17) a. *nišad* 'he asked'

kitab 'he wrote'

gumaz 'he jumped'

b. *ħalaf* 'he swore (an oath)'

xalaṭ 'he mixed'

ɣamaz 'he winked'

[A] is also spread from uvulars in the following context in the Sunni Bahrain dialect of Arabic, where the Shi^{c}i Bahrain forms show a lexically empty nucleus:[152]

(18)

Shi^{c}i	Sunni	
yixṭub	*yxaṭib*	'he betrothes'
muɣrub	*mɣarb*	'evening'
yiʕruf	*yʕarf*	'he knows'
gaħma	*għama*	'shift of pearl-divers'

Looking at other languages which seem to use uvulars systemically in the same way as, e.g., Arabic is potentially very revealing.[153] It has been noted in many languages that uvulars pattern phonologically with pharyngeals. For example, in Interior Salish languages[154] vowel-lowering is caused by the uvulars and pharyngeals *q*, *q*^{w}, *q'*, *q'*^{w}, *χ*, *χ*^{w}, *ʕ*, *ʕ*^{w}, *ʕ'*, *ʕ'*^{w}. Additionally, in (the Athabaskan language) Chilcotin, uvulars pattern with 'backed' coronals:[155] Chilcotin has two sets of coronal sibilants: plain and 'backed', and two sets of dorsals, which correspond with Arabic velars and uvulars. 'Backing' spreads to vowels, so that the 'backed' (uvular) dorsals have a lowering effect (seen acoustically in lowered F_2) on adjacent vowels ('backed' coronals have a lowering effect on all vowels in the word).[156]

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[152] Holes (1983:19). The process seen in the Sunni dialect is known as the *gaháwa* (or in this case *gháwa*) syndrome.

[153] I do not say *all* uvulars, because they may behave differently in other languages. For instance, as noted, in NE Caucasian (Daghestanian, at least), the uvulars seem to behave as primary pharyngeals. Nevertheless, this itself indicates that the uvulars and the pharyngeals share a phonological characteristic. This is, of course, the element [A]. The reason I don't look at Caucasian here is that the pharyngeals pattern either as 'pharyngealised laryngeals' or they pattern with the palatals (and are thus in my view palato-pharyngeals). They thus have a different role in the sound system.

[154] See Elorrieta (1991), Rose (1996). In particular, for comparative analyses of Arabic and Interior Salish, see Bessell (1992) and Shahin (2002).

[155] Goad (1991), Rose (1996).

[156] Goad (1991).

We also find evidence in (the Indo-Iranian language) Kurmanji Kurdish of the composition of uvular *q*. Firstly, a process of 'pharyngeal dissimilation' in Kurmanji,[157] whereby only one uvular / pharyngeal / emphatic may occur in a word, reveals the composition of *q* when the emphatic property is removed: *k*. This is seen, for example, in the Kurmanji realisation of the (Iraqi) Arabic loanword *ṭabaqa*, which becomes Kurmanji *ṭæbæk* ('level, floor'). Similarly, in a process of either 'hypercorrection' or reinterpretation in the context of low vowels, we see the reverse in the loanword *zakaat*, which in Kurmanji is realised as *ɪsqat* ('almsgiving').[158]

The issue of reinterpretation in the presence of a following low or back vowel[159] has a bearing on the present discussion. Kahn (1976b:43) observes that the emphatics, pharyngeals and the uvular *q* almost always occur with a following low vowel [æ, ɑ, o] (or occasionally word-finally). In other words, the segment under discussion here, *q*, co-occurs with vowels containing the element [A].

3.4.2 The role of [A] in the representation of uvulars

§3.4.1 showed that the Arabic uvulars are 'backed' counterparts to the velars[160] and show evidence of having the element [A] in their representation. Moreover, it has also been shown that the uvular stop *q* is generally unaspirated in the dialects of Arabic that retain a three-way voicing contrast (i.e. 'conservative' in terms of emphatics). However, in the dialects of Arabic in which the aspiration distinction has neutralised, the uvular stop is slightly aspirated like the voiceless velar *k* (these dialects I've termed 'innovative' in terms of emphatics).

Nevertheless, it is also clear that the uvulars are not primary pharyngeals. Therefore, the phonological representation is equivalent to that of the (coronal) emphatics, which are characterised by the secondary presence of [A].[161] I noted earlier

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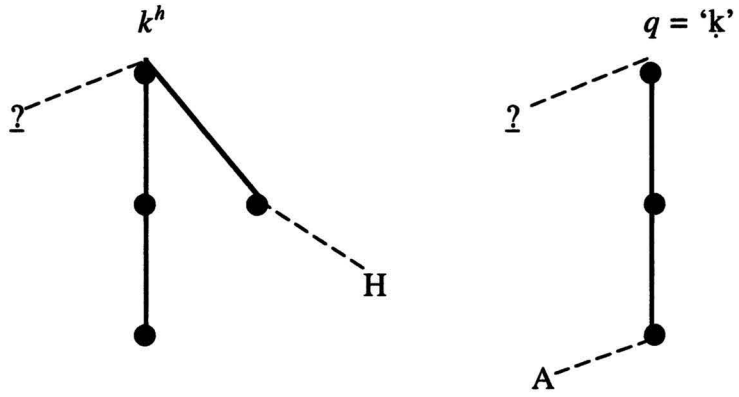
[157] See Kahn (1976a, b). For a more recent (comparative) analysis of her data, see Hoberman (1989).
[158] Kahn (1976b) discusses the issues of reinterpretation and what she terms 'hypercorrection' in Arabic loans in detail.
[159] Kahn (1976b:89).
[160] The evidence of Semitic triads, where *q* is sytemically <ḳ>, as well as evidence to be seen in Chapter 5 of the behaviour of *q* with emphatics patterning not strictly with *ħ* and *ʕ*, goes against the hypothesis of Scheer (2003), which argues for *q* as the stop counterpart to *ʕ* and *ħ*. As noted, I argue that uvulars in NE Caucasian are generally 'true' pharyngeals (phonlogically), but Semitic uvulars are 'backed' velars.
[161] In Chapter 6, I argue that uvular *q* is not the same as ('backed') dorsal *k* that is found in some dialects of Arabic. This latter is 'velarised', which is distinct from 'pharyngealised' or 'uvularised' by the presence of secondary [U].

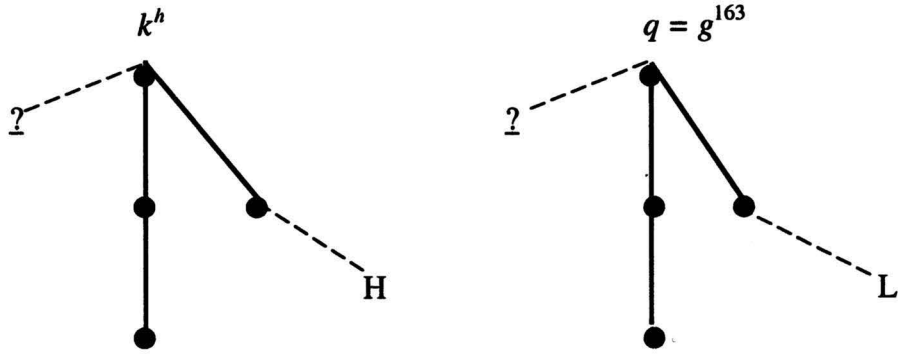
that velars have no resonance characteristic of their own,[162] so that the representation terminates in a bare FUNDAMENTAL node, whereas the uvulars have an [A] element but are distinct from the coronal emphatics which have an [I] element linked to RES (see Chapter 6). As noted, I assume that velars are manner-headed, analogously with coronals. I do not reiterate here the representation of velar ejectives.

Figure 3.26 The representation of Arabic dorsals

(i) Dorsal stops in conservative-type dialects with q

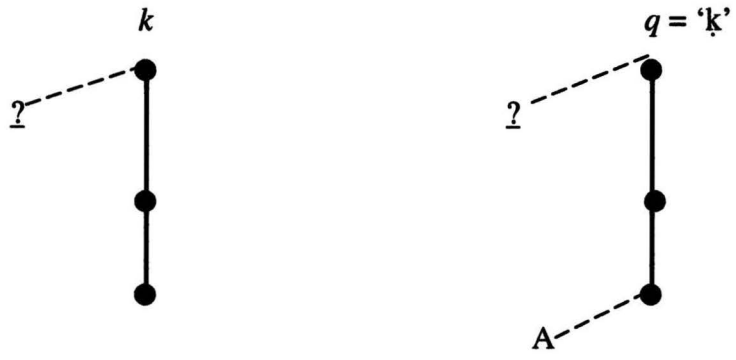


(ii) Dorsal stops in conservative-type dialects with g

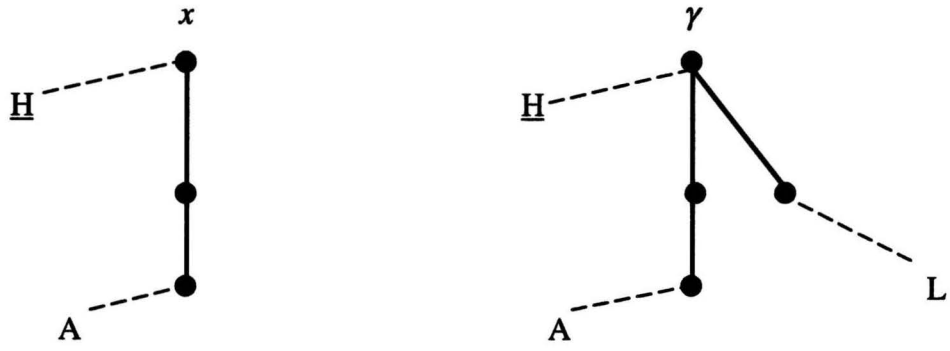


[162] Although see Chapter 6 for some modification of this for Arabic.
[163] Although see the discussion in Chapter 6.

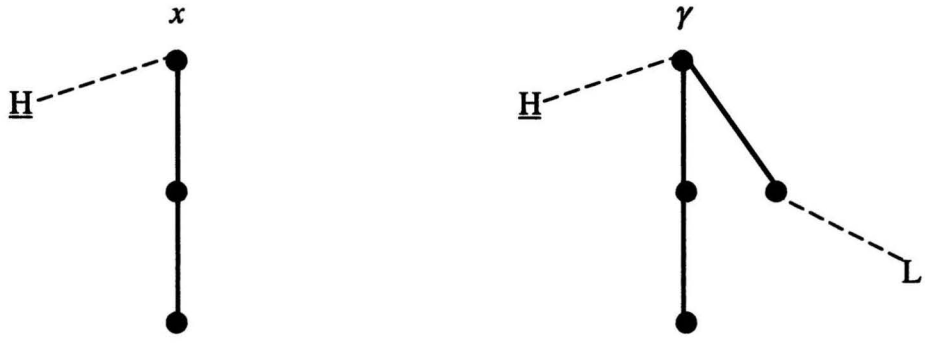
(iii) Dorsal stops in innovative-type dialects with q



(iv) Dorsal continuants behaving as uvulars



(v) Dorsal continuants behaving as velars



At the beginning of §3.4 I noted more variants of the uvulars than shown in Figure 3.26 above. Firstly, in the Arabic dialects of the major cities of the Levant and Lower Egypt, the reflex of the voiceless uvular stop is *ʔ*. Clearly, this is a case of lenition, where not only has the element [A] de-linked, but the (bare) resonance part of the structure deleted, so that the 'core' of the expression realised as *ʔ* (<*q*) thus contains only a ROOT node. However, *ʔ* (<*q*) is less likely to completely lenite to a glide, unlike etymological *ʔ*, which normally does so intervocalically. Therefore, it

may be that *ʔ* (<*q*) is actually distinct from etymological *ʔ*, with its representation keeping a bare RES node (and the *ʔ* – *k* difference being thus one of headedness).

Secondly, I noted that some dialects of Arabic have *ǰ* (< *g*) in palatal contexts. Clearly, here a following vowel containing the element [I] spreads into the empty RES node of *g* (see Figure 3.26(ii), above).

3.5 Conclusion

In this chapter, firstly, I showed the involvement of the element [?] in glottalic segments, providing evidence that it is phonologically contrastive. I then discussed the role of [?] in segmental expressions, showing that it has both a 'manner' and a 'laryngeal' function, in parallel with [L] and [H]. In discussing the possible representations of ejectives it became clear that representations as standardly assumed in what I termed 'linear structure' cannot handle glottalic contrasts. I then proposed structural (or contour) representations consisting of a 'core' (comprising a ROOT node and the resonance nodes RESONANCE and FUNDAMENTAL), and optionally of an 'offshoot' MODIFIER node, inspired by the model of Nasukawa & Backley (2005).

In the subsequent sections, I discussed the phonological representation of pharyngeals, 'backed' emphatics and uvulars, showing how these are characterised by the element [A]. I also showed how the simplified obstruent system of 'innovative'-type Arabic dialects is phonologically represented.

The status of 'emphatic' in Semitic is therefore not entirely straightforward. However, it appears that the common link between all types of 'emphatic' is in laryngeal contrasts, although this has diverged (and is diverging) across Semitic so that 'emphatic' has come to be part of a more general 'front'–'back' contrast (as will be shown in Chapter 6).

I noted previously that emphatics are typologically less common than ejectives. From the findings of this chapter, it seems clear that this hinges on the function of glottalisation as a primary laryngeal contrast, whereas Arabic-style emphatics, although (historically) inherently encoding the laryngeal contrast, are more marked due to the additional secondary function of the [A] element, and the consequently more complex representations.

Chapter 4
The History of Semitic Emphatics

The aim of this chapter is to give a brief overview of the historical background of the Semitic emphatics so that the common link between the different types of modern-day emphatics can be established by tracing their historical development. In the field of comparative Semitics there have historically been debates over certain points relevant to this thesis, which are therefore discussed here.

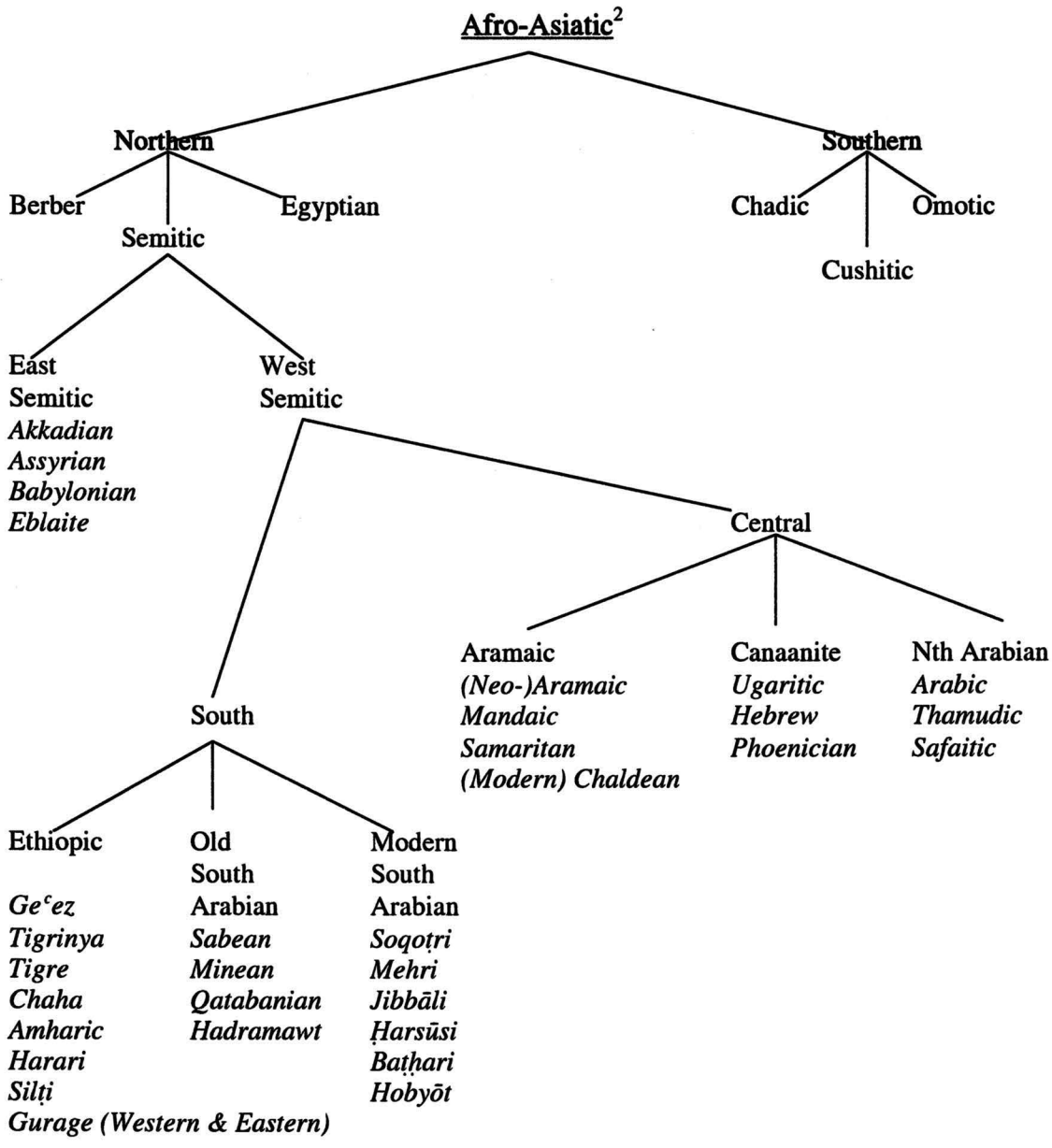
I begin this chapter by outlining the classification and spread of Afro-Asiatic, and then Semitic. In §4.2 I look at the sound system of (Proto-)Semitic, comparing it with Proto-Afroasiatic and attested ancient Semitic. §4.3 moves on to the likely historical origin of the Semitic emphatics and their place within the sound system, evaluating the debate over the (original) Semitic emphatics and that concerning the lateral series (which concerns the origin of Arabic *ḍ*). In §4.4 I discuss the emphatic trajectory hypothesis of Dolgopolsky (1977); phonological representations are then traced through the emphatic trajectory, leading us up to the realisations of emphatics across the modern-day Semitic languages.

4.1 Historical background

The Semitic languages comprise one sub-branch of the Northern branch of the Afroasiatic phylum (formerly Hamito-Semitic). It has been most commonly proposed that the Afroasiatic language family is made up as per the following model (individual languages in *italics*):[1]

[1] Adapted from Bender (1975) (see also Bennett, 1998; Appleyard, 2003).

Figure 4.1 The Afro-Asiatic language phylum



This classification is probably the most widely accepted contemporaneously, although the older classification, whereby West Semitic was divided between South and Northwest Semitic languages, the former comprising Arabic, Ethiopic, Old South Arabian and Modern South Arabian, and the latter comprising Aramaic and Canaanite, has been argued for in recent times by Corriente (1996). Moreover, a particularly interesting development in research (and relevant to our purposes) is the rejection of the earlier assumption that Semitic spread into the Horn of Africa from the Arabian

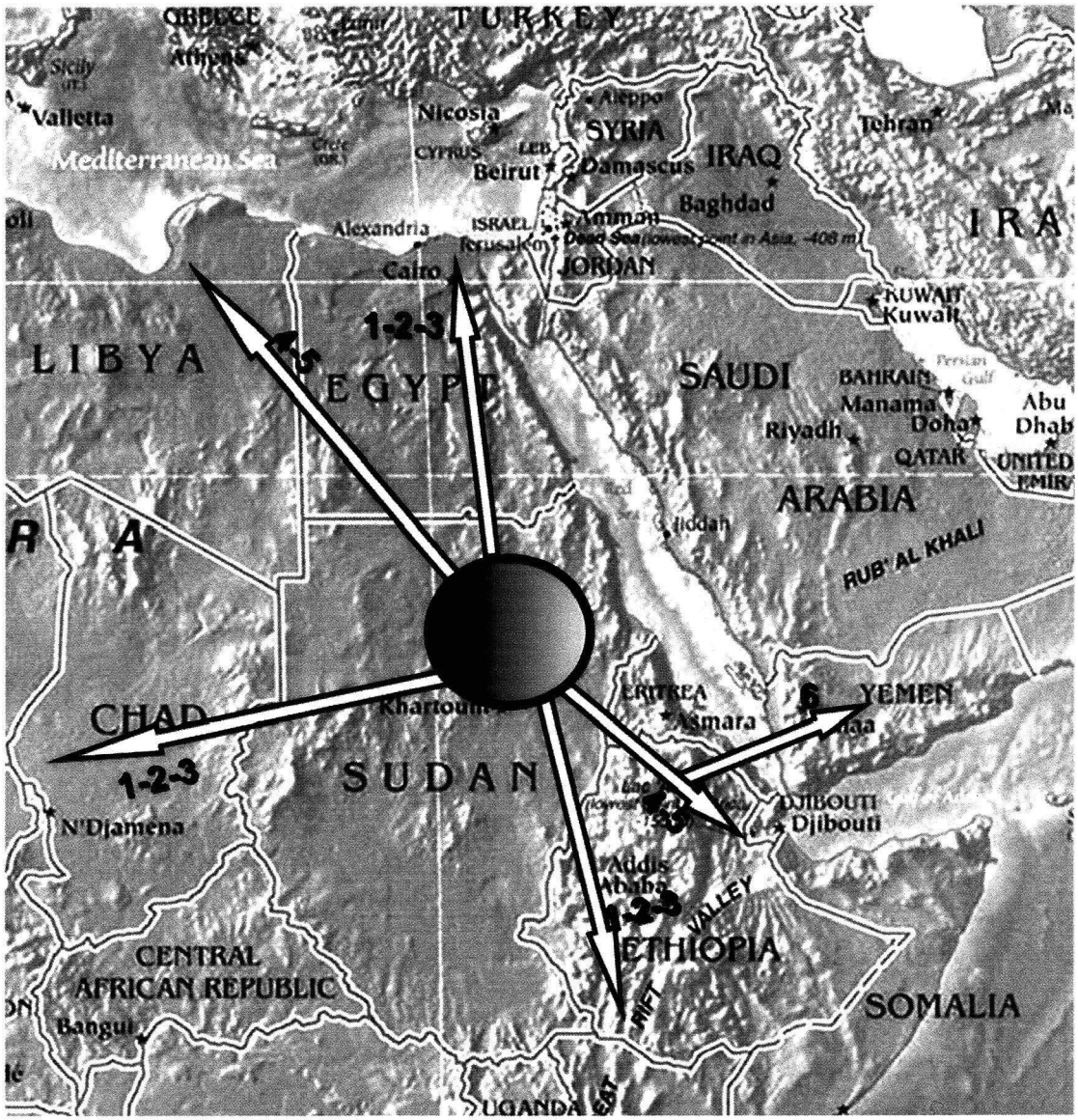
[2] The classification given is based on the work of Hetzron (1972, 1974). See Faber (1997), Bennett (1998) and Appleyard (2003) for recent overviews of the internal classification of Semitic, along with original sources.

Peninsula, which was thus the homeland or *Urheimat* of Semitic.[3] It is now increasingly accepted that the *Urheimat* of Afro-Asiatic was most likely somewhere around what is now northern Sudan,[4] and that further to the 'second explosion' of Afro-Asiatic somewhere around 8–7000 years ago, by which Semitic–Cushitic moved east into the lands of (what is now) Ethiopia, Semitic then spread via the Red Sea into Arabia Felix.[5]

Map 4.1, below, gives a likely scenario for the dispersal of the Afro-Asiatic languages (although the underlying map itself is contemporary, for ease of reference).[6]

[3] The actual term 'Semitic' derives from the Biblical name 'Shem' (the son of Noah), and is a term adopted in the late eighteenth century by a German historian (Schlözer) to refer to these languages.
[4] Bender (1975, 1997) argues for the area around the Blue–White Nile confluence (Khartoum), although Bernal (1980) holds that it was further south, in the (modern-day) border area of Ethiopia and Kenya, and Diakonoff (1965, 1988) proposed further west, to the southern fringe of the Sahara.
[5] Given the contemporaneous dispersion of Afro-Asiatic languages, and their phonological, morphological and syntactic systems, this scenario is well evidenced, especially when we reflect that the previously widely held view that Semitic spread west from Arabia was merely an *assumption* based on eurocentricism and on religious grounds and maintained because the non-Semitic Afro-Asiatic languages had not been consistently and methodically studied. In fact, the current state of research into the Afro-Asiatic phylum, with Afro-Asiatic languages linked in the way that they are known to be, itself pretty much discredits the (pre-twentieth century) notion that there was a (Hamito-)Semitic homelend in Arabia. See Bender (1997). This in itself casts doubt on the assumption that Arabic-style emphatics were the earlier form (from which ejectives developed).
[6] This is the scenario proposed by Bender (1997); my Map 4.1 is an adaptation of his Map 2 (1997:32).

Map 4.1 The spreading of Afro-Asiatic languages (per Bender, 1997)



1-2-3	Egyptian, Chadic, Omotic
4-5	Berber, Semitic–Cushitic
6	Semitic

The Semitic branch of the Afro-Asiatic language phylum is the least disputed and most well documented. The Omotic branch is particularly disputed, and some scholars still prefer the label 'Western Cushitic'.[7]

[7] For detailed discussion of the classification of the Afro-Asiatic phylum, in particular the status of Omotic, see Bender (1975, 1976, 1997) and Ehret (1979), who differ greatly.

4.2 The (Proto-)Semitic sound system

This section presents the sound system commonly reconstructed for Proto-Semitic.[8] Table 4.1 below shows the probable development of the consonant system[9] from Proto-Afroasiatic through to Proto-Semitic and then to the attested reflexes of these segments in the documented ancient Semitic languages.[10]

[8] See Moscati *et al.* (1964:15) on the notion of 'proto-language'.

[9] For reasons of space, I have omitted the following segments: m, w, r, n, y. Also, for the same reason, the * denoting the reconstructed (and thus not actually attested) status of individual items is omitted, but is indicated by the column heading where appropriate. It should be noted that the (phonemic) symbol 'c' is normally used to denote [t͡s], 'č' for [t͡ʃ], and 'ǧ' / 'j' for [d͡ʒ]. The use of other symbols and diacritics is made clear in the table and relevant footnotes.

[10] For the reconstructed Proto-Afroasiatic and Proto-Semitic consonants, columns are given according to the different sources noted.

Table 4.1 The development of the Semitic consonant system

*Proto-Afroasiatic		*Proto-Semitic			later (attested) Semitic[11]						
Militarev & Stolbova[12]	Ehret[13]	Ehret	Moscati *et al.*[14]	updated scheme–IPA	Akkadian	Hebrew	Ugaritic	Syriac	Early Arabic	E South Arabian	Ethiopic
p + f >	p + f >	p	p	p	p	p	p	p	f	f	f[15]
ṗ + b >	p' + b >	b	b	b	b	b	b	b	b	b	b
č (= ʃ)	c + ts >	θ (t^y?)	t̲	θ	š (= ʃ)	š (= ʃ) / θ	t̲ (= θ)	t	t̲ (= θ)	t̲ (= θ)	s
č̣ (= tʃ') (= s')	c'	θ̣ (t^y'?)	t̲̣	θ̣	ṣ (=s'/ts/$s^ʕ$)	ṣ / ç (= ts)	t̲ (= θ̣)	ṭ	ẓ (= ð̣)	ẓ (t̲)	ṣ
ǯ (= dʒ)	j / dz	ð (d^y?)	d̲	ð	z	z	d / ð	d	ð	ð	z
ĉ̣ (= ɬ')	(dl below)	(ḍ below)	d̲ / dl̲	→ lat. frics	(ṣ below)	(ṣ below)	(ṣ below)	(^{c} below)	(ḍ below)	(ḍ below)	(ḍ below)
t	t	t	t	t	t	t	t	t	t	t	t
ṭ (= t')	t'	ṭ	ṭ	ṭ	ṭ	ṭ	ṭ	ṭ	ṭ	ṭ (= t')	ṭ
d	d	d	d	d	d	d	d	d	d	d	d
c (= ts)	s' + s >	s	s	s	s	s	s	s	s	s_3 (= s)	s
ç (= ts') (= s')	tl'	ṣ (s')	ṣ	ṣ	ṣ (= s')	ṣ / ç (=ts)	ṣ	ṣ (ts / s')	ṣ	ṣ (= s')	ṣ
ʒ[16]	z	z	z	z	z	z	z	z	z	z	z
ĉ + ŝ[17] > (= ʃ)	ɬ	ɬ	ś	ɬ	š (=ʃ)	ś (= ʃ / s)	š (= ʃ)	s	š (= ʃ)	s_2 = ś (= ɬ)	š
(ĉ̣ above)	dl	ḍ (ɮ)	(d̲ above)	ɮ̣ (= ɮ)	ṣ	ṣ / ç	ṣ	^{c} (= ʕ)	ḍ (=ɮ)	ḍ (= ɮ)[18]	ḍ[19]

[11] Adapted from Moscati *et al.* (1964:43–44); they posit a four-way series for the interdentals, where I have classified them as laterals (see Moscati *et al.* pp.27–8).
[12] 'Afrasian', as per Militarev & Stolbova (1987).
[13] Ehret (1995:481–2).
[14] Moscati *et al.* (1964:43–44).
[15] Moscati *et al.* (1964:24); Ethiopic has *p* as well as *f*, although the former apparently corresponds mostly to Greek borrowings. They note the possibility that Proto-Semitic may have had *f* which became *p* outside of Arabic and South Semitic.
[16] This phoneme is unfortunately missing from the Proto-Afroasiatic consonant system of Militarev & Stolbova (1987:46). However, looking at their cross-Afro-Asiatic equivalences, and their positioning *'ʒ' with *'c' and *'ç' (p.48) the symbol 'ʒ' presumably represents z.
[17] Militarev & Stolbova (1987) use 'ĉ' to represent a voiceless lateral affricate, and 'ŝ' for the voiceless fricative of that series, presumably that traditionally transliterated as 'ś', i.e. [ɬ]. (Ehret, 1995, has only *ɬ* for these.) Also, M&S have P-Afr *'š' [ʃ]→ Arabic 's', 'h_2'; Hebrew & Aramaic 'š', 'h_2'; Akkadian 's̲', 'š'.
[18] See Steiner (1977:Ch.II) for a good discussion of the literature on this.
[19] Moscati *et al.* (1964:30) note that Ethiopic *ḍ* merges with *ṣ* soon after the early Aksum inscriptions; thereafter, graphemes are subject to arbitrary interchange.

*Proto-Afroasiatic		*Proto-Semitic			later (attested) Semitic						
M & S	Ehret	Ehret	Mosc *et al*	updated	Akkadian	Hebrew	Ugaritic	Syriac	Early Arabic	E South Arabian	Ethiopic
l	l	l	l	l	l	l	l	l	l	l	l
s	š	c	š	ʃ	š	š	š	š	s	s_1 (= š)	s
k	$k + k^w >$	k	k	k	k	k	k	k	k	k^{20}	k^{21}
q (= k')	$k' + k^{w'} >$	ḳ (k')	q	q (= ḳ)	q (?k')	q	q	q	q	q (= k')	q
g	$g + g^w >$	g	g	g	g	g	g	g	ǧ (=dʒ)	g	g
$\dot{q} + ḫ + q >$ (= x)[22]	$x + x^w >$	x	ḫ	x	ḫ (= x)	ḥ (= ħ)	ḫ (= x)	ḥ (= ħ)	ḫ (= x)	ḫ (= x)	ḫ
9[23] (= ʕ)	$\gamma + \gamma^w >$	γ	ġ	γ	' (= ʔ)	ᶜ (= ʕ)	ġ (= γ)	ᶜ (= ʕ)	ġ (= γ)	ġ (= γ)	ᶜ
ḥ (= ħ)	ḥ	ḥ	ḥ	ħ	' (= ʔ)	ḥ (= ħ)	ḥ (= ħ)	ḥ (= ħ)	ḥ (= ħ)	ḥ (= ħ)	ḥ
ᶜ (= ʕ)	ʕ	ʕ	ᶜ	ʕ	' (= ʔ)	ᶜ (= ʕ)	ᶜ (= ʕ)	ᶜ (= ʕ)	ᶜ (= ʕ)	ᶜ (= ʕ)	ᶜ
h	h	h	h	h	' (= ʔ)	h	h	h	h	h	h
' (= ʔ)	ʔ	ʔ	'	ʔ	' (= ʔ)	' (= ʔ)	' (= ʔ)	' (= ʔ)	' (= ʔ)	' (= ʔ)	'

[20] > š / _V[+pal].
[21] > š / _V[+pal].
[22] Moscati *et al.* (1964:40) note that Ethiopic *ḫ* gradually merges with *ḥ*.
[23] Militarev & Stolbova (1987) use '9' to notate the voiced affricate member of the uvular series (see their consonant inventory, p.46), i.e. '9' = *gʁ*. It seems that they posit this representation because they assume affricate counterparts to the coronal and dorsal spirants (where other series comprise stops). Thus, they posit a uvular series consisting of a 'spirant' and three affricates: voiceless, emphatic ('glottalized') and voiced. Given the Afroasiatic correspondences that they show for this series, where not one is affricated, and the only uvulars are **γ* and **ḫ* from various of their Proto-Afroasiatic uvular series, an affricated uvular series seems unlikely in my view. Therefore, for Militarev & Stolbova's '9' I assume *'γ', and for the other dorsals *'x'.

Table 4.1 above raises some points of discussion which I shall outline here. Firstly, there has been some debate over whether Proto-Semitic *ḏ* and *ś* should be positioned with, respectively, interdentals and sibilants (as per Moscati *et al.*, 1964, above),[24] or whether they actually formed, along with *l*, a lateral series (as per Ehret, 1995, and the scheme I adopt, labelled as 'updated', above). The arguments for the lateral series are now fairly well accepted and are outlined in §4.3, following.

Secondly, there appears to be a degree of variation between 'c' (*ts*) and 'ṣ' (when it is realised as *s'*). In §4.3, below, I argue that this is typologically predictable, and that [ts], at least in Semitic, is phonetic but not phonological. Therefore, 'c' *ts* should be taken phonologically as *ṣ* [s'].

Additionally, the segment notated as 'q' does not necessarily have the sound value *q*. However, the reasons for the apparent inconsistency are to do with its phonological status and the tradition within Semitic linguistics of notating it as 'q' (due to its value in languages like Arabic which is, historically at least, uvular *q*). I argued in Chapter 3 that uvular *q*, at least where present in Semitic languages,[25] is phonologically an emphatic velar, i.e. it has the phonological systemic value *ḳ*, and is thus a uvularised velar (strictly, in phonological terms /k$^{\varsigma}$/, although I continue to use the notation *q*). In Semitic languages with ejectives, its phonological systemic value *ḳ* indicates *k'*.

Finally, Militarev & Stolbova (1987) propose four series of affricates, including dorsal *'q', *'q̇' and *'9',[26] with a corresponding voiceless fricative. However, where uvular affricates are common in certain Caucasian languages (especially [qχ] < *q^{h}*), I cannot see any reason (either typological or going on the evidence of inter-Afro-Asiatic reflexes) for suggesting the affrication of the Proto-Afroasiatic dorsals, beyond that of making the system look more symmetrical. I thus agree with Ehret (1995) in assuming the following Proto-Afroasiatic dorsals: **k*, **k'*, **g*, **x*, **γ*.[27]

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[24] Although note that Moscati *et al.* posit that **ḏ* is a voiced emphatic *lateralised* interdental.
[25] It is important to distinguish this here, because in many Caucasian languages it seems that uvular *q* is in all probability a phonological pharyngeal (as argued in Bellem, 2005).
[26] They use '9' to notate what they propose to be a voiced affricate member of this uvular series (presumably [ɢʁ]). This is typologically and systemically highly unlikely – see fn. 23, above.
[27] I remain neutral regarding his reconstruction of labialised dorsals, which are not relevant for Semitic.

I have not yet mentioned the issue of the original form of Semitic emphatics (i.e. the 'glottalised'–'pharyngealised' debate), leaving these segments in the table above notated as 'Ç'.[28] However, as discussed in §4.3–4 of this chapter, following, it is most likely that these segments were indeed glottalicised (i.e. ejectives), in both Proto-Afroasian and Proto-Semitic, and that they went through several stages of development to become, essentially, 'backed' in Arabic and other subsets of Semitic.

Lastly, the vowel system commonly reconstructed for Proto-Semitic is like that assumed for Classical Arabic, i.e. the three peripheral vowels **i*, **a*, **u*, along with their long counterparts. Additionally, there are two diphthongs, **ay* and **aw*.

4.3 The role of emphatics within the Semitic sound system

Having presented the likely original consonant system of Semitic and, for context, its predecessor (the Proto-Afroasiatic reconstruction), this section discusses the issues surrounding the reconstruction of the Proto-Semitic sound system, in particular the debate about the original identity of Semitic emphatics (i.e. the 'glottalised'–'pharyngealised' debate), and, following on from this, the 'lateral' hypothesis and the issue of affricated *ṣ*. This leads into a discussion of the triadic nature of the Semitic sound system.

4.3.1 The original emphatics

Dolgopolsky (1977) takes the view that modern-day emphatics have developed from ejectives,[29] and although the more widely accepted view seems to be that original (i.e. earlier Semitic) emphatics were ejectives (with Arabic-style 'backed' emphatics developing from these), this is not the universal view. Leslau (1957), Ullendorff

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[28] C = Consonant.

[29] While the term 'glottalic' is often used in the Semitic context interchangeably with the term 'ejective', the distinction should here be made explicit, as Semiticists all too often do not distinguish the terms, thus implying that the two terms are equivalent. In fact, the terms are only interchangeable in the context of voiceless obstruents, since (as we saw in Chapter 2) ejectives are not the only types of sounds produced with glottalic initiation. The term 'glottalic' is thus wider than the term 'ejective', and could refer also to implosives. Moreover, and again as discussed in Chapter 2, the relationship between ejectives and laryngealisation (creaky voice) would legitimise the term 'glottalic(ised)' being used in reference to laryngealised sonorants or voiced obstruents. Therefore, although I also use the term 'glottalic' in discussing Semitic emphatics, the distinction should be borne in mind. This is important here, because Proto-Semitic **ḍ* tends to be thought of as emphatic (as *ḍ* is in many attested Semitic languages), but since the segment is known to have been voiced, it could not have been ejective, and if it were glottalic, then this means it would have been implosive (which no one, to my knowledge, has proposed or evidenced). This does not disprove the ejective hypothesis, however, as is discussed presently.

(1955)[30] and Kaye (1986, 1997b), for instance, hold that Arabic-style emphatics were the earlier form, [31] which is also implied by the system given in Moscati *et al.* (1964),[32] and that the Ethiopic languages have borrowed ejectives from neighbouring Cushitic languages (or that Cushitic influence prevented the disappearance of the ejectives). By contrast, Cantineau (1960) and Martinet (1953) reconstruct ejectives (and lateral[ised] *ḍ*) as the earlier form.[33] It also seems that proponents of the view that Arabic-style ('backed') emphatics were the earlier form (and thus that ejective realisation of emphatics was an innovation borrowed from Cushitic) are those who maintain that Semitic spread originally from Arabia into the Horn of Africa.[34] Having disputed this theory in §4.1, I here maintain that since the stronger evidence (from the work on Afro-Asiatic) is that Semitic spread into Arabia from the Horn of Africa, and since it is the languages of the Horn of Africa which have the ejective realisation of emphatic (along with Modern South Arabian, situated in Arabia Felix),[35] this further backs up the other arguments for ejectives as the original emphatics of Semitic. In further support of this is the empirical data used by Dolgopolsky (1977) to support his emphatic trajectory hypothesis (discussed in detail in §4.4), which comes from Neo-Aramaic. In various dialects of Neo-Aramaic, emphatics are realised as (at least partially) glottalised. If the original emphatics were 'pharyngealised' (and not ejectives), one would not expect to find evidence of glottalics in a Semitic language spoken to the east and north-east of the Mediterranean, with little likelihood of enough contact with Cushitic languages of the Horn of Africa to undergo such drastic influence on the sound system.

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[30] See p.156. Brockelmann (1908–13) and Bergstrasser (1928) also maintain that Arabic-style emphatics were the original Semitic.

[31] In my view, this view is due, amongst other reasons (noted above) to the commonly held assumption that Arabic emphatic *ṭ* and *q* were voiced. This view seems to stem mainly from the characterisation by Sībawayh of these segments as *majhūr*, which is commonly assumed to mean 'voiced'. I have argued strongly against this above, and consider that one of the reasons for assuming that *majhūr* is interpreted to mean 'voiced' is the Eurocentric assumption that languages like Arabic contrast only 'voiced' and 'voiceless', rather than having (at least historically) a three-way voicing contrast.

[32] In fact, Moscati *et al.* (1964:23–4) briefly outline a couple of arguments for each of these hypotheses, implying if anything that they perhaps favour the ejective hypothesis; however, as I discuss in more detail in §3.2, the system that they set up for Proto-Semitic, where *ḍ* is included with the emphatics, means that the emphatics in their system cannot be seen as ejective. They do seem to fall in favour with the 'lateral(ised)' hypothesis for **ḍ*, though, see pp.27–8.

[33] See Moscati *et al.* (1964) for a brief overview of the arguments.

[34] Amongst these scholars, there has been further debate over whether Arabia was indeed the homeland of Semitic, or whether it was elsewhere (Syria, according to Garbini (1984), cited in Versteegh (2001), which contains a good discussion of this view).

[35] Epigraphic South Arabian is assumed to have had an ejective reflex of emphatics.

Moreover, when looking more widely at Afro-Asiatic, this itself casts doubt on the theory that ejectives were a later development of emphatics. The languages of the Southern branch of Afro-Asiatic (namely Chadic, Cushitic and Omotic) are characterised by the presence of glottalics within their sound systems. In fact, when we look at Semitic in the context of Afro-Asiatic (and not just in isolation) the prevalence of glottalics within the Afro-Asiatic sound systems stands in stark relief.[36] Given that the only other branch of Afro-Asiatic which has 'backed' (rather than glottalic) emphatics is Berber, and given that most of the emphatics in Berber are said to have been historically borrowed from Arabic anyway,[37,38] the logical conclusion to be drawn is that the original Semitic emphatics were ejectives ('inherited' from Afro-Asiatic), and that the 'backed' realisation (and loss, or lenition, of ejective release) of emphatics was a later innovation.

Further support for the theory that Semitic emphatics were originally ejective is to be found in evidence of the affrication of the emphatic fricative *ṣ*. Steiner (1982) provides compelling evidence that *ṣ* was affricated in Hebrew, Aramaic and Phoenician. It is known that ejective fricatives are often realised with a degree of affrication (see Chapter 2), and this is known to be true of both Ethio-Semitic languages and Modern South Arabian, where some of the ejectives are assumed to be affricates rather than fricatives. I argue that these segments are often not phonemically affricates, but that affrication is a phonetic effect, resulting from the need to maintain enough intra-oral air pressure to produce a salient glottalic release. None of the Semitic languages with purely 'backed' emphatics have, or show any evidence whatsoever (to my knowledge) as having had, an affricated realisation of *ṣ*, supporting

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[36] The cognates of (Proto-)Semitic emphatics are shown predominantly as ejectives in (Proto-)Chadic, (Proto-)Cushitic and (Proto-)Omotic, see Bender (1975:89–90), Ehret (1995:481–2).

[37] There is no real body of data for Berber, although there is some descriptive work available from the medieval Arab historians and geographers (e.g. Ibn Battuta and Ibn Khaldun, see Applegate, 1970:588). Thus, most of the attested Berber data dates from the 19th century onwards. The pre-CE Libyco-Berber inscriptions, while assumed to be Berber, have not been interpreted. See Applegate (1970) for bibliographical overview; see also Kossmann & Stroomer (1997) and Heath (2005).

[38] Chtatou (1982:242–243) outlines some of the literature on Berber emphatics, noting that it is generally considered a feature borrowed from Arabic; Kossmann and Stroomer (1997:464) hold that 'Proto-Berber had only two pharyngealized phonemes, *ḍ* and *ẓ*,' the other emphatics having been 'borrowed from Arabic'. According to the table in Militarev & Stolbova (1987:48), Proto-Berber **ẓ* and **ḍ* correspond to Proto-Afroasiatic **ç*, **ç̌* and **ç̂* (some merging) (see Table 4.1, where Ehret has **tl'* [ʔɬ], **c'* [ʔs'], **dl* [ʔɮ], respectively, for these PAA consonants). The Berber evidence may indicate, in my view, that in fact Proto-Afroasiatic **dl* (probably [ɮ]), or at least Proto-Semitic **dl*, may have been somewhat backed, even though this may not have been a systemic feature. Also, **tl'* [ʔɬ], **c'* [ʔs'] presumably merged to some degree in Berber and (while voiced at an earlier stage) probably backed analogously with **dl*, being (or having come to be) analysed as part of the same phonological series.

the hypothesis that the affricated realisation of *ṣ* was due purely to its status as an ejective.[39]

Lastly, typologically, ejectives are cross-linguistically extremely common (the fourth most common type of stop cross-linguistically, occurring in up to 20% of the world's languages). However, 'pharyngealised' consonants are far rarer.[40] This would follow from the fact that ejectives are used within sound systems to indicate voicing (or laryngeal) contrasts, whereas phenomena such as 'pharyngealisation' are secondary articulations, which are generally more marked. Moreover, we could also add that since it has been argued that ejectives in Ethiopic and South Arabian languages were borrowed from Cushitic (i.e. the emphatic series was reinterpreted as ejective due to the influence of Cushitic), one would expect to see at least some *systematic* remnant of the 'pharyngealised' nature of the earlier realisation of the emphatics in at least some of these languages. It seems odd, to say the least, that 'pharyngealised' segments would be transformed wholesale into ejectives with no remnant of their former identity (or function in the sound system).

Positive evidence for the hypothesis that ejectives were the earlier form of emphatics was presented in Chapters 2 and 3, where I argued that the three-way voicing contrast in plosives of (what I have termed) the conservative dialects of Arabic[41] is akin to the three-way contrast of languages which have ejective emphatics. Under the argument that the original (Semitic) emphatics were 'pharyngealised' (Arabic-style), one would then have to suppose that some of these developed into a separate voicing series, although the perceptual cues for Arabic-style emphatics are clearly robust enough to stand independently, obviating the need for enhancement through further cues such as voicing. Moreover, we saw in Chapter 2 that ejectives are not necessarily perceptually distinguished from the voiceless (aspirate) series by VOT zones anyway, which makes this an even stranger development.

Therefore, since the perceptual cues to Arabic-style emphatics are robust enough to stand independently, there would have been no cause for the development of this separate voicing series. It is hard to see a systemic cause for the development

[39] See Steiner (1982:88).
[40] I noted in Chapter 2 that only 1% of languages in Ruhlen (1975) are said to have 'pharyngealised' consonants, six out of these seven being Afro-Asiatic.
[41] Again, here I mean 'conservative' with respect to emphatics and the system of laryngeal contrasts in obstruents.

of ejectives from 'backed' consonants. On the other hand, there is an obvious systemic cause for the development of 'backed' emphatics from ejectives, and that is the increasing salience of (the phonological feature correlated with) 'pharyngeal'.

Finally, if the original emphatics had been 'backed', one would expect this systematically to affect consonants of both voicing series. However, as we have seen, it affects voiceless consonants (with the exception of Semitic *ḍ* < **ɮ*, which I shall argue in §4.3.2 was originally a backed voiced lateral fricative **ɮˁ* and not originally an emphatic, becoming incorporated into the emphatic system in certain languages only as emphatics became 'backed' rather than ejective). That is, one would expect to find (originally) emphatic **ġ*, **ḅ*, **ẓ*, and so on, if the emphatics had originally been 'backed'. What we actually find is that the emphatics are voiceless, leading to a three-way (triadic) voicing opposition (as will be demonstrated in the next section), which is not what would be expected if Semitic emphatics were differentiated by a resonance quality contrast.

To conclude this part of the discussion, then, the evidence is that Semitic emphatics in their earliest form were ejectives.[42]

4.3.2 The Semitic triads and the lateral debate

In this section, I discuss the issue of Semitic laterals and then show how emphatics fitted into a sound system characterised by triads. I also discuss the development of the sound system.

The arguments for a lateral series (as opposed to interdental) in Semitic are now fairly well accepted,[43] post-Cantineau's (1951) study of the evidence that had accumulated over the previous decades.[44] Firstly, it is well known that Modern South Arabian has, as realisations of Semitic 'ḍ' and 'ś', the laterals *ɮ* and *ɬ*, respectively, with no evidence that these were the result of innovation or borrowing. Moreover,

[42] I have steered clear of the debate over the identity of Akkadian emphatics. It was traditionally assumed by default that these would have been 'backed', although this is now disputed. Geers (1945), who shows that in Akkadian only one emphatic was allowed per word / root, and that where Semitic cognates show more than one emphatic, Akkadian dissimilated all but one to its non-emphatic counterpart (Geers' Law), does not define 'emphatic'. The Akkadian case has an interesting parallel in (unrelated) Kurmanji Kurdish (see Kahn, 1976, especially on the point of hierarchy), although on the other hand Akkadian has no pharyngeals. See Buccellati (1997), Moscati *et al.* (1964).

[43] See in particular Steiner (1977), and references therein, for discussion of the history of the various proposals and detailed discussion of all the evidence.

[44] Reprinted in Cantineau (1960).

Arabic *ḍ* was clearly produced as a voiced lateral fricative at least until the eighth century CE, as per the description given by the medieval grammarian Sībawayh.[45] Additionally, in the Ḥaḍramawt dialects of southern Yemen, Arabic *ḍ* is produced as the emphatic lateral *ɮˤ*.[46]

On top of this, there is much evidence that *ḍ* in loanwords from Arabic in the early years of the Arabo-Islamic conquests was interpreted in other languages as 'ld'.[47] There is also the evidence of the Akkadian merger of *š*[48] (< etymological 'ś', i.e. *ɬ*) and *l* before apical stops and spirants, which makes sense if Akkadian *š* was (at least historically) a lateral *ɬ*. Additional evidence, parallel with 'ld' for Arabic *ḍ* in loans, is drawn from examples such as Greek *balsamon* 'Commiphora opobalsamum (tree)' borrowed from Semitic **b-ś-m*,[49] also from reported variation in Arabic of certain forms, e.g. *qišda* ~ *qilda* 'clarified butter sediment',[50] and in Hebrew between certain roots, e.g. *ṣḥq* ~ *śḥq* ('laugh'),[51] and also inter-Semitic variation in certain roots, as in (again) that relating to 'laugh', which is Arabic *ḍḥk* and Hebrew *ṣḥq* ~ *śḥq*.[52]

Going back to (early) Arabic *ḍ*, several points are clear. Firstly, it was a lateral ('Sibawayh referes to the feature of laterality being shared between the Lām and the Ḍād': al-Nassir, 1993:44), secondly it was both voiced and a continuant. However, it was not homorganic with *l* and, according to Sībawayh 'without velarization [*iṭbāq*]...the Ḍād will be out of the speech [system] because it has no homorganic other letter' (al-Nassir, 1993:45); this uniqueness of *ḍ* led to the Arabs' coining the name *luγat al-ḍād* 'language of the *ḍ*'. Moreover, according to Sībawayh, while *ḍ* is

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[45] See in particular al-Nassir (1993), also Semaan (1968) and Carter (2004).
[46] Watson (2002:2), Kaye & Rosenhouse (1997:275).
[47] E.g. Spanish *alcalde* 'judge' (< Arabic *al-qāḍi*), *arrabal* 'suburb' (< Arabic *al-rabaḍ*). Note also within Semitic, examples such as Akkadian *ruldā'u* ~ *ruḷṭā'u* from the Arabic name for the God *ruḍā'*.
[48] Note that for Akkadian, the transcription *š* (as in Table 4.1) may not be accurate. There is evidence that Akkadian in fact had a 'sibilant' distinct from *š*, although a merger occurred by the Middle Babylonian period. This distinct sibilant is etymological *ś* (sometimes written for Akkadian as 's_x'). The whole issue is complicated by the fact that the (Sumerian) cuneiform writing system used for Akkadian did not distinguish certain Akkadian phonemes, and that much of the evidence of the Akkadian sound system is drawn from a script devised for a language without many of the typically Semitic phonemes, and thus unsuited to it. See Steiner (1977:48–50, 158) for discussion of Akkadian 's_x' *ś*.
[49] Steiner (1977:123–9) discusses the case of *balsamon* and its relevance to the lateral hypothesis, and gives the reflexes across various Semitic languages.
[50] Steiner (1977:95–98) discusses this and similar cases. *qišda* ~ *qilda* is noted as a variant by the ninth-century grammarian al-Kisā'ī in his *Lisān al-ʿArab* (Steiner, 1977:95).
[51] Steiner (1977:111 ff.).
[52] See the cognate sets in Steiner (1977:26–29) for more examples of the same nature.

classified as *šajri* (palatal),[53] it is not homorganic, its place of articulation being 'between the beginning of the tongue's edge and the molars which are by the tongue'[54] and in Sībawayh's groups of sounds according to place of articulation (running from back to front of the oro-pharyngeal cavity) *ḍ* is accorded a special place *between* that of the palatals *ǰ*, *š*, *y* and the lateral *l* (which is then followed by the other coronals). Thus, it was clearly 'backed' (also evidenced in the grammarians' discussions of assimilation).[55] The reason for reiterating this point is that I propose that this realisation of *ḍ* may well go back to much earlier Semitic,[56] if not even to early Afro-Asiatic.

It could only be supposed that Proto-Semitic **ḍ* was emphatic (by which I mean included in the system as one of the emphatics) if one followed the theory that Proto-Semitic emphatics were 'backed' (rather than ejective). For instance, Moscati *et al.* (1964:27–8) posit for Proto-Semitic a four-term interdental series, one member of which is **ḍ* (which they query as ?lateralised) and which according to them is one of two emphatic interdentals: 'ṯ' *θ* and 'ḏ' (or 'ḏ') *ḍ*. However, **ḍ* couldn't have been strictly emphatic in its earlier form if emphatics were ejectives, since it couldn't have been both ejective and voiced. Having already discounted the theory that the original Semitic emphatics were 'backed', and argued strongly in favour of the ejective hypothesis, the status of **ḍ* as a Proto-Semitic emphatic must also be discounted. As I have also presented (some of) the evidence for the lateral hypothesis, which I follow here, this means that **ḍ* in Proto-Semitic was a voiced lateral fricative, but certainly not emphatic (by this I stipulate that it was not part of the emphatic system). However, I propose that it is not quite true to say that Proto-Semitic had no 'backed' segments in its system, and this is where **ḍ* comes in. In my view, it is very likely that Proto-Semitic **ḍ* was not only a lateral but also 'backed'. Therefore, while the emphatics themselves at that stage were ejectives (and not 'backed'), **ḍ* was backed, but not an emphatic.

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[53] al-Nassir (1993:44); al-Hasan al-Karouri (1996:55).
[54] Semaan (1968:41).
[55] See Semaan (1968), al-Nassir (1993), Carter (2004).
[56] Subsequent to writing this chapter, I have come across the same proposal made by Bennett (1998:13), who concludes that 'It would be consistent...to assume a pre-Aramaic Northwest Semitic pharyngealized lateral (voiced or voiceless) as the reflex of *ṣ́*'. He also notes that 'The pharyngealized lateral [i.e. [ɬ] as a reflex of *ṣ́*]...seems to have undergone a similar change in early Aramaic, probably yielding a uvular fricative [i.e. *γ*]'.

Firstly, I suggest that the reason for the 'backed' realisation of *ḍ [ɮˠ] was its distinction from other laterals; liquids cross-linguistically tend to pattern as 'clear' or 'dark'.[57] Since laterals appear particularly prone to assimilation processes which may have led to its phonetically overlapping with the other laterals, and thus made it less perceptually distinct, this may have caused it historically to have come to be realised as the 'dark' member of the series, if it wasn't already 'dark', i.e. 'inherited' as such from Proto-Afroasiatic. The suggestion that it was 'dark' at least as far back as early Semitic is backed up by the fact that the voiceless member of the lateral series, *ɬ, came to be realised in many of the daughter Semitic languages as the palatal fricative 'š' (= ʃ), as seen in Table 4.1, whereas *ḍ has *no* palatal reflexes. This perhaps indicates an original underlying resonance contrast between *ḍ [ɮˠ] and *ɬ [ɬʲ].[58,59]

There are also other correspondences which indicate the 'backed' nature of *ɮ. For example, Table 4.1 shows the Syriac[60] reflex of this as the voiced pharyngeal ʕ, such as e.g. *'âraʕ* 'earth' (cf. Arabic *'arḍ*). The pharyngeal reflex of this follows if the earlier Semitic form was already 'backed'. Moreover, Bennett (1998:13) notes that Syriac ʕ is the reflex of Biblical Aramaic *q*.[61] It is also potentially of interest that Syriac, according to Militarev & Stolbova (1987:48), had dorsal *γ* as a reflex of Proto-Afroasiatic *ɮ (which in their scheme is *ĉ), which then became pharyngeal ʕ. I think it most likely that this earlier Syriac *γ* developed from a velarised lateral *lˠ*, again indicating the backed nature of earlier *ɮ.

To summarise, I have argued that Proto-Semitic had emphatics which functioned in the sound system as a laryngeal contrast and were ejectives. In addition,

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[57] For instance, English has clear liquids syllable-initially but dark liquids syllable-finally (under the traditional view of the syllable), whereas Russian has a phonemic contrast between clear (palatalised) *lʲ* and dark (velarised) *lˠ*. German has clear *r* syllable-initially and dark *r* syllable-finally. Brazilian Portuguese has clear *l* syllable-initially and vocalised *w* (< dark *l*) syllable-finally.

[58] I use the palatalisation symbol for my phonetic representation of *ɬ not to indicate that it was overtly palatalised, but to indicate that it was 'clear' as opposed to 'dark'; also see Chapter 6.

[59] Note that in many other Semitic languages *ḍ merged with ṣ, indicating that it was not robust enough within those sound systems to survive, and indicating its fricative nature. I suggest that this happened through reanalysis of *ḍ as an affricate, and at some point the loss of the 'back' quality and voicing ([ɮˠ] > [dzˤ] > [dz] > [ts]). Table 4.1 shows that ṣ was affricated in Hebrew, Syriac, Phoenician and Ethiopic. Ugaritic is closely related to Hebrew and Phoneician, both of which had affricate *ts* for *ṣ.

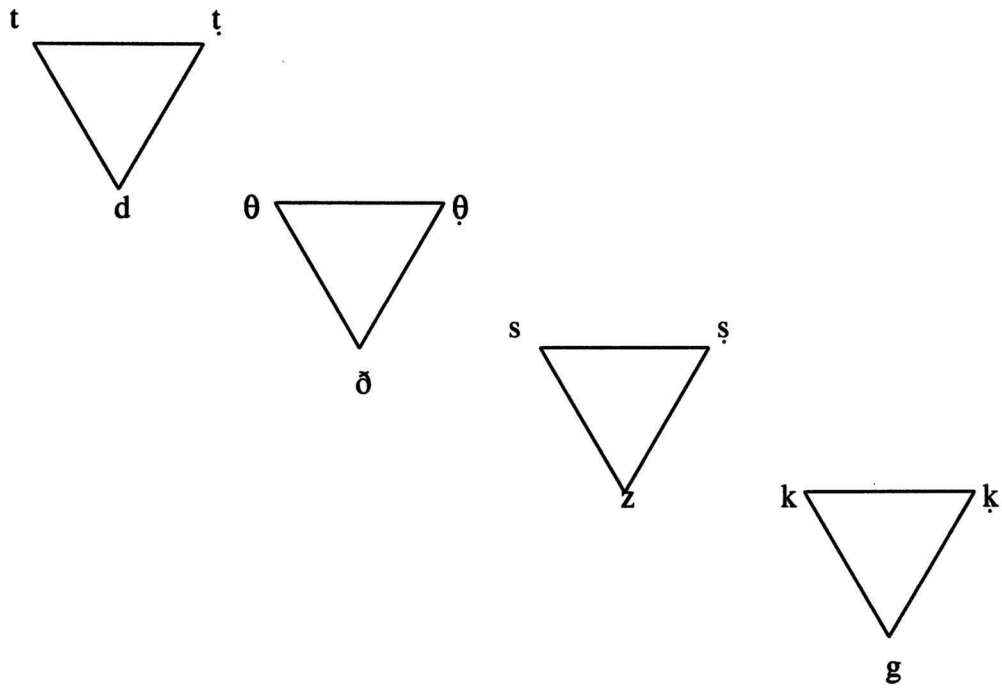
[60] A note would be in order here concerning the usage of the terms 'Syriac' and 'Aramaic'. On the whole, where I use a given source, I stick to the term used therein. Generally, comparative Semiticists use the term 'Syriac' in reference to Old (attested) Aramaic. However, note that it is used by Bennett (1998) in reference to later Aramaic, which he contrasts with Biblical Aramaic. Outside of this, however, the term 'Syriac' more usually (or historically in Iraq) denotes the Aramaic-speaking Christian minorities or denominations; alternatively, 'Syriac' is sometimes used to refer to the Aramaic dialect of the area around Orhai or Edessa. Thus, 'Aramaic' can be seen to have broader reference. See Odisho (1975) for discussion of this point.

[61] This may well have been /ɣ/, which still evidences a 'backed' earlier *ɮ.

Proto-Semitic had a series of laterals, of which the voiced fricative member either merged in daughter languages with *ṣ* (when it had the value *s'* or *ts*) or had a 'back' realisation (Arabic emphatic *ḍ*, Syriac / Aramaic pharyngeal ʕ). I have suggested that this voiced lateral *ɮ* was probably already 'backed' (i.e. what would traditionally be called 'velarised') in earlier Semitic, if not also originally in Afro-Asiatic (and probably itself resulting from a sound change, from original **ɬ'*). Thus, while I have argued for the original identity of Semitic emphatics as ejectives, I have also proposed that it is not true to say that earlier Semitic had *no* backed consonants in its sound system, but firstly that at this earlier Semitic stage, 'backness' was not systematically exploited as part of the system, and secondly that this 'backness' was not related to the emphatics, since **ɮ* only later became part of the emphatic system (in Arabic).

We can now see that what is commonly reconstructed for (Proto-)Semitic is a series of triads, as follows:

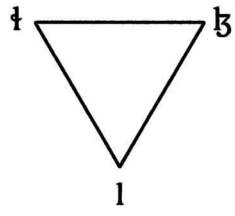
Figure 4.2 The Semitic triads[62]



[62] What is noticeably missing from the triadic system shown here is a labial (stop) series, although this is usually reconstructed for Proto-Afroasiatic, viz. **p*, **ṗ*, **b*. Proto-Semitic, however, is reconstructed with the labials **p*, **b*, with Proto-Afroasiatic **ṗ*, **b* having merged in Proto-Semitic to **b*. There are no labial fricatives, although in early (or Proto-)Arabic, Epigraphic South Arabian and Ethiopic, Proto-Semitic **p* becomes *f*. There is also no palatal triad. Thus these triads are proposed only for coronals and velars, which according to the representations proposed in Chapter 3, are precisely those which do not have a resonance element.

In addition, there is a series of three laterals, but while these are usually included in the triadic scheme, I have rejected the assumption that one of these laterals was emphatic since the triadic series typically contain three members differentiated by voicing contrasts, that is, voiceless (aspirated), voiceless glottalic and voiced. The lateral series, while triadic, does not contain an emphatic (glottalic) member, but instead a sonorant and two fricatives (one voiceless, one voiced):

Figure 4.3 The Semitic lateral series



I think it more likely that this is not part of the triadic system of Proto-Semitic[63] (although earlier Afro-Asiatic probably had a triadic opposition in the lateral series), but that *ɬ* and *ɮ* form a pair, as do *l* and *r*. All the other consonants, apparently with the exception of *š* (ʃ), form pairs (normally voiceless–voiced), as seen in Table 4.1.[64]

4.4 From the diachronic to the synchronic

In this section, I look at the development of the earlier Semitic system into the systems that we see across Semitic today. I start in §4.4.1 by presenting the emphatic trajectory hypothesis set up by Dolgoposky (1977), and then in §4.4.2 I discuss the emergence of the 'pharyngeal' character along this trajectory. Lastly, in §4.4.3 I contextualise the preceding discussions in terms of phonological representations.

[63] I noted above that the triads are proposed only for those consonantal series which would not be thought to have a resonance element (according to my model of representations presented in Chapter 3). I proposed above that *ɮ* in early Semitic is likely to have been 'backed', and would thus have a resonance element, which would fit with these segments not being part of the triadic system.

[64] As noted, I omitted from Table 4.1 the segments *r*, *m*, *n*, *w*, *y* (= IPA *j*). These appear to consitute pairs, with *r* partnering *l* as liquids (whereas the lateral fricatives don't seem to behave as liquids), two nasals and two glides.

4.4.1 Genesis – the emphatic trajectory hypothesis

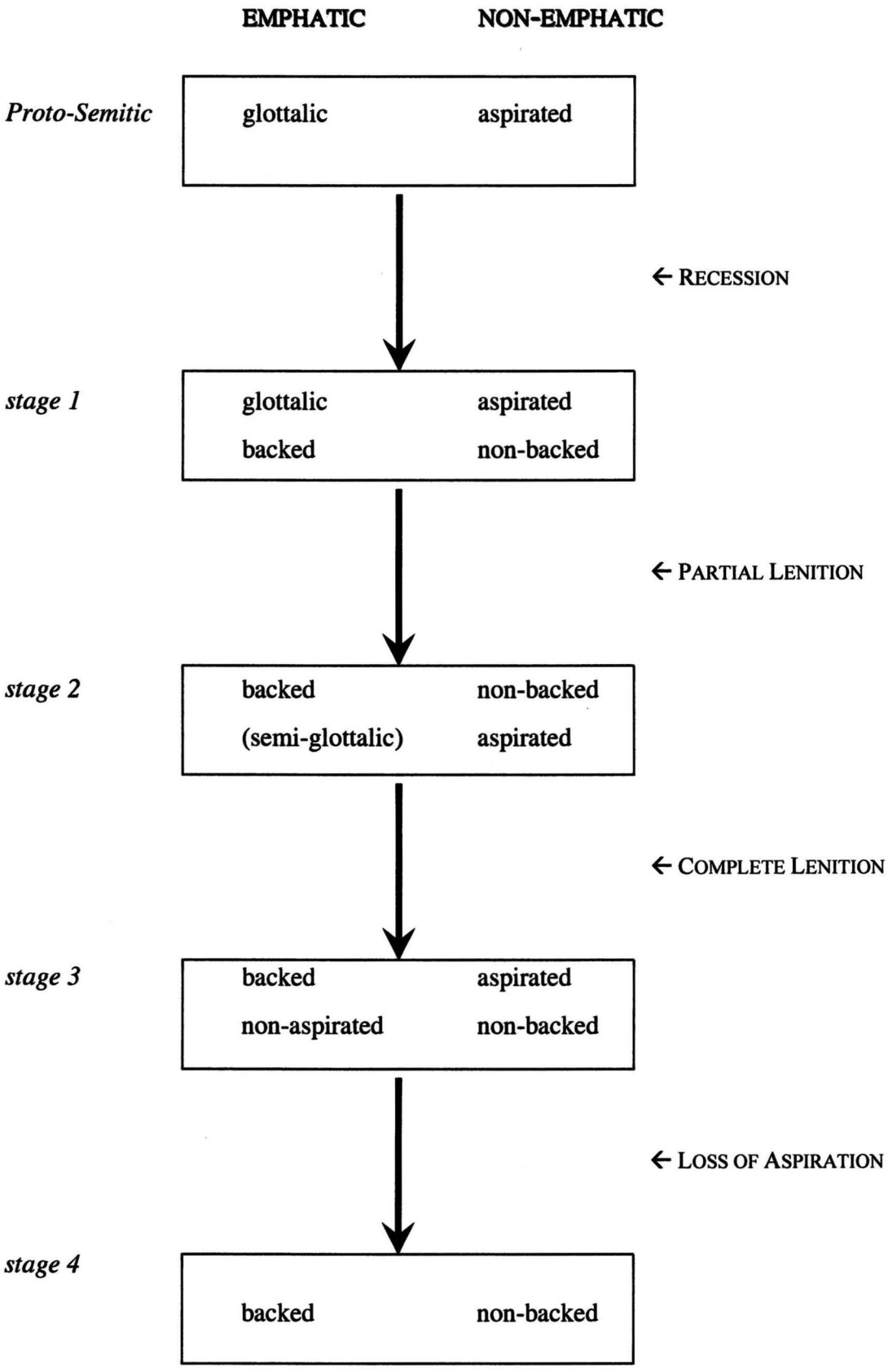
The emphatic trajectory hypothesis of Dolgopolsky (1977) posits that the original Semitic emphatics were glottalics and that the development into the system seen today in Arabic can be mapped along a trajectory, the stages of which are evident in various dialects of Neo-Aramaic. In this respect, Arabic is the most innovative of the Semitic languages. He discusses the Proto-Semitic consonant system in terms of a three-way distinction between voiced–voiceless–emphatic, maintaining that Proto-Semitic emphatics did not have a voiced–voiceless contrast, unlike the emphatics of modern-day Arabic and Berber. He argues that this is due to the glottalisation of emphatics in Proto-Semitic, where the triadic opposition of consonants would be manifest articulatorily in an opposition of the three main positions of the glottis: open glottis – vibrating vocal cords (i.e. approximated glottis) – closed glottis.[65] Thus, if the Proto-Semitic emphatics were actually glottalised, it would not have been possible to have a voiced–voiceless distinction.

Investigating the emphatics of the living Semitic languages, Dolgopolsky (1977) notes that there are three different realisations of emphatics. Firstly, those in Arabic are 'uvularised'. Secondly, in Ethiopic and Modern South Arabian emphatics are glottalics. This is true also of some Neo-Aramaic dialects, but here glottalisation is accompanied by tongue retraction and 'recession' of adjacent vowels (or of the whole word). Thirdly, Dolgopolsky argues that in some other Neo-Aramaic dialects the emphatic/non-emphatic opposition is actually a non-aspirated/aspirated opposition (respectively).

Dolgopolsky then discusses the Neo-Aramaic dialects in terms of representing the stages of the transition, in order to trace the trajectory from ancient glottalisation to Arabic 'uvularisation'. Figure 4.4 represents the trajectory proposed by Dolgopolsky, tracing the emphatic/non-emphatic distinction (in voiceless obstruents).

[65] This corresponds to the articulatory targets that I classify as (i) 'stiff-and-open', (ii) 'lax' and (iii) 'stiff-and-closed', which map onto the acoustic patterns (i) 'noise-lag', (ii) 'lead' = 'minus-lag' (or perhaps 'no-lag'), and (iii) 'stop-lag'.

Figure 4.4 Dolgopolsky's (1977) emphatic trajectory



According to Dolgopolsky, in the first stage of the trajectory the glottalic articulation of the emphatics causes recession of both the emphatic and the adjacent vowels, which may spread across the entire word.[66] Therefore, the emphatics are both ejective and backed. The non-emphatic voiceless counterparts are distinctive in being aspirated (but not recessed). This first stage is evident in Urmian Nestorian Neo-Aramaic (Neo-Assyrian) (spoken by the Christians of Urmia [Rezaiye], in north-west Iran [South Kurdistan]) and also some varieties of Kurdistani Jewish Neo-Aramaic.[67]

In the second stage of this trajectory, glottalisation is weakened to semi-glottalisation, and the distinctive opposition between emphatic and non-emphatic is now perceived as primarily that of aspiration vs recession / non-aspiration. This stage is represented by the Jewish Neo-Aramaic dialects of north-west Iran and south-east Turkey, specifically, Urmia, Salmās, Başkale and Gawar (Yüksekova) (all in Kurdistan, on either side of the Turkish–Iranian border).

In stage 2 of Dolgopolsky's trajectory, the phonological emphatic vs non-emphatic distinction is perceptually that of aspiration vs recession, thus, since the contrast does not depend on the perceptual salience of glottalisation, 'fortis' ejective realisation is weakened to 'lenis', and the VOT lag shortens.

Therefore, although the opposition of emphatics vs non-emphatics is primarily that of aspiration vs recession, the (non-aspirated) emphatics are still nevertheless glottalic, even though this may not be the most salient feature, and this is presumably still part of their phonological representation. It may alternatively be argued that the 'glottalic' feature is no longer part of the phonological representation, meaning that the emphatics would be plain voiceless – indeed this is what is found in stage 3 of Dolgopolsky's trajectory. Therefore, although, as will be seen in §4.4.3, I show the phonological representation of stages 1 and 2 as being identical (with varying phonetic mappings), it could also be argued that it is stages 2 and 3 which are phonologically identical (with varying phonetic mappings).

The third stage of Dolgopolsky's trajectory sees the complete loss of glottalisation, and emphatics are now distinguished from non-emphatic voiceless

[66] Dolgopolsky does not indicate *why* glottalic articulation should trigger backing, but seems to assume it as a given.
[67] Dolgopolsky doesn't specify these.

consonants as non-aspirated from aspirated and as recessive, which also causes the recession of adjacent vowels, from non-recessive. This stage is reflected in the Neo-Aramaic of Ṭūr ᶜAbdīn (AKA Turoyo, in south east Anatolia).

Finally, aspiration is then lost and the emphatics are distinguishable only by recession, which is, according to Dolgopolsky, what we see in Arabic.

However, in contrast to this final point of Dolgopolsky's hypothesis is my argument, which actually backs up his theory of the emphatic trajectory, and which I have used to argue for the ejective hypothesis, that Arabic does indeed, at least historically, have a three-way voicing contrast in plosives. In the dialects of Arabic which maintain a three-way voicing contrast between voiceless aspirated (voiceless non-emphatics), 'plain' voiceless (voiceless emphatics), and voiced consonants, we can see how the emphatics have developed from earlier Semitic, since although there is a three-way voicing contrast in stops, there is actually a four-term stop series due to the interaction of both voicing and backing. The perception of the emphatic / non-emphatic contrast, while being primarily cued by recession, is enhanced in such dialects by the aspiration contrast. However, in what are in this sense more innovative dialects, the laryngeal contrast of the two voiceless series has neutralised; according to the emphatic trajectory hypothesis, such characterisation of Arabic dialects appears well founded.

In contrast with plosives, fricatives in the languages which have lost the glottalisation of emphatics do not have the three-way voicing opposition that may characterise the stops, as is most commonly the case cross-linguistically.[68] Arabic fricatives may be one of four types: voiceless non-emphatic, voiced emphatic, voiceless emphatic, voiced emphatic. Thus, there is only a two-way voicing contrast in fricatives, with the emphatics being true counterparts (in terms of voicing) of the non-emphatics, unlike the (voiceless) stops, which are not true counterparts in the dialects which maintain the voicing distinction of the emphatics.

[68] Although not very common, there are languages that have voiceless aspirated fricatives – three languages (out of 317) in Maddieson (1984) have a voiceless aspirated fricative (in all cases *s*ʰ).

4.4.2 The emergence of the 'pharyngeal' character

In this sub-section, I focus on the emergent 'pharyngeal' character of the emphatics, and how this may have happened; since Arabic represents the last stage(s) of the trajectory, Arabic is the logical focus of the discussion here.

Firstly, I have argued that early Semitic had a backed voiced lateral fricative *ɮˤ (i.e. [ɮˤ]) as a member of the lateral triad. At some point in early Semitic, it seems that *ɬ became palatal *ś [ç ~ ʃ], although this must have occurred after a split between South Semitic (Ethiopic and South Arabian),[69] since South Arabian retained the lateral reflex. The merging of *ɮˤ with ṣ in Akkadian, Hebrew and Ugaritic indicates that ṣ in these languages had probably lenited (*ts'* → *ts*),[70] and probably *ɮˤ lost its laterality (and its 'backed' quality) to become **dz*, which then devoiced. In Syriac, as noted, *ɮˤ becomes *ɣ* (thus merging with historical *ɣ*), presumably as a result of its backed quality, and then *ɣ* merges altogether with ʕ, retaining the backed quality. Arabic retained the lateral fricative ɮˤ, although backed, as I have argued, which is why I believe that Arabic, almost alone among the Semitic languages, actually retained its lateral quality until fairly recently. That is, since Arabic systemised the 'back' quality, it naturally retained ɮˤ (=[ɮˤ]), which was incorporated into the emphatic system, which by that stage of Arabic was phonologised as 'backed', and later losing the lateral quality but retaining it as emphatic.

This leads on to the question of how 'backness' came to be systemised as a correlate of emphatic. Firstly, Steiner (1982:88–9) outlines suggestions by Martinet (1964:113–4) and Catford (1974:26) to the effect that 'a change from glottalic to pulmonic pressure initiation brought about the phonologization of pharyngalization...According to this hypothesis, pharyngal compression was originally an automatic concomitant of glottalic pressure initiation'. However, this implies that there is an intrinsic link between ejectives and 'pharyngeal constriction', such that on this account ejectives cross-linguistically would be expected to pattern with pharyngeals or lenite to some sort of pharyngeal, which is not the case.[71]

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[69] In early Ethiopic, *ɬ also apparently became palatal *ś*, and *ḍ* merged with *ṣ*, indicating that these laterals fell out of the system.

[70] As discussed earlier, ejective fricatives tend to affricate, which initially is phonetic. This presumably in Hebrew, etc, was systemised (i.e. phonologised), since *ṣ* would otherwise have merged with *s*.

[71] The major recent work on the typology of ejectives, Fallon (2002), which is impressive in its scope, makes no link between ejectives *per se* and 'pharyngeal'.

Secondly, Heselwood (1996)[72] presents an account of the development of emphatics from Proto-Semitic ejectives to modern-day Arabic 'backed' emphatics (with the Cairene Arabic voiceless emphatic *t̪* then becoming aspirated, while *t̪* in Baghdadi Arabic fossilises at the stage of 'plain' voiceless). According to Heselwood (1996), the emphatics of Proto-Semitic lost their glottalic initiation (in earlier Arabic), becoming voiced and laryngealised (creaky). They then lost the laryngealised quality, becoming instead pharyngealised, since 'the laryngopharyngeal constriction was then "reanalyzed" as the salient phonetic correlate of emphasis and ascended higher up the pharynx' (p.27). His scheme for the emphatics is as follows:[73]

Table 4.2 *Probable phonetic evolution of the principle allophones of apical obstruents*[74]

ḥarf	*translit*	*P-Sem*	*> Arabic development*
ط	ṭ	t'	> ʔd̪ > d̪ > tˤ
ظ	ð̣	t̪θ'	> ʔd̪ð > d̪ð > ð̪ > ðˤ
ص	ṣ	tˢ'	> s' > sˤ
ض	ḍ	tɬ'	> ʔd̪ɮ > d̪ɮ > ɮ > ɮˤ > ðˤ

According to this scheme, glottalisation to backing occurred as follows (Heselwood, 1996:27):

> the glottal occlusion characterising ejectives weakened slightly to laryngealisation resulting in a constriction in the glottis accompanied by a narrowing of the laryngopharynx which may have involved ventricular and aryepiglottic constriction...The weakening...could have involved merely a slackening of the longitudinal tension such as accompanies creak phonation...The laryngopharyngeal constriction was then 'reanalyzed' as the salient phonetic correlate of emphasis and ascended higher up the pharynx...then modal voice phonation would result and the emphatic sound become phonetically voiced.

It is certainly extremely likely that larygealisation was left as a remnant of the lenited glottalic. However, in my view, this does not *in itself* account for the 'backing'

[72] Chapter 2 presented the results of his analyses of VOT in Cairene and Baghdadi Arabic.
[73] Heselwood (1996) does not discuss the development of *q* (from Proto-Semitic *k'*), which under his account would presumably have lenited and voiced, becoming laryngealised *g*.
[74] Adapted from Heselwood (1996:22), retaining his transcription. For Proto-Semitic he adopts Cantineau (1960), following revisions made by Martinet (1959).

process seen in both Arabic and (some) Aramaic, which clearly became such a distinctive characteristic. Moreover, if this were the case, one would expect to see evidence (either historical or in dialect variation) of voiced *ṣ, which is not the case.[75]

Additionally, under this account, emphatic ṭ also underwent this laryngealisation, showing wholesale change from ejective to voiced (laryngealised) and then spontaneous and wholesale change back to voiceless as the laryngealisation was lost, which doesn't fit with ḍ / ḍ̌, which show no evidence of having devoiced.

Thus, while it is clear that ejectives lenited, and while I agree that the creakiness which is often a correlate of glottalisation was a factor in backing, I don't think that this *in itself* triggered such systematic backing of the emphatics. That is, while Heselwood argues for a purely phonetic account of this sound change, I believe that the sound change was the result of the association of glottalisation (through creakiness) with an already existent pharyngeal character inherent in the sound system. I argued earlier that the lateral series of Proto-Semitic was not part of the triadic system because *ɬˁ was not ejective and was already backed. Moreover, sound changes involving palatalisation of *ɬ evidence an *i*-quality which indicates that Proto-Semitic already had a back–front contrast.[76] I agree that as the ejectives lenited in a sub-set of Semitic, they left a remnant of their former identity in creakiness (or laryngealisation). Since the voiced pharyngeal ʕ is known across Semitic to be realised as creaky,[77] it is likely that the creaky emphatics became associated with the pharyngeals, and thus associated with the 'back' quality which was already evident in the 'backness' of ɬ. Thus, there was a more wholesale systemisation of back vs non-back contrasts, i.e. a step-by-step emergence of a general 'pharyngeal' quality to the Semitic sound systems. In this sense, the backing of the emphatics was an adaptive change (i.e. internal to the sound system).

[75] Heselwood (1996:28) says that 'sˁ' may have been voiced at some stage (although he doesn't indicate any laryngealisation).
[76] In Chapter 6 I argue that (at least in Arabic) non-emphatic coronals are [I]-specified and that this is an inherent part of the sound system.
[77] The voiced pharyngeal is also reported to be frequently glottalised in Ethio-Semitic and Cushitic. See Hayward & Hayward (1989:190). This further supports the evidence of a perceptual link between the voiced pharyngeal and the emphatics.

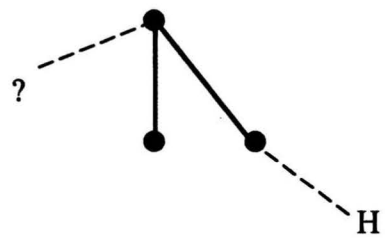
4.4.3 The emphatic trajectory – phonological representation

The aim of this section is to present the various stages of emphatic development in terms of changing phonological representation. I start with earlier (or common) Semitic (as Proto-Semitic) and move through Aramaic and Arabic.

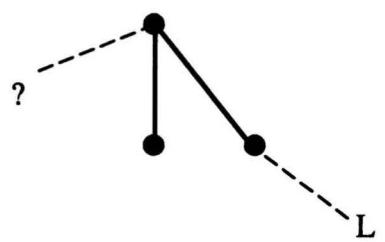
Firstly, earlier (or Proto-)Semitic had glottalised (i.e. ejective) emphatics. Therefore, as per Dolgopolsky's articulatory characterisations, the three-way (triadic) contrast of at least four Proto-Semitic consonant series represents the three states of the glottis: open, approximated, closed (i.e. stiff-but-open, slack, stiff-but-closed). These articulatory targets map onto the acoustic targets noise-lag, no-lag, stop-lag, being realised roughly as voiceless aspirated, voiced and glottalised. For the purpose of exemplification, the representations given are for the coronal stop series, *t d ṭ*:

Figure 4.5 *Phonological representation of Proto-Semitic triads: coronal stops Stage 0*

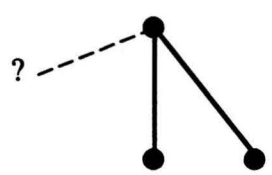
(i) ** voiceless (aspirated) coronal*



(ii) ** voiced coronal*



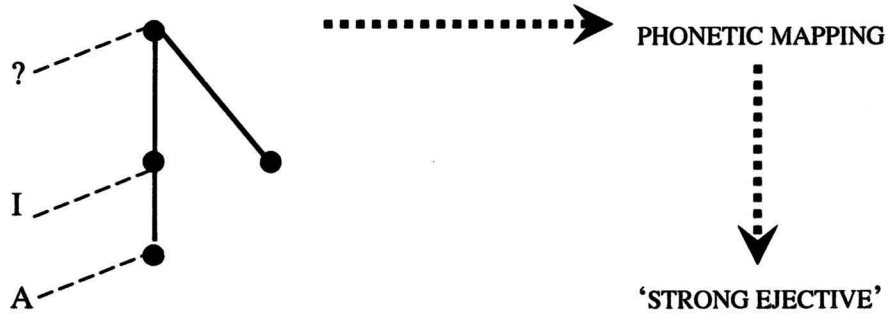
(iii) ** (ejective) emphatic coronal*



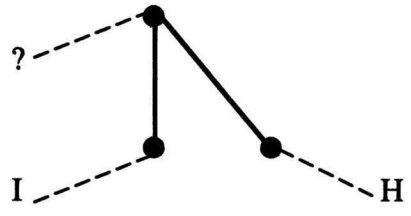
The first stage of the trajectory reflects the backing of the emphatic series. I have argued that this involves the element [A]. However, as I demonstrate in Chapter 6, this seems to have been part of a more general 'back'–'front' characterisation of the sound system whereby non-emphatic coronals are 'front' and thus have an *i*-quality ([I]-specification). In this stage, however, the emphatics, although 'backed' are still glottalic:

Figure 4.6 *Phonological representation of stage 1 voiceless stops: Neo-Aramaic – Urmian Nestorian, some Kurdistani Jewish*

(i) *backed glottalic emphatic stop*



(ii) *aspirated non-emphatic stop*

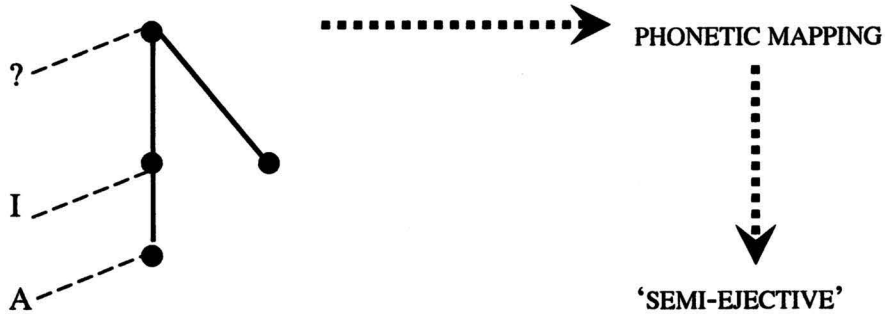


Under this account of emphatic development, the emphatics first become backed, due, as discussed to the emergence of a general 'front'–'back' contrast in the sound system. Emphatics then gradually lenite, with the element [A] becoming first the dominant or most salient factor in the distinctive opposition of emphatics, and then the only salient factor (as the glottalic factor lenites completely, i.e. the element [?] de-links). However, the decreased glottalicness of the emphatics in stage 2 is not necessarily encoded in the segment itself, but is a phonetic correlate. That is, in stage 1, where – according to Dolgopolsky – emphatics are fully glottalic, the element [?] linked to the relevant part of the structure maps onto the phonetic characteristic

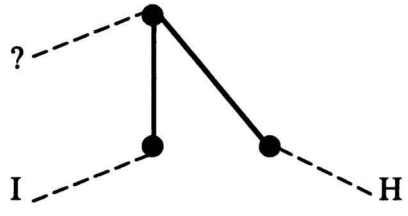
realised as 'strong (fortis) ejective'. This mapping is clearly language-specific,[78] thus partially lenited ejectives which still nevertheless *have* a clear degree of ejective release or creaky release (thus contrasting in this respect with other segments), therefore may be argued still to have the phonological representation which maps onto 'glottalic' (even though the exact phonetic implementation of this may be different from that of another language). Therefore, the phonological representation of stages 1 (above, Figure 4.6) and 2 (below, Figure 4.7) are the same, but with slightly different phonetic realisations.

Figure 4.7 *Phonological representation of stage 2 voiceless stops: Jewish Neo-Aramaic of NW Iran & SE Turkey*

(i) *backed semi-glottalic emphatic stop*



(ii) *aspirated non-emphatic stop*

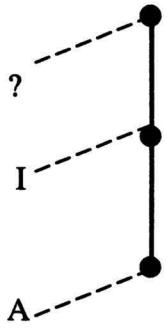


[78] For example, some languages have voiceless aspirates which average 50ms VOT, whereas others have voiceless aspirates which average 90ms VOT (see Ladefoged & Cho (2001) for a good cross-linguistic study of this). Since these don't contrast within a given language, they could not be considered phonlogically contrastive, thus encoded in phonological representation, but a product of language-specific mapping of phonological categories onto phonetic features.

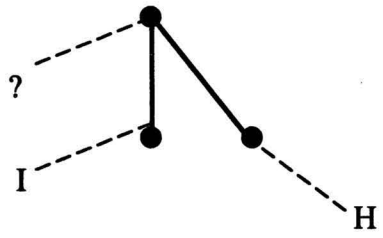
Stage 3 of the trajectory, represented by Ṭūr ᶜAbdīn Neo-Aramaic and some (more conservative) Arabic dialects, shows the complete loss of glottalisation (the de-linking of [?]):

Figure 4.8 *Phonological representation of stage 3 voiceless stops: Ṭūr ᶜAbdīn Neo-Aramaic & 'conservative' Arabic*

(i) *backed non-aspirated emphatic stop*



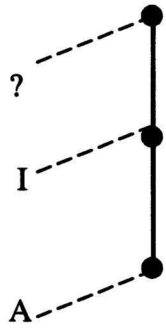
(ii) *aspirated non-emphatic stop*



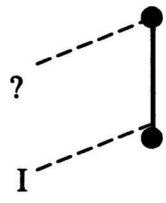
The final stage of the trajectory shows neutralisation in terms of laryngeal contrast of the voiceless stops, so that the emphatic / non-emphatic contrast is now purely 'back'–'front':

Figure 4.9 *Phonological representation of stage 4 voiceless stops: 'innovative' Arabic*

(i) *backed (neutralised) emphatic stop*



(ii) *(neutralised) non-emphatic stop*



4.5 Conclusion

This chapter has investigated the historical background of Semitic emphatics, tracing their development from common (or Proto-)Semitic to the present, and looking at the changing phonological representations. I presented the commonly reconstructed sound system of Proto-Semitic and the consonant systems of older attested Semitic languages. Accordingly, I have argued on various grounds that the Semitic emphatics were originally glottalics (ejectives), and followed the 'lateral hypothesis', which is now widely accepted. However, I argued that by the time of early Semitic, the lateral series did not strictly have an emphatic member. Moreover, I proposed that the voiced lateral *ɮ̣ ('ḍ') was already 'backed' by at least early Semitic, if not earlier. Having presented the Semitic triads, I then discussed the emphatic trajectory hypothesis of Dolgopolsky (1977) and argued that the emergence of the pharyngeal character led to a systemic 'front'–'back' contrast in which emphatics play a crucial part, meaning that the backing of emphatics (and subsequent lenition of the previous salient laryngeal contrast) is not an arbitrary sound change. Further to the subsegmental

primes and structures of phonology for which I argued in Chapter 3, I then traced the emphatic trajectory in terms of changing phonological representations.

Overall, it can be said that what is perceptually crucial in the production of emphatics in Semitic historically is the voicing opposition. To my knowledge, across the whole of Semitic it is only in the more innovative dialects of Arabic that this voicing opposition which distinguishes the emphatics has completely neutralised. Therefore, in seeking to answer the question 'what does it mean to be "emphatic"?', the answer lies essentially in the the original function of 'emphatic' within the obstruent system as a laryngeal contrast, which is mostly maintained. However, the changing overall characteristic of various Semitic sound systems has led to the systemic importance of the laryngeal function being lost, and the systemic importance of these (formerly secondary) characteristics being promoted. In these languages, it is the pharyngeal characteristic of the emphatic which can affect the nature of certain domains (i.e. syllables, roots or words),[79] and it is this which therefore receives primary attention in the literature.

In the next two chapters I move on to look at the behaviour of emphatics within the various sound systems of Arabic dialects, as it is this which will (eventually) enable the setting up of a fully comprehensive typology.

[79] This point is returned to in Chapter 6, with reference to Arabic.

Chapter 5
Towards a Typology of Arabic Sound Systems and Emphatics

We saw in Chapter 4 how Arabic fits into the Semitic language family. This chapter discusses in more detail the sound systems of various dialects of Arabic in relation to the behaviour of emphatics. The aim is to look at emphatics across dialects in order to see how 'emphaticness' functions within the sound system. Therefore, several different types of dialects are looked at. This necessitates looking at dialect classification and it raises the question of the degree to which 'dialect type' equates with varying emphatic behaviour. In fact, it seems that reports of varying behaviour are complicated by the (theoretical) approach and assumptions of the researcher to a degree. However, since the dialects clearly do have differences in sound systems, emphatics indeed have a varying role. The major sections of this chapter are therefore restricted to the issues of dialect classification and the variant sound systems of representatives of each major dialect group (under the traditional five-group classification), whereas analytical issues (and more in-depth discussion of emphatic behaviour) are kept mainly for Chapter 6.

This chapter can also be seen as a step towards bringing together the facts of the various dialects as a potential point of reference for future research. It is not a definitive account, since it is an enormous topic, and too large in scope for the current thesis, but a starting point which aims secondarily to bring under the spotlight the type of work which needs to be done in order to gather a more comprehensive corpus of pan-dialectal data for such a typology.

Additionally, due to the restrictions of the size of this project, it has been necessary here to confine discussion to issues which are more generally segmental. Therefore, topics such as syllable structure, stress assignment, etc, are not really looked at here.

The chapter proceeds as follows. Firstly I discuss Arabic as a language and look at dialect classification, detailing both the more geographical classification and then what has been called 'ecolinguistic' classification. §5.2 gives an overview of the (traditional) consonant and vowel system of Old Arabic. In §5.3 I discuss the issue of

phonological classification, noting the segmental characteristics which vary across dialects and positing a number of key variables to be investigated across the dialects. This leads us into the details of the sound systems of the dialects, in §5.4, where the key variables are detailed for a sample of dialect types, and where I also discuss any particularly salient features of the sound system, or any further aspects not fitting into the criteria. The concluding section sums up the major points arising from the cross-dialectal survey undertaken in the previous section.

5.1 Arabic as a language

Arabic today is a widely spoken language. As the language of the Qur'an, it spread via the Arab conquests and growth of the Islamic *umma*, or 'community',[1] from the time of the Prophet Muḥammad (d. 632 CE) onwards, beyond the Arabian Peninsula into Africa, Asia and Europe. The Classical Arabic (CA) of the Qur'an lives on now as 'the religious and liturgical language of all Muslims,[2] regardless of origin',[3] but it is not spoken, or acquired by children, as a native language. As a lingua franca, a standard form of Arabic commonly termed Modern Standard Arabic (MSA) has developed as the language of the media, education and academia, literature, bureaucracy, international trade, and so on. Put another way, MSA is, in the words of Holes (2004:6), the 'language of power and control, as opposed to the language of intimacy and domesticity (the dialect)'.[4] Since MSA is not limited to the educated elite, it has been assumed that a situation of diglossia exists in relation to 'colloquial' and 'formal' Arabic (see for instance Altoma, 1969), although as Holes (2004:49) incisively puts it:

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[1] Islam itself was probably the least important influence *initially* on the spread of the Arabic language after the Arab conquests. See Holes (2004:35).

[2] This is not at all to say that all Arabs are Muslims! According to Holes (2004:4), more than 90% of Arabs are Muslims, although there are large communities of Christian Arabs and, until relatively recently, Arab Jews. Moreover, the designation 'Muslim' often arises from cultural heritage rather than actual religious practice. Indeed, many Arabs who are culturally Muslim do not actively practise the faith (in Iraq, for instance, the major opponent to the Baᶜthist regime has traditionally been the Communist Party, founded in 1934, which survives despite the utmost repression).

[3] Holes (2004:1).

[4] Holes (2004:6) also calls MSA 'a kind of communally owned linguistic reservoir that [Arabs] can dip into when they need to'.

> The concept of Arabic as a 'diglossic' language, if it was ever accurate, is now an oversimplification: the behaviour of most Arabic speakers, educated or not, is rather one of constant style shifting along a cline at opposite ends of which are 'pure' MSA and the 'pure' regional dialect, more accurately conceived of as idealized constructs than real entities.

Currently, some variety of Arabic is spoken as a native language by somewhere around 250 million speakers, and Arabic is an official language in twenty states in the Middle East and Africa:[5] Mauritania, Morocco, Algeria, Tunisia, Libya, Sudan, Djibouti, Somalia, Egypt, Saudi Arabia, Yemen, Oman, the United Arab Emirates, Qatar, Bahrain, Kuwait, Iraq, Syria, Lebanon, Jordan, as well as the Palestinian Territories. There are also large minorities of native speakers of Arabic[6] in Khuzistan (a region of southern Iran adjacent to Iraq), the Balkh region of Afghanistan, Uzbekistan, north-eastern Iran, the part of south-eastern Turkey that borders Syria, northern Nigeria, Mali, Niger and Chad. Cypriot Arabic is also spoken by a decreasing community of Maronite Christians in Northern Cyprus,[7] and Maltese, although showing the strong influence of contact with European languages, is usually designated as a dialect of Arabic.

5.1.1 Arabic dialects

In their very broadest classification, Arabic dialects[8] (as opposed to Standard Arabic) are generally spoken of in terms of Eastern (Mashriqi) and Western (Maghribi).[9] The geographical division between the two dialect groups runs along the Egyptian Delta.[10]

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[5] Holes (2004:1).

[6] Holes (2004:2) puts this rather nicely: 'In adjacent areas once but no longer under Arab hegemony, a linguistic flotsam was left by the receding imperial tide.'

[7] Ethnologue states 140 speakers, in the village of Kormakiti.

[8] Discussion of the use of the term 'dialect' is outside the scope of this thesis. I use it here to mean 'native language variety', i.e. the various systems or varieties of Arabic that are acquired as a mother tongue (unlike Modern Standard [MSA] or 'Classical' Arabic [CA]). See Owens (2006), Holes (2004).

[9] For a comprehensive up-to-date introduction to Arabic dialect geography (with dialect atlases) see Behnstedt & Woidich (2005). For a survey (and classification) of Arabic dialects with discussion and sample texts, see Fischer & Jastrow (1980).

[10] Versteegh (2001:134). To illustrate, he cites the isogloss which is taken to characterise the distinction between the Eastern and Western dialect groups: 'All dialects of the Maghreb are characterised by the prefix *n-* of the first person singular of the imperfect verb', thus Moroccan Arabic *nəktəb* but Syrian Arabic *ʔəktob* 'I write'.

As Holes (2004:3) puts it, Arabic dialects 'may be thought of as being distributed along innumerable sets of intersecting continua, from Morocco in the west to Oman in the east, and from the borders of southern Turkey in the north to Sudan in the south'. The classification of Arabic dialects is not only tricky (due to various complicating factors), but also, as Versteegh (2001:140) states, even arbitrary. Firstly, dialects are not normally discrete entities independent of one another, but form continua, so that it is not possible normally to draw distinct lines on a map between speakers of one dialect versus another. Moreover, any attempt to do this would depend on the basis on which one judges one dialect distinct from another, e.g. phonetic features, lexical distribution, and so on. As Versteegh (2001:140) points out, 'The selection of different isoglosses as distinguishing marker leads to different divisions.' Moreover, this is further complicated in the Arabic case by the coexistence of sedentary and Bedouin dialects across the Arabic-speaking world. Having said that, Versteegh (2001:141) holds that the nomadic (Bedouin) dialects may be easier to classify, and that they 'may be regarded as discrete dialects, which are maintained even when the members of the tribe disperse over a large area. They reflect in their linguistic features the history of their migratory pattern.' With this traditional pattern of migration, though, the (nomadic) Bedouin dialects are not strictly areally defined in the sense of the sedentary dialects, but defined by tribal affiliation.[11] Other Bedouin dialects show the patterns of waves of migrations and settlement of formerly nomadic Bedouin tribes, meaning that in many areas of the Arabic-speaking world we find a sedentary vs Bedouin dialect dichotomy (also commonly called urban vs rural). Thus, for instance, the dialects classified as North-east Arabian (Najdī) are historically related to tribally defined speech communities, those of the Shammar and ᶜAniza. The former includes some of the Bedouin dialects of Iraq, and the latter includes the dialects of Kuwait, (Sunni) Bahrain, and the Gulf States. Also included in the classification of North-east Arabian is the Syro-Mesopotamian dialect group, which includes the Bedouin dialects of North Israel and Jordan. Alternatively, we find that within the Arabian group, the dialects classified as North-west Arabian (according to the reclassification of Palva, 1991) include the dialects of the Negev and the Sinai,

[11] Ingham (1982), see chapters 1 & 2.

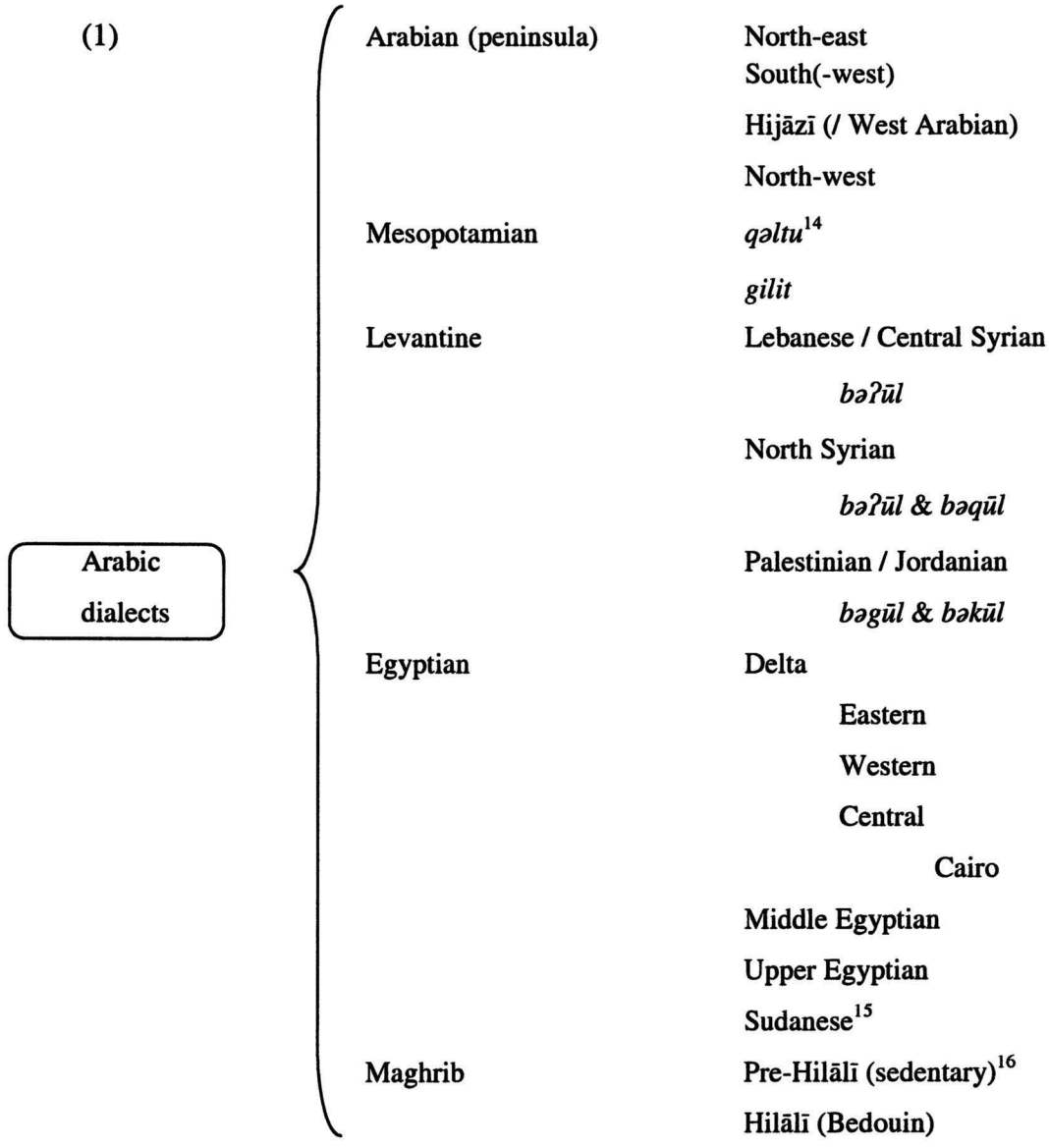
southern Jordan, the eastern coast of the Gulf of ᶜAqaba, and some regions of north-western Saudi Arabia.[12]

Generally speaking, Arabic dialects are classified into the following five major groups: (1) *Eastern (Mashriqi):* (i) Arabian (peninsula) / Bedouin, (ii) Mesopotamian, (iii) Syro-Lebanese (or Levantine), (iv) Egyptian; (2) *Western (Maghribi):* (v) Maghrib. However, these do not necessarily relate to strictly demarcated geographical regions, and there is much overlapping, certainly in the case of the Arabian, Mesopotamian[13] and Maghrib groups. The five major dialect groups may then be further classified roughly as follows:

[12] Although see the more recent work of de Jong (2000).

[13] The case of the Mesopotamian dialects is especially complex. See Versteegh (2001:156–9) for a brief overview; Blanc (1964) for thorough discussion of the *qəltu* and *gilit* dialect distribution in Baghdad; Jastrow (1978) for work on the *qəltu* group of dialects; Ingham (1997) and Ingham (1982:ch's 1–2) for Mesopotamian Bedouin dialects.

Figure 5.1 The classification of the modern-day Arabic dialects



Holes (2004) differs slightly from the classification in Figure 5.1 in that he classes as one group the dialects of the old-established cities of the Fertile Crescent

[14] So called after the two main variants of the reflex of CA *qultu* 'I said' which broadly differentiates Mesopotamian dialects. See Blanc (1964), who coined these terms, for an in-depth study of the distribution of these dialects in Baghdad (between Muslim, Christian and Jewish speech communities); Jastrow (1978) (an in-depth study of the *qəltu* dialects) for discussion. The choice of these lexemes reflects both a phonological variable and a morphological one (the reflex of OA *q* and the retention of the *-tu* form of the 1PS verbal suffix). The term was then applied to the Levantine dialect group (although for the non-past forms of the same verb), reflecting another morphological variable: that of the prefixation of *b-* to non-past verbal forms, which differentiates these dialect groups from the Bedouin dialects of this area (Levantine) which do not have the *b-* prefix.

[15] This would seem to include not just Sudanese, but also Nigerian dialects.

[16] Hilālī refers to the two stages of Arabicisation of North Africa: (1) late seventh century (during the Arab conquests); (2) tenth and eleventh centuries (the Banū Hilāl invasion). See Versteegh (2001:164).

and Cairo. In fact, this is relevant in relation to another type of distinction often made (at least, for the Levant) which is what may be called 'ecolinguistic' (Cadora, 1992). However, Holes (2004:70) discusses in addition to the sedentary–Bedouin division discussed above, a 'third socioeconomically defined dialect type', typical especially of the Levant, which differs from the 'city' dialect types and 'Bedouin' dialect types, and that is 'ruralite' (i.e. that spoken by 'long-established settled farming communities in villages'). He notes that throughout the Middle East, 'The overall effect is that of a dialectal patchwork quilt'. This distinction between Arabic dialect types – Bedouin (nomadic) vs rural sedentary vs urban sedentary – is developed in most detail in the 'ecolinguistic' theory presented by Cadora (1992). He notes that 'As a culture area the Arab world has had for more than a millennium three different ecological structures – nomadic (bedouin) and sedentary (rural and urban) – with parallel linguistic systems.' [17] He then notes that in correlation to 'identifiable transitional stages' along the passage from one to another of the ecological structures is linguistic adaptation as follows:[18]

BEDOUINITE → BEDOUINITE–RURALITE → RURALITE → RURALITE–URBANITE → URBANITE

This distinction between Bedouin, sedentary–rural and sedentary–urban dialect types, along with the formal acknowledgement of transitional stages in between, which is characteristic of the Levant, is likely to be a factor in the varying behaviour of emphatics and 'emphasis' in the Levantine dialects of Arabic.

A final point of note here concerns gender variation. This is a topic which is rather under-researched for Arabic, although attention towards it is increasing in line with research more generally in the field of sociolinguistics on gender variation.[19] The topic of gender variation in Arabic dialects is outside the scope of this thesis and therefore not discussed further here.

[17] Cadora (1992:1).
[18] Cadora (1992:1–2).
[19] See e.g. Kahn (1975), Haeri (1997), Khattab *et al.* (2006).

5.2 Arabic segmental systems

5.2.1 Consonant system

The realisations of certain consonants in Old Arabic (OA)[20] are somewhat disputed. We have recourse to the accounts of the medieval Arab grammarians, which provide us with a reasonable guide to the consonants of what they considered 'pure' Arabic, but they themselves noted dialectal variation, and are not entirely clear on some points.[21] Moreover, there is still debate over the correct interpretation of their descriptions, particularly in relation to segments such as *ḍ*, *q* and *ṭ*, on which more presently. What is generally agreed to have been the consonantal system of OA, as seen in Chapter 4, is repeated here:

Figure 5.2 The consonant inventory of Old Arabic

b	*f*	*m*	*w*
	θ đ ḍ		
t d ḍ	*s z ṣ*	*n l r*	
ǰ	*š*		*y*
k			
q	*x ɣ*		
	ḥ ʕ		
ʔ	*h*		

A point of note relating to the above is to reiterate that the issue of the independence of *ḍ* and *đ* in earlier Arabic is disputed.[22] Otherwise, variation with respect to the consonantal system is discussed throughout this chapter.

5.2.2 Vowel system

It is fairly clear that Old Arabic (OA) had the three short vowels *a*, *i*, *u*. What are generally transliterated as the three long vowels *ā ī ū* are reflected orthographically as

[20] As noted previously, I use the term OA somewhat non-committally, but avoid the term Classical Arabic (CA), which could be argued to be a 'hypothetical' construct, and has certain connotations. In what follows, I also refer where relevant to written Arabic or what is generally 'Standard Arabic'.

[21] In fact, as discussed, one problem with the accounts of the Arab grammarians relates to the issue of phoneme–grapheme correspondence.

[22] See the discussion in Chapter 3.

effectively 'aa' 'iy' 'uw', respectively. These would presumably have been realised as long vowels where immediately followed by a consonant, but otherwise, *y* and *w* in this position have a 'consonantal' value. Additionally, there were two diphthongs *ay* and *aw* (in addition to the *ay* and *aw* sequences where *y* and *w* have consonantal values). The treatment of these diphthongs across contemporary Arabic dialects varies. Where some dialects retain the diphthongs, other dialects have diphthongs in only some positions, but the coalesced monophthongs *ē* and *ō* in others, and many other dialects have *ē* (in some dialects *ī*) and *ō* (in some dialects *ū*) in most positions. This is shown in relation to individual dialects presently.

Insofar as the function of vowels within words is concerned, in Arabic (as well as to varying degrees in other Semitic languages) vowels do not have the lexically contrastive function that vowels typically have in many other languages, and this is a crucial feature of the morphology, which involves an essentially consonantal system of lexical roots. Ingham (1994:16ff.) divides vowels (for Najdi Arabic) into two types: those which have a 'specific grammatical marking function' and those which do not. He notes that where they have a grammatical function they tend to be more stable, while the non-marking cases of vowels are unstable and 'subject to the effect of phonological processes associated with morpheme structure conditions'. Ingham shows that vowels involved in verbal person / number affixes do not elide and are not affected by the short vowel raising rule (*a* → [æ]). Additionally, in Najdi there are 'stem vowels' marking such contrasts as perfective vs imperfective, and transitive vs intransitive vs passive. This is well known for Old Arabic, but less well discussed for contemporary dialects.[23]

What is relevant for our purposes, however, is that the (short) vowels in contemporary Arabic dialects are often not especially stable, particularly the high vowels, which often appear to elide or to be epenthetic, and the realisation of which is often highly subject to consonantal influence. The low vowel *a*, while appearing more stable, is also subject to a degree of consonantal influence as well as to *imāla*, meaning that its realisation may vary considerably.

[23] There is, however, a body of literature on apophony. This is far outside the scope of this thesis and is thus not investigated here.

5.3 Phonological classification

In this section, I outline the phonological variables that may be used as classificatory criteria in setting up a phonological typology of Arabic dialects. The aim of this chapter overall is to put the sound systems of Arabic dialects into the context of (typical) dialect classification, highlighting the role of emphatics within these sound systems. So far, I have outlined the development of Arabic and rough distribution of the *Neuarabische Sprachtypen*, as commonly classified. I have also outlined some of the typical properties of the Arabic morpho-phonological system as a whole and introduced what are most commonly accepted as the common historical consonant and vowel inventories. This section therefore looks at those variables of the sound system that vary across the dialects of Arabic. These are the variables used in the assessment of the dialects in the following section.

Since information on all the variables is not available for all the dialects (or dialect types) that I look at in the next section, setting up such a typology should in fact enable us to make predictions about dialects concerning one or more of these variables based on the patterning of the other variables of that dialect's sound system. Indeed, this work highlights the need for the gathering of such information, to be analysed consistently, which is a point I come back to in the concluding chapter to this thesis.

The working hypothesis is that certain generalisations for Arabic dialects can be made about sound-system types based on these phonological variables (the classificatory criteria).

Properties of the sound system that vary across the dialects are as follows. Firstly, we have seen that generalisations have been made about the realisation of historical *q*, *k* (and to some extent *j*). Given the analysis of the uvular stop *q* as the emphatic (or 'backed') member of the velar triad, and given that palatals are said in at least some dialects to block the spread of the emphatic property, the reflex of the dorsals in a given dialect can be assumed to have a bearing on the nature and behaviour of emphatics. Moreover, the dorsals more generally may play a crucial role in establishing front–back contrasts, as will be seen in the next section.

Previous work classifying dialects into broad types based on phonological variables focused on the realisation of *q* and *k*. The earliest is the work of Haim Blanc who, using the sedentary–nomadic dichotomy, gives the following system:[24]

Figure 5.3 Blanc's (1964) sedentary–nomadic dichotomy

OA	[qaʕad]	[qāʕid]	[kubr]	[kabīr]
	sedentary type		*nomadic type*	
(i) RETENTION			(i) FRONTING (1)	
	[qaʕad]	[qāʕəd]	[gaʕad]	[gāʕəd]
	[kubr]	[kabīr]	[kubr]	[kʲabīr] or [čabīr]
(ii) (a) *q*-DEBUCCALISATION			(ii) FRONTING (2)	
	[ʔaʕad]	[ʔāʕəd]	[gaʕad]	[ǰaʕəd][25]
	[kubr]	[kabīr]	[kubr]	[čəbīr]
or: (b) FRONTING			(iii) FRONTING (3)	
	[kaʕad]	[kāʕəd]	[gaʕad]	[ʤāʕəd]
	[čubr]	[čbīr]	[kubr]	[tsəbīr]

According to the scheme above, dialects are classified as sedentary or nomadic. Blanc posits a trajectory of development, along which the dialects of today may be seen as more conservative or more innovative (compared with OA). The sedentary dialects are seen primarily in two stages: (i) retention of OA *q* and *k* (Blanc calls this stage de-voicing); (ii) *either* *q*-debuccalisation, *or* fronting (of both *q* and *k* in all environments). The nomadic dialects are seen primarily in three stages, although in all cases the reflex of OA *q* is voiced: (i) fronting #1 (of only **k* in front-vowel

[24] Adapted from Blanc (1964:30). It should be noted that Blanc (1964) has 'ɢ' for the OA uvular stop. As previously discussed, however, I refute the hypothesis that this was necessarily voiced ɢ (in Old, or pre-divergent, Arabic). Blanc (1964:29) argues for ɢ on the basis of Sībawayh's classification of it as *majhūr* (where I argue above that *majhūr* sounds were in opposition to the voiceless aspirates, i.e. *mahmūs* sounds). Those who consider the OA uvular stop to have been ɢ argue that it subsequently devoiced to *q*, although as Proto-Semitic has **ḳ* (i.e. [k']) it seems odd that this would spontaneously have then become voiced, especially given that ɢ is typologically extremely marked, and given that other emphatics (*ṭ* and *ṣ*) did not. Therefore I have not included Blanc's 'de-voicing' stage (1).

[25] Note that I use *ǰ* to denote the voiced palato-alveolar stop, IPA [dʒ]

environments); (ii) fronting #2 (of both *q* and *k* in front-vowel environments); (iii) fronting #3 (of both *q* and *k* in front-vowel environments).

Holes (1983:14–15) uses a similar analysis for the various (Sunni and Shi'i) dialects of Bahrain, adding OA *γ* and *ǰ*.[26] He notes that Blanc's analysis seems applicable not only to the classification of Mesopotamian dialects, but additionally to dialects of Arabic well outside Mesopotamia, so that, for instance, dialects conform to Blanc's stages as follows: (A) sedentary: (i) the Omani dialect discussed by Reinhardt (1894 [1972])[27]; (iia) urban dialects of the Levant; (iib) rural village dialects of central Palestine, some North African rural sedentary dialects, and most Bahraini Shi'i dialects; (B) nomadic: (i) the Bahraini Sunni dialect;[28] (ii) the Mesopotamian rural dialect of Khuzistan (southern *gilit*); (iii) the central Arabian dialects.

In addition to the reflexes of OA dorsals and palatals, another phonological variable to be considered is the number and contrastivity of vowels. As seen earlier, it is generally assumed that OA had three short vowels *i a u*. However, in many dialects the high vowels *i* and *u* have at least partially neutralised (in some dialects they have entirely merged), such that *i* is found in front (non-emphatic) environments, and *u* is found in back (emphatic) environments. It may also be relevant to look at the reflexes of OA *ay* and *aw*, since these are retained in some dialects but in others are realised as *ē* and *ō*. In Mesopotamian *gilit*, *Cē* is diphthongised to C^{y}[ɪɛ] in non-emphatic environments, meaning that it participates in the emphatic / non-emphatic contrast.[29] Such factors are also thus included as relevant phonological variables.

Moreover, I have already noted that OA **ḍ* and **ḏ́* are not independent phonemes in the vast majority of the *Neuarabische Sprachtypen*,[30] and that their identity seems to depend at least partly on whether the dialect is considered to be in

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[26] All the Sunni dialects (of Bahrain) have the reflex *ɢ* or *q* for OA *γ*, and OA *ǰ* is realised by different dialects variously as (IPA) *ʤ*, *j*, *g* or *j*.

[27] Reinhardt (1972 [1894]).

[28] It strikes me from this classification alone that the Sunni Bahrain dialects as classified by Holes (1983:14) are more likely to fit Blanc's stage (2) of the nomadic-type dialects, since OA *q* is *ǰ* in front-vowel environments and OA *k* is systematically *č* in front-vowel environments. Blanc's stage (1) reflects Muslim Baghdadi Arabic (*gilit* Mesopotamian).

[29] Cf. (*ṭabb*-type) Muslim Baghdadi (a *gilit* dialect) [bʲɪɛḍ] 'eggs' (*[bɛ:ḍ]) (OA *bayḍ*), where the word-final emphatic does not spread into the initial *b*, which is palatalised, and does not prevent diphthongisation, in contrast with [ḍɛ:f] 'guest' (OA *ḍayf*), [ṭɛ:ħ] 'falling' (OA **ṭayħ*), [ṭɛ:r] 'birds' (OA *ṭayr*), [ṣɛ:f] 'summer' (OA *ṣayf*) (contrast the latter with [sʲɪɛf] 'sword', from OA *sayf*).

[30] Except for some dialects of Yemen, as discussed in Chapter 3, §3.3, above.

this respect more 'conservative', in which case *ḍ̄* is prevalent, or 'innovative', in which case *ḍ* ~ *ẓ* is prevalent. This appears to go hand in hand with whether a given dialect has interdentals (i.e. whether OA **ḏ̄* and **θ* are retained).

Also noted earlier is that there are dialects in which the VOT contrasts between voiceless emphatics and non-emphatics is retained (i.e. that there is a three-way voicing contrast), but that in other dialects there is a two-way voicing contrast (where the voiceless emphatics and non-emphatics are all generally somewhat aspirated). In addition, I noted that there appears to be dialectal variation in the realisation of the voiced pharyngeal ʕ, which in some dialects is realised commonly as a stop, and in others as an approximant. These are two factors that are often not taken into consideration in descriptive works, and the information is thus not always available (in the following section indicated as necessary per dialect).

In addition to these variables, I noted in Chapter 3 that in some (Bedouin-type) dialects there is a type of resyllabification in guttural contexts commonly known as the *gaháwa* syndrome (in some dialects *ghawa*). Since this further reinforces the general perception of 'guttural' quality, this is also relevant to the overall sound system and is included.

Lastly, the variables which directly involve emphatics are as follows. Some dialects have been analysed as having a greater number of 'phonemic' emphatics than others. Therefore, where possible, I include a list of such emphatics, as given by the relevant source. Secondly, the minimum and maximum domains of spread of the emphatic property are also said to be subject to dialectal variation. Additionally, where particular segments are known to block the spread of the emphatic property, this information is given. Lastly, in some dialects, almost all cases of words which are partly or wholly emphatic contain a phonemic (normally coronal) emphatic which is the trigger. Other dialects, however, have some words or domains which contain such a segmental trigger, and other words or domains which are deemed emphatic without having a clear segmental trigger (e.g. in Iraqi *gilit* where certain combinations of consonants (and vowels) are interpreted as emphatic).

Since all the above factors potentially interact in the sound system of any given dialect to give it its distinct quality, and since the behaviour of emphatics in a

given dialect is presumably not arbitrary but a function of the sound system as a whole, it is relevant to any cross-dialectal, comparative account of Arabic emphatics to look at the overall sound system. Moreover, all these factors clearly participate in the pan-Arabic phonological typology.

Therefore, for each variety of Arabic detailed in the following section (where the information is available) the following phonological variables are shown as potential classificatory features:

Table 5.1 Dialectal phonological variables

1	reflex of OA *q*, *k* and *ǰ*
2	vowel system (identity and contrastivity of short vowels; realisation of OA diphthongs *ay* and *aw*)
3	presence / absence of interdentals; realisation of OA **ḍ* / **ḏ̣*
4	lexical (segmental) emphatics
5	VOT contrasts (three-way vs two-way voicing contrast)
6	realisation of the voiced pharyngeal ʕ (predominantly stop / approximant)
7	syllabification in guttural contexts (*gaháwa* / *ghawa* syndrome)
8	minimum and maximum domains of spread of the emphatic property
9	potential blockers to the spread of the emphatic property
10	presence of non-segmental trigger(s) of the emphatic property

Finally, where other factors are relevant, or involved in backing, or where there are other points to be made about emphaticness, this is discussed after the main points above. For instance, since words in many dialects apparently can't be seen simply in terms of segmentally triggered 'emphatic' and 'non-emphatic' sequences, and this point is elaborated on where necessary.

A last point to be revisited before moving on to the details of the dialects relates to some of the terminology employed by the Arab grammarians (and those following) which is used where relevant in this chapter. Firstly, the grammarian Sībawayh[31] classified the consonants of Arabic according to various criteria. One of

[31] I use Sībawayh here as representing the Arab grammarians, since he is generally considered the 'founding father' of the Arab grammatical tradition.

these was *iṭbāq*, 'lidding, covering', which was characteristic of the emphatic consonants (the *ħurūf muṭbaqa* 'lidded phonemes'). Secondly, the term *tafxīm* referred to a 'backed' allophone of *ā*, although was later taken to refer to the process of the spreading of emphaticness or backing, causing segments to become *mufaxxam* ('puffed up'). Lastly, in non-guttural, non-emphatic contexts, *ā* was fronted / raised (generally where the preceding or following vowel was *i*), in a process called *imāla* 'inclination' (i.e. inclination towards *i*). These three concepts are referred to at various points in the current chapter.

5.4 Dialect phonology

In this section, I go through the various dialect groupings of Arabic to identify typical properties of the sound system per group. For the purposes of this thesis, the reliance has had to be predominantly (although not entirely) on the descriptions available in the literature, rather than my own primary sources.[32] However, in itself this gathering together of the data typically available for the dialect types is a crucial basis for a phonological typology. A secondary aim of this chapter is thus to highlight any types of data which are so far either unavailable or sketchy.

5.4.1 Arabian

According to Versteegh (2001:148) and Palva (1991), the Arabian dialects can be classified as follows:

(1) North-east: dialects of the Najd (esp. of the ᶜAniza and the Shammar): (i) ᶜAnazī dialects incl. those of Kuwait, the Gulf states, and the Sunni (ᶜArab) communities of Bahrain; (ii) Shammar dialects incl. some of the Bedouin dialects of Iraq;[33] Syro-Mesopotamian Bedouin dialects

[32] As discussed in my concluding chapter, it is intended that as an extension to the current work, first-hand data can be gathered for each of the dialect groups, and that consistent methodological (both phonological and acoustic) analyses will enable a more fully comprehensive account of Arabic phonological typology.

[33] Holes (1983) shows the relationship of the Shiᶜi dialects of Bahrain to the 'sedentary' (/'semi-nomadic') dialects around the periphery of the Arabian peninsula and into lower Mesopotamia (Ingham's, 1976, *ahl il-naxīlāt* classification for the dialects of the sedentaries and town-dwellers on the Shaṭṭ il-ᶜarab and lower Kārūn river); he shows that the Sunni dialects of Bahrain (classified as South(-west) Arabian above) are 'nomadic' and comparable to Ingham (1976)'s *ᶜarab* classification for the lower Mesopotamian dialects of the (sedentarised) nomads of the Euphrates.

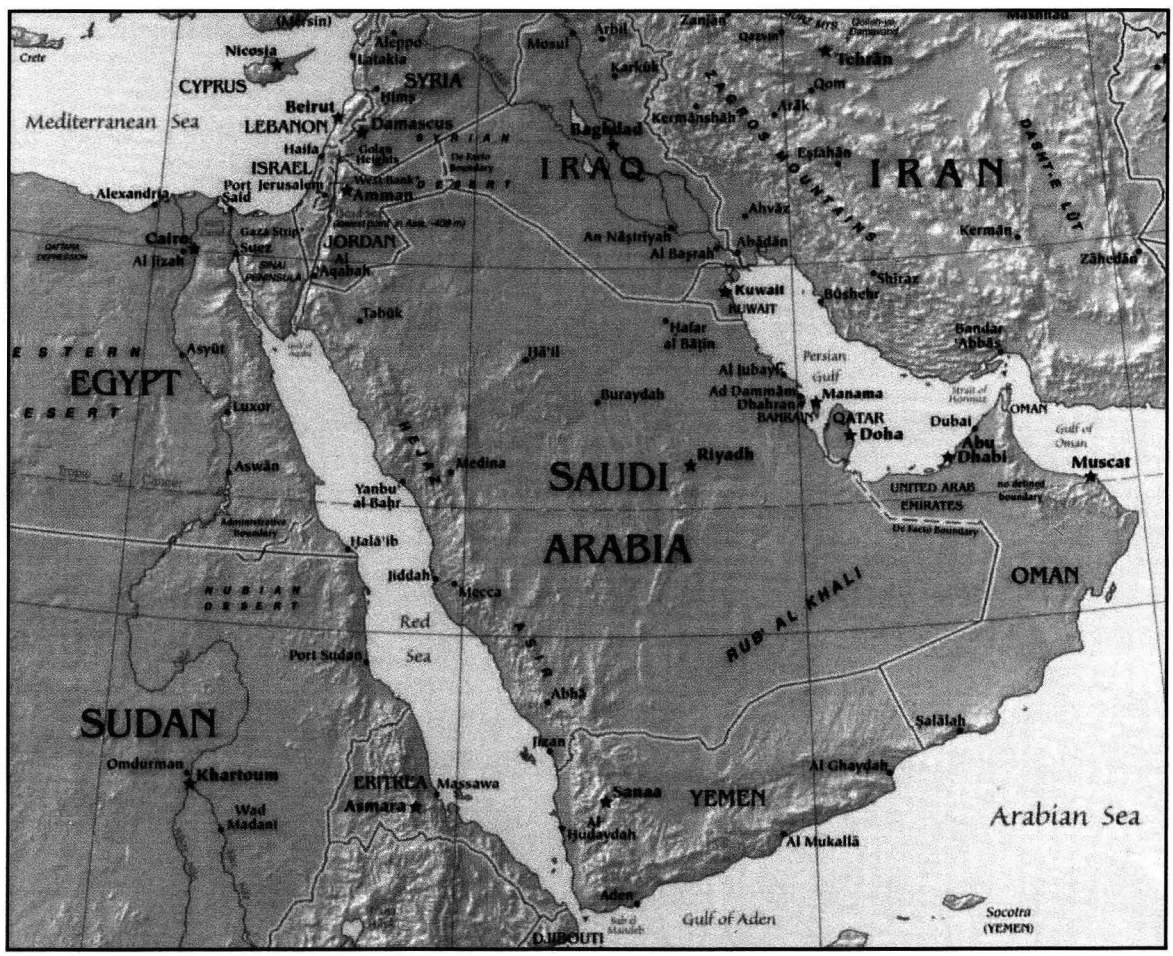
(2) South(-west): dialects of Yemen, Ḥadramawt, Aden, the Shiᶜite (Baḥārna) communities in Bahrain

(3) Ḥijāzī (=West Arabian): Bedouin dialects of the Ḥijāz and the Tihāma and the (sedentary) dialects of the urban centres of this area, chiefly Mecca and Medina

(4) North-west:[34] dialects of the Negev and the Sinai, also southern Jordan, eastern coast of Gulf of ᶜAqaba, the regions of Ḥisma and Ḥarrat al-Riḥa in north-western Saudi Arabia

In this section, I shall outline the behaviour of emphatics in the dialects of Ṣanᶜā (Yemen), Negev Bedouin and Sinai Bedouin.

Map 5.1 The Arabian dialect area[35]



[34] The north-west Arabian dialect group proposed by Palva (1991) is generally accepted (although Versteegh, 2001, doesn't mention it, subsuming these dialects under north-east Arabian). However, further work by de Jong has raised some questions about the north-west Arabian dialect group.

[35] Map middleeast_ref01 (adapted) from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps/.

5.4.1.1 Ṣanᶜāni

The features of the phonological system of Ṣanᶜāni taken into consideration here are as detailed in Watson (2002).[36]

Table 5.2 Phonological features of Ṣanᶜāni

1	OA *q* → *g* (voiced) – all items (including MSA borrowings and what may be termed *Hocharabische*, e.g. *al-gurʔān* 'the Qur'an')
	OA *k* → *k*
	OA *ǰ* → *ǰ*
2	*i, u, a*[37] in Ṣanᶜāni and most Yemeni dialects, there is some merge between *i* and *u*, although they are contrastive 'in most contexts' (Watson, 2002:22)
	ī ū ā ay aw
3	interdentals = *θ ð̣ ṯ*
	OA **ḍ / *ḍ̣* → *ḍ̣*
4	lexical (segmental) emphatics = *ṭ ṣ ḍ̣* (*ḷ* is marginal – only in *aḷḷāh* 'God' and derivatives of this word) as stated by Watson (2002:279) the pharyngealisation of the Yemeni emphatics is weaker than that of other dialects, but this is compensated for by the emphatics being instead strongly labialised (as is clear from the soundfiles I have listened to)[38]
5	voicing contrast = three-way (*ṭ* is voiceless unaspirated; *t* is voiceless aspirated)[39] [40]

[36] Her transcription adapted slightly here: I notate consonants as throughout this thesis; Watson (2002) denotes emphatic spread by underlining segments – I use underscript dots to reflect this (while acknowledging that this has the unfortunate effect of obscuring the emphatic trigger, as well as implying that all segments become emphatic in the same way as the coronals – a point that I refute).

[37] Watson (2002:22) notes that in Ṣanᶜāni and most Yemeni there is some merge between *i* and *u*, although contrastive 'in most contexts'. The neutralisation context(s) is not made clear here, but presumably the reference is to those contexts where labialisation harmony triggers *i* → *u*, thus neutralising the opposition (Watson, 1996; 1999; 2002:279–284). The data indicate that this context creates a considerable degree of neutralisation.

[38] These are the soundfiles of Ṣanᶜāni recorded by Janet Watson and available on the SemArch website: http://www.semarch.uni-hd.de/tondokumente.

[39] This is noted by Blanc (1969:24–5), who says that the 'primacy of the aspiration feature and the instability of voicing is even more striking [than in Najdi]'; also Qafisheh (1992:2), who says that '/t/ is a little aspirated...while /ṭ/ is unaspirated'.

6	ʕ is realised as at least very creaky, more often as a stop (with creaky release)[41]
7	no re-syllabification in guttural contexts: 'coffee' = *gahwih*
8	the emphatic property spreads L–R within the phonological word stem: minimum emphatic domain is CV, e.g. *ṭarīg* 'road, way'; maximum domain is the phonological word, e.g. *ṭuṛug*[42]
9	• rightward spread of the emphatic property under the analysis in Watson (2002) is optionally blocked by non-tautosyllabic *ī*, e.g. *ṭawīl* ~ *ṭaẉīl* 'long (m.s.)' • suffixes become emphatic only when immediately adjacent to the emphatic trigger, e.g. *šaṇaṭ-āṭ* 'bags', *maṛaḍ-ha* 'her illness', vs *ṭaḷab-āt* 'demands', *ḍaṛaḅ-ha* 'he hit her'[43] • prefixes and clitics usually do not become emphatic, even where tautosyllabic with an emphatic: *bī-ṛaḅḅaṭ* 'he is tying', *bi-t-naḍḍaṃ* 'she arranges', *yi-ṭlaʕ* 'he goes up'; however, cf. *aḍ-ḍuhṛ* 'midday', where the stem-initial emphatic *ḍ* has caused assimilation of the definite article *al-* (as for all dialects seen); the first three examples (of non-spread) involve prefixes which are inherently 'front' context

[40] Watson's (2002:43) analysis of Ṣanᶜāni as having three triads (*t-ṭ-d*, *s-ṣ-z*, *θ-ḍ-ð*) leads her to conclude that 'voice is [thus] non-distinctive in the Ṣanᶜāni emphatics', since Ṣanᶜāni emphatics do not have emphatic counterparts contrasting for voice. For her, therefore (using monovalent features), where the non-emphatic voiced coronals have [voice] and voiceless don't, this also means that the emphatic coronals don't have [voice]. This is contrasted with Cairene, in which emphatics have a [voice] contrast, since Cairene has the two four-term systems *t-ṭ*, *d-ḍ*, *s-ṣ*, *z-ẓ* (i.e. the emphatics contrast for voice amongst themselves). However, there are two problems with this: firstly, although the notion of redundancy would be invoked here, it does not explain why (or predict that) in Ṣanᶜāni *ḍ* is voiced while *ṭ* / *ṣ* aren't; secondly, this view does not explain why emphatics in certain dialects, of which Ṣanᶜāni appears to be one, are produced consistently with (roughly) zero VOT, in contrast with the voiceless non-emphatic stops, which are slightly aspirated (as shown in Chapter 2, above), whereas in dialects like Cairene, emphatic and non-emphatic coronals have overlapping (or roughly the same) VOT zones. While redundancy may be invoked, i.e. for Watson a coronal obstruent with (tertiary) non-primary [dorsal] and the acoustic feature [strident] therefore has no [voice] feature, these features do not form a natural class and there is no sense of phonetic naturalness inherent in this. I therefore assume that Ṣanᶜāni emphatic stops are 'plain' voiceless, whereas other voiceless stops have [H].

[41] This information is not specified in Watson (2002), but these facts are clear from the soundfiles (available online, details as above).

[42] I argue in Chapter 6 that the emphatic property targets only coronals, so that the *g* in *ṭuṛug* is not actually emphatic, but just not in a 'front' (*imāla*) context. I am slightly puzzled by the example of *ṭuṛwag* 'roads' and *ṭuṛug* 'ways', vs *maṇaḍug* 'areas', where the first two are denoted as entirely emphatic while in the last example, *-ug* is not shown as emphatic; I suggest that any apparently conflicting data is because velars and labials don't become emphatic, but are perceived as being in 'front' or 'non-front' domains. In these examples there is no 'front' domain.

[43] Again, the data conflicts as to whether 'emphaticness' spreads rightwards into labial *b*, which is shown as emphatic only when there is no following ('non-emphatic') vowel. Again, I suggest that this

10	non-segmental triggers: Watson doesn't show certain combinations of consonants to be emphatic (as compared with, say, Mesopotamian *gilit*); however, there is 'labial spread' which seems equivalent to what is notated as emphatic in *gilit*, although this is more extensive in Ṣanᶜāni (most likely due to different reflexes of the suffixes); labialisation spreads predominantly L–R and is not restricted to the stem, but active in suffixes; it targets short high vowels so that it is manifest in an alternation between *i* ~ *u*, data below

Some of the data showing labialisation of short vowels is as follows.[44]

(1)	labialised		non-labialised	
	magṭūb-uh	'diligent (f.s.)'	*maktūb-ih*	'written (f.s.)'
	yiwaṣṣul-uh	'he brings it (m.)'	*yiwaggif-ih*	'he stops it (m.)'
	faṣl-uš	'your (f.s.) class'	*dars-iš*	'your (f.s.) lesson'
	ħāfiḍ-l-uh	'remembering it (m.)'	*ǰāhiz-l-ih*	'ready for it (m.)'
	ṣāyum	'fasting (m.s.)'	*kātib*	'writer'
	maḍārub	'wooden beaters'	*madāris*	'schools'

A last point of note is that Watson (2002:281) notes that 'the erstwhile enhancing feature [labial] has adopted the role of compensatory feature with the result that non-primary [labial] is now more active in signalling emphasis spread than non-primary [guttural]'. While in my analysis [labial] is not emphatic *per se*, and while the analysis (per Chapter 6) is not of [guttural] and [labial] features, but the elements [A], [U] (and [I]), I think Watson's conclusion is interesting in that it highlights the role of [labial] (for me, [U]) in the overall 'back'–'front' contrast. Moreover, Watson

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is not because *b* becomes emphatic, but that it is in a 'back' (*u*- or *a*-) context rather than a 'front' context. In *mā ḍaṛaḅ-ṣ* 'he didn't hit', it is the presence of the 'back' variant of *a* preceding the final *bš* (and the lack of a following vowel, and thus the possibility of a 'front' or *imāla* context) which make *bš* seem 'back' here. Moreover, since the emphatic property is shown to spread into a suffix only when it is directly adjacent to the emphatic trigger (i.e. a 'primary' coronal emphatic), in this example *š* cannot be emphatic (the lack of following vowel removes the context in which 'frontness' or 'backness' is perceivable).

[44] From Watson (2002:281), see also Watson (1996, 1999). It should also be noted that non-domain-final labials and dorsals are labialised to the right of *u* and *w* (and dorsals to the left of *u*), e.g. *du*[kk^{w}]*ān* 'shop', indicating that the velars are 'backed' by [U] (see Chapter 6).

(2002:279) notes that 'the degree of pharyngeal constriction in the Ṣanᶜāni oral emphatics differs from, and is less than, that in the Cairene oral emphatics'. Firstly, I suggest that this is why 'emphaticness' is much less likely to spread into affixes. Secondly, this indicates that this cross-morphemic-boundary type of spread is likely to be more related to co-articulation, and is thus on a different level from the spread within the stem that affects other coronals (as discussed in Chapter 6). Lastly, this also indicates that the role of 'emphaticness' within the sound system is part of the general 'front'–'back' contrast, but is not itself the only correlate of 'back' (or rather, 'non-front', which I think is the crucial point). Since Ṣanᶜāni has more *u*-quality (which I argue for other dialects in Chapter 6 is actually [U] domains), the *a*-quality ([A] domain) is not so crucial in distinguishing the 'non-front' context (which is another way of interpreting Watson's analysis of this).

5.4.1.2 Negev Bedouin

According to the classification of Palva (1991),[45] Negev Bedouin is North-west Arabian. Previously, the Bedouin dialects of Ḥōrān / South Palestine / Jordan (the *bəgūl* dialects) and Negev Bedouin were considered continuations of Ḥijāzi dialects (because western Arabia, except Mecca, was almost a *terra incognita*). Palva, however, holds that there are two types of *bəgūl* dialects, and that the conditionally affricating (g [<*q] → *ǰ* and *k* → *č* in palatal environments) *bəgūl* dialects are the Syro-Mesopotamian branch of North Arabian, whereas the *bəgūl* dialects without affrication (slightly further south) are a markedly different type of Bedouin which he calls North-west Arabian. This Negev Bedouin is one of these NW Arabian dialects.

The account of Blanc (1970) of the Arabic dialect of the Bedouins of the Negev[46] shows the following characteristics in relation to the phonological variables discussed in the previous section:

[45] Although see the work of de Jong (2000) on the Bedouin dialects of north-west Sinai.

[46] He notes that they are semi-nomadic tent-dwellers, and that the dialect is represented chiefly by the speech of the Ẓullām, inhabiting predominantly the area around the northern and central Negev (Be'er Sheva district) (Blanc, 1970:1–2).

Table 5.3 Phonological features of Negev Bedouin

1	OA *q* → *g* (voiced)
	OA *k* → *k* ('fortis')[47]
	OA *ǰ* → most speakers have *ǰ* (some speakers have *ď*, some have *ḍ̌*)
2	*i u a* partial merge of *i* and *u*; only closed syllables truly contrastive (*ṭaḅḅ* 'he arrived', *ṭuḅḅ* 'arrive!', *ṭiḅḅ* 'medicine')
	ā ē ī ō ū ay aw iy uw many speakers merge most instances of *ē* with *ī* (*bīt* 'tent', **bēt* < OA *bayt*) OA *ay* + *aw* preserved mostly only when following guttural or emphatic (*ʕayn* 'eye', *ṭayr* 'bird') some speakers merge *ō* and *ū* → [ō] *iy* and *uw* common word-finally (*guwiy* 'strong', *aḅuw* 'father') no internal *imāla* but word-final (OA) *ā* and *ā'* normally → *iy*, except when following emphatic or preceding V = *a* (*miy* 'water' <OA *mā'*, *ndiy* 'call' < OA *nidā'*)
	emphatics cause 'flatting' of adjacent vowel accompanied by rounding and backing (except *ay* → [äy])
3	interdentals = *θ ď ḍ́*
	OA **ḍ / *ḍ́* → *ḍ́*
4	'phonemic' (segmental) emphatics = *ṭ ṣ ḍ́* (*ṛ ḷ ḅ ṃ f* are products of environment, see 10 below)
5	voicing contrast = three-way (*ṭ* is voiceless unaspirated; *t* is voiceless aspirated)[48]
6	no information given re-exact realisation of the voiced pharyngeal *ʕ*

[47] Blanc (1969:24) includes this dialect as one which has aspirated *k* and *t* (and unaspirated *ṭ*).

[48] Blanc (1969:24) states that in this dialect, voiced consonants are de-voiced word-finally (although not aspirated). Therefore, word-finally the contrast is one only of aspiration. This fits with the argument I presented previously that Sībawayh's characterisation of obstruents as *majhūra* and *mahmūsa* relates to 'unaspirated' and 'aspirated', respectively (not 'voiced' and 'voiceless'), which is the point argued by Blanc (1969), who cites also Garbell (1958). Blanc (1969) argues that 'voicing' is not used as a feature by Sībawayh because it is 'not quite sufficient as a distinctive feature' (p.13) since the voiced consonants may devoice in certain positions, and *ṭ* and *q* are also not entirely stable in terms of voicing (the latter indicating to me that they are phonologically voiceless 'plain' and thus vulnerable to ambient voicing).

7	guttural-initial clusters (*h ʕ ħ γ x* + C) normally realised with *a* (*gaháwa* 'coffee'), V_1 often reduced to [i] (*šahár ~ šihár* 'month' < OA *šahr*)
8	Blanc (1970:21) notes that the domain is maximally the word, minimally the syllable, and that it spreads into suffixes only where there is a word-final emphatic (both lexical or environmental)
9	blockers seem to be lexical / historical *i* (and *ī*), cf. *ḍill* 'shadow'
10	non-segmental emphatic property: (i) *ṛ* occurs generally with emphatics, gutturals, labials and (historical elided) *u* (*yašṛaḅ* 'he drinks', *tṛāḅ* 'earth'); also always word-finally after *ā* (*nāṛ* 'fire', *ħmāṛ* 'ass'); *r* occurs in *i*-environments, including where this is historical but elided (*širib* 'he drank', *krāb* 'fallow', *ḍrāʕ* 'arm')[49] (ii) *ḷ* occurs following *a* or *u* adjacent to *x γ g* (*daxaḷ* 'he sought asylum', *mangūḷāt* 'transported (f.pl.)', *šuγḷ* 'work'), also if intervening labial (*gaḅḷ ~ gabl* 'before',[50] *gaṃḷa* 'a flea',[51] *axáḅaḷ* 'crazy'); otherwise *l* (*dāxil* 'one seeking asylum', *mangūlīn* 'transported (m.pl.)', *šiγlih* 'a job'); non-derived forms with historical **u* or **a* show *ḷ* whereas **i* shows *l* (*xlāf* 'except' <OA *xilāf*, *glāʕ* 'forts' <OA *qilāʕ*, but *gḷūḅ* 'hearts' <OA *qulūb*, *gḷāṃ* 'pens' <OA *aqlām*, *xḷāg* 'character' <OA *axlāq*); suffixal *i* does not affect this (*xaḷḷī(h)* 'my vinegar' vs *xallih* 'let him', *xāḷī(h)* 'my maternal uncle' vs *xāḷa* 'he took aside'); note that word-finally *ḷ* is always found after *a* and *ā*, but after *u* and *ū* it is optional (*γūḷ ~ γūl* 'ogre', *ʕguḷ ~ ʕgul* 'tethers')[52]

[49] As seen for other dialects, it seems that *r* is intrinsically 'back' (and triggers backing in other segments), but may be 'de-emphaticised' by adjacent *i* or adjacent non-back consonants (i.e. *imāla* contexts).

[50] I suggest that the variation here is due to whether or not the word is interpreted by the speaker as having the usual anaptytic [i] (giving *gabl*) or anaptytic [u] due to the labial (giving *gaḅḷ*).

[51] But note *gaml* and *gamil* 'fleas', where this plural form is interpreted with /i/, which disallows this as an emphatic environment.

[52] The exception to this is the verb 'to say', where variation is seen in the 3rd person past tense forms (*gāḷ ~ gāl* 'he said', *gāḷat ~ gālat* 'she said', *gāḷaw ~ gālaw* 'they (m.) said', *gāḷan ~ gālan* 'they (f.) said'), but all other forms have only *l* (*gult* 'I said', *gūl* 'say!', *agūl* 'I say').

5.4.1.3 Sinai Bedouin

This section details a Bedouin dialect of the northern Sinai Littoral.[53] The details here are of the Smēᶜniy and ᶜGēliy dialects, spoken by the Samāᶜnah, a tribe fully settled in the oasis of Gaṭyah (in the north-west of the Sinai), and the ᶜAgāylah, a tribe to the west of the Samāᶜnah (who are settled now in villages near the northern coast of the Sinai).

Table 5.4 Phonological features of Northern Sinai Bedouin

1	OA *q* > *g*
	OA *k* > *k* and *ḳ*
	OA *ǰ* > *ǰ*
2	short vowels: *i a u* *i* → [ɪ] in front environments → [ɪ̠] (backed and centralised) after an emphatic → [e] next to pharyngeals *u* → [ʊ] in 'neutral' environments → [o] near emphatics or after a pharyngeal *a* → [ɐ] in 'neutral' environments → [a] after pharyngeals or laryngeal *h* → [ɑ] preceding or following emphatics long vowels: *ī ē ā ō ū* OA diphthongs *ay* and *aw* > *ē* and *ō*[54]
3	interdentals retained: OA *θ ḏ ḍ* > *θ ḏ ḍ*
4	lexical (segmental) emphatics: *ṭ ṣ ḍ̠ ḷ (ḳ ṛ)*[55]

[53] All details from de Jong (2000).

[54] In the related Rmēliy and Swērkiy dialects of the coastline of north-eastern Sinai (bordering the Negev), de Jong (2000:86–8) notes that the OA diphthongs are retained when preceded by emphatic, uvular, pharyngeal or laryngeal consonants.

[55] De Jong (2000:250) states that he recorded no minimal pairs isolating *ṛ* and *ḷ* as phonemes independent of *r* and *l*; most of the data show *ṛ* and *ḷ* in the environment of gutturals and *ā* (cf. e.g. *gāḷ* 'he said' vs *gūl* 'say (m.s.)!'). Additionally, he gives *k* and *ḳ* as separate phonemes, although phonemic *ḳ* is given only for the masculine singular and plural pronominal suffixes *-uḳ* and *ḳuṃ / ḳuw*. Notably, both of these 'velarised' *k*s appear in a labial environment. There are some words where *ḳ* is notated, e.g. *ṛḳaḅ* 'knees', indicating that this is not just 'emphaticisation' triggered by coronal emphatics. In Chapter 6, I argue that these cases are predictable, but that they simply show lack of *i*-colouring (or *imāla*). I would also expect cases such as *yfukk* 'he unties' to have *ḳ* as the examples above, although

5	there is a three-way voicing contrast in northern Sinai Bedouin[56]
6	no information on the exact realisation of the voiced pharyngeal ʕ
7	some resyllabification in guttural contexts ('coffee' = *gáhawah*) – not all morphological categories show this '*gahawah* vowel', but many do (there is variation in some categories); generally the stress is not displaced[57]
8	minimum domains of spread of emphatic property = CV unit, maximum is potentially the word; there is little data showing emphaticisation of affixes, with the exception of the feminine *-ih* ~ *-ah* suffix, which is *-ah* after 'back' consonants, and the data show *ṛuṃṃānah* 'ankle', *ẋwānah* 'his brothers'[58] suggesting that *n* has become 'backed' under the influence of rightward spread; also *šuɣḷit-na* 'ours' (here the feminine suffix is *-it* due to the following suffix) is given as [ʃʊɣɬtnɑ], indicating that emphatic *ḷ* has caused 'velarisation' of the following suffixal *t* and *n*; *ẋaẉāḷ-ḥuṃ* 'their (maternal) uncles' is given as [xɑwɑ:ɬhom], again indicating L–R spread from *ḷ*
9	rightward spread within the stem is blocked by *y š ǰ t d z*: *gṃāših* 'a piece of cloth', *ṛaššāt* 'sprayings', *ṭayyāš* 'wavering', *ʕaṛabiyyāt* 'cars',[59] *ṭāsih* 'pan', *ħaṣātih* 'his pebble', *fiṭīsih* 'prey animal'
10	although not explicitly discussed, clearly there are instances of what are notated as emphatics where there is no ('primary') emphatic coronal: *kuṃān* 'also', *ṛḳaḅ* 'knees'

this is not notated, since *k* is 'back' ('velarised') in labial (including *u*) environments, as argued in Chapter 6.

[56] Most interestingly, for the Rmēliy and Swērkiy dialects, de Jong (2000:61) acknowledges Blanc's (1970) observation that Negev Bedouin has voiceless lenis unaspirated *ṭ*, and further notes that '*ṭ* followed by a vowel is often accompanied by a degree of glottalization (...*t'*). Such glottalization is especially apparent when *ṭ'* (an "ejective stop", IPA [tʼ]) is followed by a stressed vowel.' He notes (p.249) that glottalisation of *ṭ* was heard only once in Smēᶜniy.

[57] De Jong (2000:264–6).

[58] De Jong (2000:64).

[59] De Jong (2000:64) gives the IPA here as [ʕɑrɑbey:æ:t] [*sic*], the 'e' here indicating that the *b* is not 'front'.

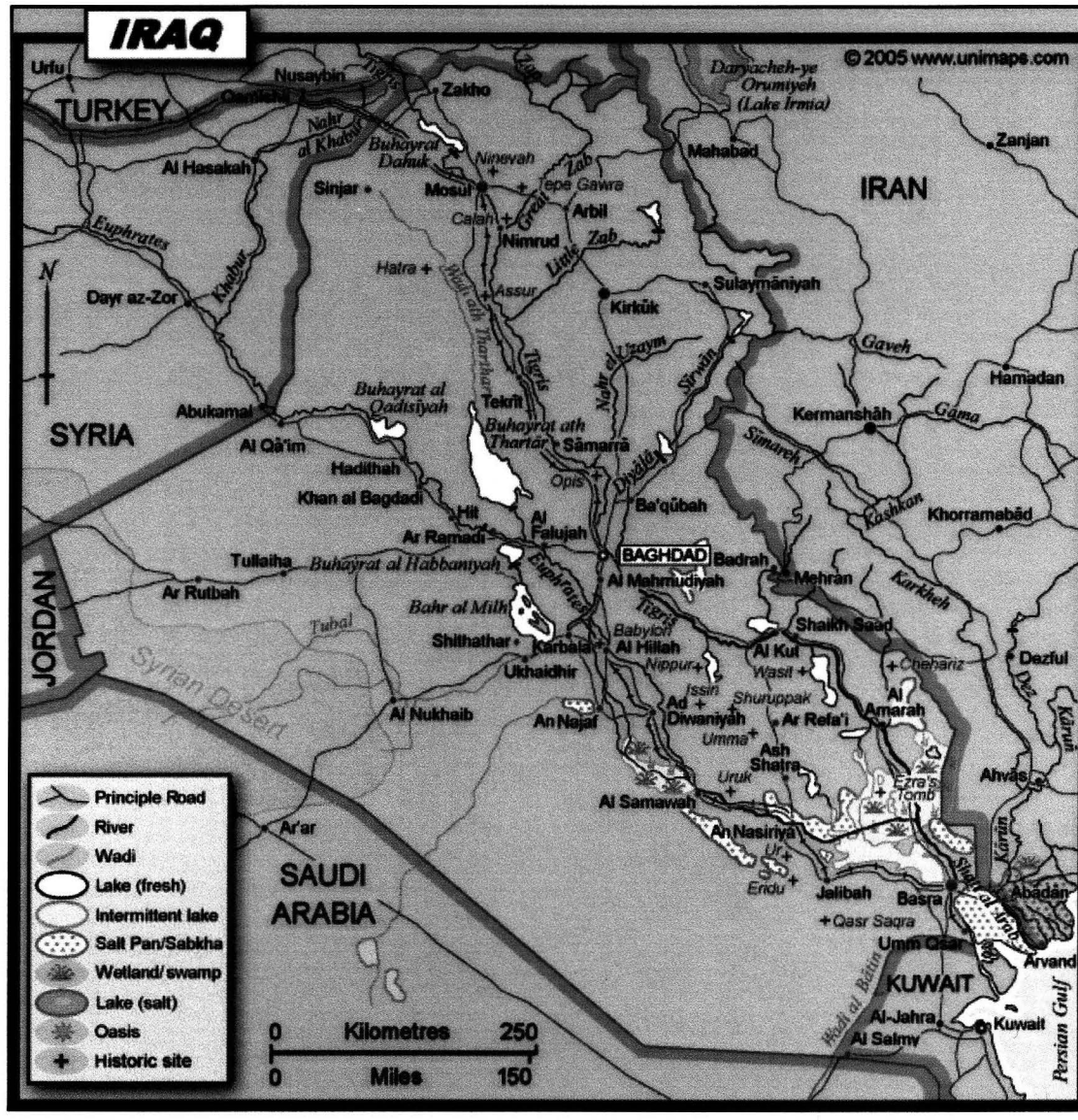
5.4.2 Mesopotamian

Mesopotamian dialects, which extend roughly from the Gulf along (and between) the Tigris and Euphrates rivers up to the Anatolian plateau (in eastern Turkey),[60] are broadly divided into *gilit* and *qəltu* dialect groups. The *qəltu* dialects, according to Jastrow (1978:318), 'are assumed to descend directly from the Arabic vernacular of medieval Iraq, whereas the *gilit* dialects represent a more recent type of Arabic which resulted from an influx of Beduin dialects and the Beduinization of the older language stratum'. [61] The *qəltu* dialects cover the areas of (south-)eastern Turkey, (north-)eastern Syria (specifically Deir az-Zor), and northern Iraq (including the Christian and Jewish speech of Baghdad). The *gilit* dialects cover southern Iraq (including the Muslim speech of Baghdad), as well as Khuzistan (in south-west Iran), as far south as the Gulf. The *qəltu* dialects are further sub-classified by Jastrow (1978) into Anatolian, Euphrates and Tigris.

[60] Blanc (1964:5); Jastrow (1978:318).

[61] This was one of the major conclusions reached by Blanc in his 'communal' studies (1964), and is now widely accepted. Some further evidence is presented in Levin (1994).

Map 5.2 The Mesopotamian dialect area[62]



5.4.2.1 Muslim Baghdadi (sedentary *gilit*)

Muslim Baghdadi is classified as (sedentary) central Mesopotamian *gilit*. Ingham (1997:14) identifies this sub-group as comprising 'a central Mesopotamian area centred around Baghdād, Musayyab, Ḥilla and Karbalā', which contrasts with southern Mesopotamian *gilit*.

It is well known that the Arabic spoken in Baghdad can be roughly divided along communal lines, i.e. Muslim, Jewish and Christian varieties.[63] Muslim

[62] Map of Iraq from http://www.unimaps.com/mideast-today.html.

Baghdadi (MB) is a *gilit* dialect, whereas Christian (CB) and Jewish Baghdadi (JB) are varieties of the *qəltu* dialect. It has been noted that MB is not (traditionally) a homogenous dialect,[64] and it would seem that the old quarters of Baghdad (which would have been predominantly Shiʿi, Sunni, etc) roughly demarcated the different varieties. However, since the publication of Blanc (1964) the dialects of Baghdad have undergone a certain amount of change. Firstly, since 1948 the Jewish community of Iraq has gradually diminished.[65] Secondly, there has been considerable levelling of the differences between the sub-varieties of MB,[66] due predominantly to population movement within the city. Additionally, a large-scale influx of rural immigrants to the city from the late 1950s onwards (i.e. after the 1958 revolution and subsequent political upheavals) has resulted in further changes. For current-day MB, Abu-Haidar (1988) distinguishes between a *xaššˇ*-type and a *ṭabb*-type variety,[67] where the former is 'the well-established standard Baghdadi term',[68] and the latter is a formerly rural (i.e. from outside Baghdad) term.[69]

Blanc (1964:166–8) surmises that the *qəltu* dialects in Baghdad (viz JB and CB) reflect the earlier form of Arabic present in the area, i.e. that they are 'direct

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[63] See the seminal work by Blanc (1964); for *qəltu* dialects see the work by Otto Jastrow; for Baghdadi (and Christian Baghdadi) see the work by Farida Abu-Haidar; for the dialects of lower Iraq, see the work by Bruce Ingham.

[64] Blanc (1964:9 and fn. 2) notes that Massignon (1914) treated (albeit in a rather confused account) seven different dialects of Baghdadi Arabic, including three Sunni and two Shiʿi varieties, although apparently 'unburdened by substantiating data'(!), and which don't correspond to the variations within MB that he observed.

[65] According to the Wikipedia entry 'History of the Jews in Iraq' (accessed Aug 2007), fewer than 100 remain. According to Maurice Shohet, only 23 Jews were known to be in Baghdad in 2004 (http://www.samba.co.il/iraqijews/history.doc).

[66] Abu-Haidar (1988:74–5).

[67] Based on the word used for 'to enter'. I have been told that the *xaššˇ*-type is a hallmark of the older generation of 'original' Baghdadis, whereas the *ṭabb*-type tends to be spoken by the majority of the younger generation in Baghdad and those of rural origins (immigrants from southern areas). It appears likely that there is some degree of political affiliation associated with the different types, since the *ṭabb*-type may have been either consciously retained or adopted as a mark of sympathy with or affiliation to the anti-Baathist or left-wing movements that had a stronghold in the south (which is traditionally seen as the seat of rebellion). This would have been the case up until fairly recently. However, it is unclear how this is changing with the recent socio-political developments in Iraq; at the time of writing there has been mass internal migration within Baghdad itself, as well as mass emigration of refugees, and the political situation (along with allegiances and political thought) has changed rapidly.

[68] Interestingly, the word *xaššˇ* is used by Negev Bedouin, as per Blanc (1970), and I have heard it used by rural northern Palestinians (Galilee region) of Bedouin origin.

[69] Blanc (1964:168) also notes that an ongoing (i.e. early 1960s) process of rural immigration into Baghdad has led to differences within MB, and that many speakers of MB are identifiable as being of rural origin.

descendants of dialects spoken by the urban population (both Muslim and non-Muslim) of Abbasid Iraq'. MB, by contrast, is likely a descendant of the *gilit* dialects of the rural south and of (semi-)nomadic tribes who were likely to have settled in Baghdad from the seventeenth century onwards (Blanc, 1964:170). Thus, the dialectal variation in Iraq reflects the waves of population movement and settlement over the centuries.

Table 5.5 Phonological features Muslim Baghdadi

1	OA *q* → *g* (voiced) – most items (some lexemes retain *q*; some lexemes have *ǰ*, e.g. *ǰidər* 'cooking pot', *gumar* 'moon', *ṭarīq* 'road', *bāgillə ~ bāǰillə* 'broad beans'; rarely *k*, as in *wakit* 'time')
	OA *k* → *k* (~ *č* mostly in palatal environments, although cf. e.g. *šubbāč* 'window', *čaff – čfūf* 'palm – palms (of the hand)'; thus *č* is phonemic; *č* is also common in the large number of Perso-Turkic loans peculiar to Iraqi)
	OA *ǰ* → *ǰ*
2	short vowels: *a i u* (although *i* and *u* have neutralised in many contexts)
	long vowels: *ī ē ā ō ū* OA diphthongs **ay* and **aw* usually *ē ō*
3	interdentals = *θ ḏ ḍ*
	OA **ḍ / *ḏ* → *ḍ*
4	lexical (segmental) emphatics: *ṭ ṣ ḏ (ẓ ḷ ṛ)*
5	voicing contrast = three-way (*ṭ* is voiceless unaspirated; *t* is voiceless aspirated)
6	ʕ predominantly stop (word-initially and -finally), inter-vocalically mostly creaky continuant
7	no resyllabification in guttural contexts (*gahwa* 'coffee')
8	minimum and maximum domains of emphatic spread: minimally the syllable, maximally the word; spread into affixes is generally only where there is a word-final ('primary') emphatic
9	potential blockers to the spread of the emphatic property: *i*, *ī* and palatals rightwards; the situation is rather complex in MB, and is detailed further in Chapter 6

10	presence of non-segmental trigger(s) of the emphatic property: in MB, there are certain sequences of consonants which are said to trigger 'emphasis' as they seem 'backed'; these are most often *x* / *γ* in combination with labials, *r* or *l*, *g* in combination with *r* (and often labials and *l*), where the vowel is *u* or *a*; this is discussed in detail in Chapter 6

The distribution of the vowels seems crucial to the behaviour of emphatics in the *gilit* dialects, and is therefore detailed further here. Firstly, and as remarked on by Blanc (1964:37), 'the preponderance of [u]-coloring environments is one of the salient features of M[B] in contrast to J[B] and C[B] and, indeed, to most Arabic dialects'. MB has the short vowels *i*, *u*, *a*, and *ə*,[70] although *i* is restricted to unstressed open syllables and is quite rare. For some speakers, there is no contrast between *i* and *ə*, and for all speakers Blanc (1964:31) observes that it is hard to find true minimal pairs involving these. Moreover, although *u* contrasts with *ə*, there is a good deal of neutralisation, and it is not the case that OA *i* and *u* show the MB reflexes *ə* and *u*. Blanc (1964:36–7) notes that the occurrence of *ə* and *u* 'is usually predetermined by contextual factors', that is, the consonantal environment. He defines three types of consonantal environment: colour-preserving; *ə*-colouring (i.e. neutralisation of the short high vowels); *u*-colouring.

(i) colour-preserving: OA *u* → MB *u*
OA *i* → MB *ə*
(some OA *a* → MB *ə*)

- environment: CVC where one C is a velar and one C is non-back, non-emphatic, non-labial
- examples:

OA	MB	
ya'kul	*yākul*	'he eats'
**mākil*	*mākəl*	'eating'
ya'xuð	*yāxuð*	'he takes'
**māxið*	*māxəð*	'taking'

[70] Blanc (1964) uses *e* to symbolise neutralised *i* and *u* ('a phoneme with allophones clustering about a mid, central [ə]', p. 30).

rukba	*rukba*	'knee'
rakibat	*rəkbat*	'she rode'

(ii) *ə*-colouring: OA *u* → MB *ə*

OA *i* → MB *ə*

- environment: CVC where neither C is colour-preserving or *u*-colouring
- examples:

OA	MB	
ṣudqān	*ṣədqān*	'friends'
bustān	*bəstān*	'garden'
raǰul	*raǰəl*	'husband'
θulθ	*θələθ*	'third'

(iii) *u*-colouring: OA *u* → MB *u*

OA *i* → MB *u*

(some OA *a* → MB *u*)

- environment: CVC where one C is a velar or emphatic and one C is a labial
- examples:

OA	MB	
ħāmiḍ	*ħāṃuð*	'sour'
wāqif	*wāguf*	'standing'
ḍābiṭ	*ðāḅuṭ*[71]	'officer'
ṣidq	*ṣudug*	'truth'
	danābug	'drums'
qamar	*gumar*	'moon'
baṣal	*ḅuṣal*	'onions'
kamaša	*kumaš*	'he grasped'

[71] Blanc (1964:37) actually has this MB form as *ẓāḅuṭ*, although normally MB has *ð* for both OA *ð* and *ḍ*, but p. 17 notes *ẓ* as a phoneme (in addition to *ð* < OA *ð* and *ḍ*), with no further note. Woodhead & Beene (1967) have only *ð* and list the above lexeme as *ðaaḅuṭ*, Erwin (2004 [1963]:37) also has *ðaaḅuṭ*. Two Iraqi informants (native speakers of *ṭabb*-type MB) confirm this form as *ðāḅuṭ*. Blanc (1964: 18) also gives *ẓuruf* for 'envelope', for which both my informants produced *ðarf*. However, Erwin (2004 [1963]:14) has *ẓ*, giving *ǰaẓẓ* 'it creaked' as an example, and Erwin (1969:50) notes that 'In most instances, *ẓ* occurs near another emphatic, or after *j* in the same syllable', giving as further examples *ẓumaṭ* 'he boasted', *ǰuẓma* 'boots', *ǰiẓdaan* 'wallet'. He lists it in his phoneme inventory.

The examples in (iii) above can be contrasted with MB words of the same shape as follows. V_2 as *u* in *ħāṃuḍ*, *wāguf*, *ḍāḅuṭ* contrasts with V_2 as *ə* in e.g. *ħāməl* 'carrying, pregnant' and *lāzəm* 'necessary'. Both Vs of *ṣudug* (the second of which is 'epenthetic') contrast with the Vs of *səǰən* 'prison' (<OA *siǰn*).[72] The final V of *danābug* contrasts with the *ə* of *ħwāǰib* 'eyebrows'. The first V of *gumar* and *ḅuṣal* contrasts with V_1 as *ə* of *ǰəmal* 'camel' and *səmač* 'fish'. V_1 of *kumaš* and *kuḅar* contrasts with V_1 as *ə* of *gəṭa*^{c} 'he cut', *rəkaḍ* 'he ran', *ḍəħak* 'he laughed'.

Also noted by Blanc (1964:37) is *u*-colouring in the environment of *r* (which is more restricted). *r* sometimes behaves as an emphatic in the environment of a low vowel. That is, *r* and *b* as 'flanking' consonants cause both **ə* and **u* to merge (to *u*) when *a* (or often also *ā*) is adjacent to *r*. So we find that after *ā* there is variation, e.g. *šārəb* ~ *šārub* 'drinking', *ḍārəb* ~ *ḍārub* 'hitting'.[73] However, where *r* is preceded or followed by *a* there is always *u* (from **i* or *u*), as in *mətɣarrub* 'having gone abroad', *buraq* '[the lightning] flashed' and *burak* 'puddles'.[74] There appears to be a degree of *u*-conditioning when a 'back' consonant is also present, as in *ɣurab* '(the sun) set' (**ɣərab* cf. *rəkab* 'he rode'). However, in some words there appears to be variation when *r* is adjacent to a 'back' consonant, e.g. *muɣrub* ~ *məɣrəb* '(at) sunset'.[75] Finally, Blanc (1964:37) says that in the *r* and labial environment, *u* is always the 'epenthetic' vowel: *darub* 'road', *gabur* 'grave', *ħarub* 'war' (cf. *barəd* 'cold', *sarəǰ* 'saddle').

Erwin (2004 [1963]:37–8) also notes (for 'educated' Baghdadi Arabic) that 'In a great many words...non-final *i* and *u* are in complementary distribution, and that the two vowels contrast in only a few words.[76]

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[72] It should be noted that *ṣudug* does not fit the '*u*-colouring' environment as defined by Blanc, above, since neither vowel is immediately adjacent to both a labial and a velar / emphatic, although the whole word could be considered to comprise a '*u*-colouring' environment.

[73] Blanc (1964:38) gives the form *šwārəb* without the variant *šwārub* for 'moustaches', although another plural of the same shape shows *u*, viz *danābug* 'drums', above, and thus one would expect the same form (or at least variation) for *šwārəb*.

[74] The latter two examples are as given by an informant, confirming Blanc's analysis. Woodhead & Beene (1967:32) give the first word as *biraq* (i.e. for Blanc *bəraq*) which was not accepted by my informant, and the second form as *birak* (for Blanc *bərak*), which my informant rejected, and the singular as *burka* ~ *birka* 'puddle', for which my informant accepted only *burka*.

[75] Woodhead & Beene (1967:334).

[76] It should be noted that the short vowels given by Erwin are: *i*, *u*, *o*, *a*, with no distinction between *i* and *ə*. The short vowel *o* is marginal, appearing in loan words.

Lastly, as noted above, Mesopotamian *gilit* dialects are typically considered to have 'emphaticisation' triggered by certain sequences of consonants, as in e.g. *gumar* 'moon', *gabul* 'before', where the entire word is considered emphatic (and often transcribed as such). In Chapter 6, I argue that sequences such as *gab* and *gam* are not actually emphatic, but in a sense 'neutral' in that they are not subject to the *i*-quality that occurs with 'front' consonants (non-emphatic coronals, for instance). This also means that in examples such as *maṣṭaba* 'bench', realised according to Erwin (1969:48–50) as *ṃaṣṭaḅa*, it is not that the labials are actually emphatic, but that there is no 'front' environment to effect *imāla* of the vowels. This example is contrasted with *maktaba* 'library' to show that the labials of *ṃaṣṭaḅa* are emphatic, but I argue that in *maktaba* the front environment (of *t* and *k*) triggers *imāla*, so that the contrast is labials in a front environment vs labials in an environment where they display their full characteristics (e.g. acoustically the *a* vowel in such an environment will have a lowered F_2 in comparison with the *a* vowels in *maktaba*, which I argue is due to the absence of *imāla*).

5.4.2.2 Sedentary Khuzistani (*gilit*)

Khuzistan is a province in south-western Iran, abutting Iraq, with a large number of Arabs. The dialect is of the southern Mesopotamian *gilit* type, and forms a branch with dialects of the region of Baṣra, and probably Nāṣiriyya and al-ᶜAmāra.[77] Ingham (1976:76) divides the dialects of southern Iraq and Khuzistan into four groups: (i) Shaṭṭ al-ᶜArab and lower Kārūn, (ii) ᶜAmāra and surrounding marshlands, (iii) the Euphrates, (iv) Zubair and parts of Fāu. The first three groups are Mesopotamian *gilit* dialects and the fourth is similar to Kuwaiti Arabic and is thus north-eastern Arabian. The dialect detailed here is that of the palm cultivators of the banks of the Shaṭṭ al-ᶜArab and lower Kārūn, who are sedentary (*ḥaḍaṛ*).

[77] Ingham (1997:13–14).

Table 5.6 Phonological features of Khuzistani[78]

1	OA *q* → *γ* most items,[79] or *g* (some lexemes, e.g. *gahwa* 'coffee', *gᶜadat* 'she sat down', *gilit~gallēt* 'I said'; rarely *k*, as in *kital* 'he hit'[80])
	OA *k* → *k* ~ *č*, the latter mostly in palatal environments, although cf. e.g. *kila* 'he ate' [**čila*], *killa* 'all of it' [**čilla*]; note phonemic č in Persian loans e.g. *čāra* 'trick, stratagem')
	OA *ǰ* → *y* (*yāb* 'he brought [MB *ǰab*], *yimal* 'camel' [MB *ǰimal*], *diyay* 'chickens' [MB *diǰāǰ*])
2	final: *i a u* non-final: *a ə* vowels highly variant, especially *ə*, which is most often [ɪ], but in emphatic environments [ʏ], in labial environments [u], with pharyngeals in non-emphatic environments [ə], with slight context-dependent variations on these[81]
	ī ē ā ō ū[82]
3	interdentals = *θ ḏ ḍ*
	OA **ḍ / *ḏ* → *ḍ*
4	lexical (segmental) emphatics: *ṭ ṣ ḍ*
5	voicing contrast: as far as I am aware, this is three-way (*ṭ* is voiceless unaspirated; *t* is voiceless aspirated)
6	*ʃ* generally a 'frictionless continuant',[83] except where geminate, when there is 'a full closure'.[84] Preceding *ħ*, it assimilates (i.e. *ʃ* → *ħ*) (according to Ingham this is in common with other fricatives, as opposed to stops, thus evidence that

[78] Ingham (1974), with further details and clarification from Ingham (1973, 1976, 1997).

[79] Note however, that in emphatic contexts, while many speakers have *ġ* (Ingham uses this to denote 'back' *g*), for others there is free variation of *ġ~ɣ̇*, meaning that for the latter there is neutralisation of **q* and **γ* in emphatic contexts > *ġ~ɣ̇*. Non-emphatic **q* > *γ* is apparently much more stable. See Ingham (1973:537) for some details, and for comprehensive discussion Ingham (1974). This *γ* reflex of *q* is a prominent feature of Khuzistani, which immediately identifies the Khuzistani speaker. Other southern Mesopotamian *gilit* dialects have mostly *ǰ* for **q*.

[80] This contrasts with *čital* 'he killed', where palatalisation occurs. Both forms relate to OA **qatal*.

[81] I have recordings of an informant from Samāwa (the Euphrates side of southern Iraq) producing *ħəzn* 'sadness' as both [ħɪzn] and [ħẹzn] in the same conversation.

[82] In this dialect, as in other Mesopotamian *gilit*, *e:* following coronals, in non-emphatic environments, is realised as something like [ɪɛ] (Ingham, 1974:152, shows this as [ɪə]).

[83] Ingham (1974:104–5).

[84] Ingham (1974:104–5).

	it is phonologically a fricative in this dialect)
7	no resyllabification in guttural contexts (*gahwa* 'coffee')[85]
8	• minimum domain of the emphatic property is the syllable – however, Ingham (1974) shows that syllables may be either: fully emphatic, fully non-emphatic, increasingly emphatic or decreasingly emphatic; this indicates that the domain is not necessarily the 'syllable' in traditional terms, but the CV (or VC) unit (see below) • maximum domain of the emphatic property is potentially the word, but it seems more likely that this is due to the complicating factor of two processes: 'emphaticness' ('pharyngealisation') and 'velarisation' (the opposite of 'lip-spread'); the latter has generally to do with labials and gutturals (see below)
9	spreading of backing or emphaticness is blocked by apicals *z d θ n* and palatals *ǰ č š y*, and sometimes by *l* (since the latter is backed only in certain limited contexts)
10	Ingham (1974) analyses two types of emphaticness – (1) unpredictable (i.e. phonologically distinctive, or phonemic), occurs with: *ṭ ṣ ḍ̊*; (2) predictable, occurs with: a sequence of two of: bilabial, velar, *r*; or a word-final sequence of *x+l*; or a sequence of *g+l* when not separated by a long vowel

Ingham (1974) gives a syllabic analysis of emphasis, following the prosodic analysis of Firth. He notes that there are four types of syllable:

(i) totally emphatic, e.g. *ðaḅ* 'he twisted'

(ii) totally non-emphatic, e.g. *ðɛb* 'he threw away'

(iii) increasingly emphatic, e.g. *šaṭ*[86] 'river'

(iv) decreasingly emphatic, e.g. *ðʌn*[87] 'he thought'

[85] In the rural Arabic dialect of the region, there is resyllabification in guttural contexts, thus *ghawa* 'coffee', *γliḅat* 'she overturned' (cf. urban *γiliḅat*), *ṃṭaḷa* 'he threw him' (cf. urban *ṃiṭaḷa*), etc. See Ingham (1997:9–12).

[86] He transcribes this to reflect velarisation (but not pharyngealisation) of the initial consonant, thus [ʃʌt].

[87] Transcribed with velarisation of final consonant, i.e. [ðʌn].

The syllables which are semi-emphatic under this analysis are said to be partially velarised, partially pharyngealised. That is, in the increasingly emphatic *šaṭ*, C_1 is velarised, and C_2 pharyngealised (the latter with firm stricture, i.e. significant muscular tension). In the decreasingly emphatic *ḍʌn*, C_1 is pharyngealised, and C_2 velarised (the latter without firm stricture). Ingham (1976:77) holds that the velarised consonants are acoustically–impressionistically between emphatic and non-emphatic. Thus, a consonant may be non-emphatic, semi-emphatic (velarised) or emphatic (pharyngealised). Additionally, the vowel ʌ̲ (iii–iv above) is 'approximately between the positions of [ɛ] and [ɑ]' (i–ii above). Ingham also contrasts the spread-lip position of the vowel in (ii) with the neutral-lip position of the vowel in (i), i.e. 'emphatic' equates to neutral lip position whereas non-emphatic equates to spread lip position.

Under a Firthian analysis, emphasis is seen as a feature of the syllable or word (i.e. a linguistic segment larger than the phoneme). The particularly interesting point about this analysis is that it formalises the contrastive / non-contrastive roles of emphatics. That is, in certain domains there is the possibility of an emphatic / non-emphatic contrast (unpredictable emphasis), whereas in others it is not possible to have a contrast (predictable emphasis). Therefore, Ingham (1976) analyses certain roots as within an E-system (he says about these that it is necessary to assign the feature of emphasis / non-emphasis to a prosodic element of structure) and others as outside the E-system (where the pattern of emphasis / non-emphasis can be related to the nature and ordering of its consonants, i.e. emphasis is predictable). A root is classed as being within the E-system 'so long as there is potentially the possibility of contrast'[88] between emphatic and non-emphatic. So, for example, the following data are classed as E-roots because they are minimal pairs distinguished only by the presence of emphasis (although note that it is the potentiality of contrast, rather than necessarily the existence of minimal pairs that places a root within the E-system):[89]

(2)	[ṣɑḅ]	'he poured'	[sɛb]	'he reviled'
	[ḍɑḅ]	'he twisted'	[ðɛb]	'he threw away'
	[ḥɑṭ]	'he put'	[ħat]	'it (leaf) fell'

[88] Ingham (1974: 83).
[89] Ingham (1974:83).

For roots outside the E-system, 'the feature of emphasis or non-emphasis is a characteristic of the particular configuration of C and V units involved'.[90] Therefore, E-roots and non-E-roots can be defined by two criteria: (i) the presence or absence of *t, s, ð* or *ṭ, ṣ, ḍ*; (ii) the presence or absence of sequences of consonants associated with emphasis (mostly combinations including labials / velars / *r*). E-system roots therefore always contain *t, s, ð* or *ṭ, ṣ, ḍ* (where emphasis is non-predictable). It should be noted, however, that both E-roots and non-E-roots may be: non-emphatic; partially emphatic; totally emphatic.

To summarise, the system of E-prosody has been set up to account for an emphatic feature which is phonologically relevant (E-roots) and an emphatic feature which is phonetic (and not phonologically relevant). Although (for reasons of space) I don't analyse this particular dialect in Chapter 6, it should be borne in mind that in terms of the processes looked at in this thesis, this dialect of Khuzistani is very similar to Muslim Baghdadi Arabic, for which I shall argue that the sound system is characterised by *i*-quality, *a*-quality and *u*-quality, and that it is the interaction and conflict between these resonance qualities across domains which creates the effect of 'emphasis' vs 'non-emphasis'.

5.4.2.3 Christian Baghdadi (*qəltu*)

The Mesopotamian *qəltu* dialect group is now thought to comprise four main branches,[91] one of which is focused on here. However, there is considerable variation between these branches, and sometimes between individual dialects within one branch, in terms of the realisation of some of the phonological variables with which this section is concerned. These will be noted where relevant, and where the data is available, but may well be due to adstrata influence, i.e. the unique situation of this group of dialects where they are generally isolated in areas where the majority speak non-*qəltu* dialects of Arabic (in the larger *gilit*-speaking area, i.e. north-eastern Syria and central and southern Iraq) or the majority or official language is not Arabic (in the

[90] Ingham (1974: 84).

[91] Jastrow (1978:1–26), the seminal work on these dialects, divided the Mesopotamian *qəltu* dialects into three major groups (Anatolian, Tigris and Euphrates). This classification was updated by Jastrow (1994) and incorporated dialects discovered further to his 1978 work.

Turkish- and / or Kurdish-speaking areas, i.e. eastern Turkey and north-eastern Iraq).[92]

As discussed, the Mesopotamian *qəltu* dialects are generally considered to be the 'original' dialects of the region. That is, these were the sedentary dialects of Mesopotamia which in parts of the region (southern Iraq up to Baghdad, at least for the Muslim population) were historically displaced by the immigrating Bedouin tribes. They remain typical of the non-Muslim population, and to some extent Sunni, rather than Shi^{c}i Muslims, since the latter dominate the south of Iraq and the former the north of Iraq (with Baghdad being more of a melting pot).[93]

Jastrow (1994) divides the Mesopotamian *qəltu* dialects into four branches (individually comprising groups of dialects): Anatolian, Kurdistan, Tigris and Euphrates. The Anatolian branch is formed of the dialects of Arabic spoken in what is now south-eastern Turkey, the Kurdistan branch consists of the dialects of Arabic-speaking Jews of Iraqi Kurdistan who have now emigrated, the Tigris branch comprises those dialects which follow the Tigris south from around Mosul to Baghdad (and including the Jewish and Christian Baghdadi dialects, as well as the Jewish and Christian dialects of the remainder of southern Iraq, predominantly Baṣra and ^{c}Amāra), and the Euphrates dialects follow the Euphrates south-east from around Dēr iz-Zōr[94] towards Baghdad.[95]

In general, it could be said that the *qəltu* dialects are well known for the salience of *imāla* (fronting / raising of the long low vowel *ā* to *ē* or even *ī*),[96] and that this in particular distinguishes this group of dialects from the *gilit* dialects.[97]

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[92] Jastrow (1994:119) also notes this: 'the present-day *qəltu* dialects in North-Eastern Syria and in Central and Southern Iraq are language isolates (Sprachinseln) imbedded [*sic*] in the large *gilit* dialect area...the Kurdish area is interspersed with isolated *qəltu* dialects...'

[93] However, it would be interesting to see how far this is reflected in Abu-Haidar's distinction between *ṭabb*-type and *xaššš*-type dialects. How far this has or has not been affected by the current situation in Iraq is unclear.

[94] Often transliterated as Deir az-Zawr.

[95] It should be noted that although the *qəltu* dialects are (or were) spoken by the non-Muslim population of these regions, it is by no means confined to these communities: see Jastrow (1994) for fuller details.

[96] This is not the case, however, in guttural and emphatic environments, where *imāla* does not occur.

[97] Blanc (1964:48 and fn.75) remarks that in medieval times, according to various sources, *imāla* was a well-known characteristic of Iraqi Arabic, and particularly of Baghdadi. Thus the *qəltu* dialect group reflects this, whereas the *gilit* group does not, being a later import historically.

Additionally, with the exception of the Euphrates group of dialects,[98] as the nomenclature shows, this group of dialects is known for its retention of OA *q*.

However, these dialect groups differ with regard to some of the phonological variables noted in this section, since there are certain phonological isoglosses which, as Jastrow (1994:120) notes, 'apply only to part of the *qəltu* dialects', and may thus be seen to typify one group in particular. These are, firstly, that the Tigris branch typically has *γ* (voiced post-velar fricative) for Old Arabic *r* (where the other dialect groups typically have [r]).[99] Thus, OA **γ* and **r* have merged in these dialects to *γ*. Secondly, the Euphrates group of dialects exhibits partial variation between *g* ~ *q*, and *č* ~ *k*, making it 'intermediate between the *gelet* and *qeltu* types'.[100] Many dialects of the Anatolian branch have a palatalised [kʲ] allophone of *k* in front vowel environments (as in Turkish), and *q* as the first consonant in CC may be realised as [x]~[γ]. In the Siirt and Sason groups of Anatolian, however, *q* varies with [ʔ] or may be elided (as is typical of Syro-Lebanese dialects).

For vowel systems, Jastrow (1994:120) notes that in the *qəltu* dialects there has been a 'wide-spread merger of old **i* and **u* to *ə*' (which doesn't include the Euphrates branch). Additionally, the OA diphthongs *ay* and *aw* are often preserved, although most systems have five 'long vowels', including *ē* and *ō*, these often arising through *imāla*, or through the lowering of *ī* and *ū* in guttural / emphatic environments, or in loanwords.

I have chosen to exemplify this dialect group with the dialect of Christian Baghdadi (CB),[101] as this was the dialect for which I could find the most information relevant to this chapter. However, because of the availability of some information showing that the dialect group as a whole may show considerable variation with regard to the ten variables shown, I have given further information (where available) on dialectal variation in footnotes.

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[98] The Euphrates group has voiced *g* < **q*.

[99] It is not uncommon for speakers of *gilit* dialects to realise *r* as either a voiced uvular fricative or an alveolar approximant, in which case they seem to view it as a 'speech defect' (*luθγa*) (p.c. – various MB speakers) but certainly not as a feature of the dialect. See the detailed discussion in Blanc (1964: 20–5, fn. 41). This is occasionally (although not nearly so regularly) attested in other dialects.

[100] Blanc (1964:26), see also Jastrow (1978, 1994).

[101] Detailed fully in Abu-Haidar (1991), also see Jastrow (1978, 1994), Blanc (1964).

Table 5.7 Phonological features of Mesopotamian qəltu – Christian Baghdadi[102]

1	OA *q* → *q* in CB (*g* is rare, occurring mostly in loans and proper names)[103]
	OA *k* → *k* (with *č* occurring in loans)[104]
	OA *ǰ* → palato-alveolar affricate *ǰ*
2	short vowels: *i, ə, a, o, u*[105]
	OA diphthongs: **ay* > *ē* and **aw* > *ō* additionally, in guttural / emphatic environments, *ō* in CB arises as a reflex of OA **ū* and *ē* < **ī*[106] *imāla* (where 'long' *ā* is realised as [e:], except in guttural / emphatic environments) is a salient feature of CB
3	CB has no dental fricatives:[107] OA **θ* > *t* and **ð* > *d*[108]
	OA **ḍ* / **ḏ* > *ḍ*
4	lexical (segmental) emphatics = *ṭ ḍ ṣ* 'secondary' emphatics are *ḅ ḷ ṃ ṇ*, which become emphatic in the environment of a 'primary' emphatic and a back vowel[109]

[102] Abu-Haidar (1991), Jastrow (1978; (1994), Blanc (1964); most of the data is from Abu-Haidar, and I retain her notation of emphatics, even for labials (which I dispute) since this shows environments where labials are non-front.

[103] As for all *qəltu* dialects, excepting the Euphrates branch, where there is some variation of *q* with *g*. Also, much of the Anatolian branch has optional allophones [x]~[ɣ], although Siirt and Sason appear more similar to Syro-Lebanese dialects in having free variation between [q]~[ʔ] (or complete elision).

[104] As for most of the *qəltu* dialects, although, as stated, the Euphrates dialects show partial variation between *k* and *č*, and the Anatolian dialects have palatalised [kʲ] in front vowel environments.

[105] This is the system given in Abu-Haidar (1991). Schwa is realised as [ɪ]. Short *o* is rare, but occurs sometimes in final open syllables preceded by the gutturals *ḥ*, *ʕ*, *q* or *ɣ*.

[106] Abu-Haidar (1991:18) notes that '*ō* is far more common in CB than in either MB or JB'; where CB has *ō* but MB doesn't, this is mostly in guttural environments (with or without an emphatic). This does not appear to happen universally, though, and in the only two examples I could find where *ū* occurs in an emphatic environment with no gutturals, it is given as *ū* (not **ō*). The same is true of *ē* < **ī*. Blanc (1964:41) notes that it is a tendency and 'not carried out with entire consistency'. This lowering of *ī* > *ē* and *ū* > *ō* is noted also for other *qəltu* dialects, especially the Anatolian branch (Jastrow, 1978, 1994).

[107] This merger of the OA dental fricatives with coronal stops is not typical of the *qəltu* dialects, a majority of which retain the dental fricatives. CB (Tigris branch) along with the (Jewish) Kurdistan branch and the Diyarbakir group and the Jewish Nusaybin / Qāmišli dialect (Anatolian branch), have coronal stops instead of dental fricatives; many of the other Anatolian dialects (as well as the Tigris dialect of Bəḥzāni) have the alveolar sibilants [s], [z], [ẓ] in place of dentals. Unusually for the Arabic dental fricatives, their realisation as labiodental [f], [v], [ỿ] is attested in various dialects of the Anatolian group: all the Siirt dialects as well as one Mardin dialect and a village in which a Diyarbakir dialect is spoken (Jastrow, 1978:34–5).

[108] Abu-Haidar (1991:8) notes that the situation is changing among the younger generation, where the interdentals, particularly *θ*, have been reintroduced in loans and proper names.

[109] Blanc's (1964:17) consonant inventory gives *ḅ ḟ ṃ ḷ ẓ* as phonemes for JB and CB (along with MB).

5	no information is available for the *qəltu* dialects on aspiration or non-aspiration of voiceless plosives; however, as discussed in Chapter 2, at least JB seems to have a three-way voicing contrast (voiceless non-emphatics are aspirated whereas voiceless emphatics are non-aspirated), in common with the *gilit* dialects[110]
6	no information available on the exact realisation of the voiced pharyngeal *ʕ*[111]
7	no resyllabification in guttural contexts
8	the emphatic property is minimally across the syllable and maximally the word; it seems that spreading is much more limited than in *gilit* dialects, and the data in Abu-Haidar (1991) doesn't show any particularly clear patterns in this: there are cases where the emphatic property seems to spread into an adjacent syllable purely because otherwise there would otherwise be no acoustic cue (e.g. CVCVC becomes CVCVC), but other cases where it seems to spread unnecessarily (in terms of the necessity of extra acoustic cues); *b* is much more likely to become emphatic than any other segment (>*b*), although there are some puzzling examples which lead me to question the accuracy of the data, e.g. *maṭbaᶜa* 'printing press' (p.23)[112] (such examples alongside e.g. *laḍam* 'to thread' (p.15) and *munaḍḍama* 'organisation' (p.9) vs. *naḍaṃ* 'to compose' (p.14) show the necessity of acoustic / experimental analysis as they appear inconsistent) emphaticness seems not to spread into affixes, cf. *bāṣ-āt* 'buses', *bāḍ-ət* 'she laid (an egg)' (p.15)
9	in the data given, the only clear blockers to the spread of the emphatic property seem to be *ī*, *ē*, cf. *bāḍət* 'she laid an egg'[113] vs. *bēḍ* 'eggs', *naṣīb* 'fate' and *mabīḍ* 'ovary' vs. *šaṭaḅ* 'to cross out' and *naḅaḍ* 'pulse'[114]

[110] It is possible that this VOT contrast in JB is due to *gilit* adstrata influence, and that other *qəltu* dialects may not have such a contrast. I have not been able to verify this one way or the other.

[111] In the Anatolian dialects, the pharyngeals are rather unstable: Jastrow (1978:43–4) discusses assimilation of, and variation between, ᶜ and *ħ*, which in some cases may also either depharyngealise (> *ʔ h*, respectively) or elide.

[112] Although cf. *maṭḅōx* 'cooked' and *maṣḷōx* 'skinned' (p.27) in which the adjacent consonant is given as emphatic, cf. *ṣabbōya* 'blackboard' (p.27), *ṣāḅūn* 'soap', *ṭāḅōq* 'bricks' (although p.30 has *ṭābōqa* 'a brick'), *ṣāḷōn* 'sitting-room' (p.25), *ṣabūħ* 'radiant' (p.28).

[113] Abu-Haidar (1991:15) gives this as *bāḍət*, which is presumably a typo.

10	generally, emphaticness seems to be triggered almost always by a 'primary' emphatic consonant (*ṭ ṣ ḍ*); Abu-Haidar doesn't show any instances of what she considers to be 'emphatic' being triggered by combinations of segments

5.4.3 Levantine

There are generally considered to be three major groups of Levantine (Syro-Lebanese) dialects: (1) Lebanese / Central Syrian consists of Lebanese (e.g. Beirut, Tripoli, also includes Maronite Cyprus) and Central Syrian (e.g. Damascus, but also includes the dialect of the Druze); (2) North Syrian (e.g. Aleppo, also includes Hatay peninsula [Turkey]); (3) Palestinian / Jordanian consists of the following sub-groups: Palestinian town dialects, central Palestinian village dialects, rural sedentary dialects of southern Palestine and the Jordan Valley, which includes the dialects of the Ḥōrān (although there are further differences between Ḥōrāni and southern Palestinian– Jordanian).[115]

The above dialects are also sometimes classified by non-past forms of the verb 'say': group (1) is *bə'ūl*; much of group (2) (except the major cities) is *bəqūl*;[116] group (3) splits into: (i) *bə'ūl* (thus, Palestinian large-town / city dialects tend to be classified as group (1), since they are *bə'ūl* dialects); (ii) *bəkūl* (generally, central Palestinian rural dialects); (iii) *bəgūl* (the north Palestinian rural dialects which are often seen as generally 'Bedouin', rural north Jordan, including the Ḥōrān).

Cantineau (1938), which classifies sedentary Levantine,[117] divides the dialects into three major groups, primarily on the basis of the reflex of **q*: (1) his group S_1 (reflex = *q*) is most of the villages / small towns of sedentary Lebanon and Syria, this is the 'méridionale' part of Lebanon, Mount Hermon, southern part of the Beqᶜā Valley, south of the Beirut–Damascus line, the Druze of the Ḥōrān, and the plains and coast of Syria (but mostly the towns, not the cities); (2) his group S_1 (reflex = *ʔ*) is almost all the cities of the region, as well as the general countryside region of north

[114] These data actually serve to exemplify my position that the labials are not emphatic vs non-emphatic, but 'front-environment' vs 'non-front-environment'.

[115] The classic work on the classification of this dialect group is Cantineau (1938). See also Cleveland (1963) for a useful (very concise) summary. Versteegh (2001:153) also summarises this and discusses the well-known isoglosses of the region.

[116] This is shown on Map 9 of Behnstedt (1997); the *q* dialects are those north of Homs (Ḥimṣ), especially along the coastal region, but excluding the larger cities such as Aleppo (which have *ʔ*).

[117] He treats nomadic (i.e. Bedouin) dialects separately.

Lebanon which is north of the Beirut–Damascus line (including the Beqᶜā Valley) and stretches south-east over the Anti-Lebanon to Damascus; (3) his group S_2 (reflex = *k*) (and concomitant is unconditional **k* > *č*, unlike the Bedouin-type *conditional* affrication of **k*) is the large part of the Palestinian plateau (except the cities of Haifa, Yāfa [Jaffa] and Jerusalem, which have *ʔ*, as above) as well as two Syrian villages in northern Ḥōrān (Čanāčer and Zāčye) and in the (Syrian desert) oasis of Suxne.

A last point here is that Jordan is very split. Traditionally, as a desert kingdom (or, previously, desert region of 'Transjordan'), the population was predominantly nomadic, i.e. Bedouin, and the predominant dialect type thus Arabian. This situation still obtains today to the east and south-east of today's Jordan, although northern and western Jordanian dialects (of an earlier sedentary, rural population) are classified with rural Palestinian.[118] It seems that Amman may be an odd case, in that it may have had a predominant dialect classifiable as 'southern Palestine & Jordan Valley' (*bəgūl*), excluding it from all the other large towns and cities of the region, which seem to be *bə'ūl*.[119] However, with the increasing influx of refugees, this may have changed quite quickly (the usual figure bandied about is that around 60 per cent of Jordanian nationals are Palestinian). Moreover, over the last few years there has also been a huge influx of Iraqis. It remains to be seen how these dialects mix in the future. The case of e.g. Damascus is a little different, as the migrants have not outnumbered the original inhabitants (*Šawām*), and as the *bə'ūl* type of dialect perhaps has regional prestige (if younger people equate 'the city' with 'sophistication', that is education, wealth, and other social markers of prestige), meaning that this type of dialect is likely eventually to 'win out' over the more rural-sounding *bəgūl* where the context is present (as in Amman).

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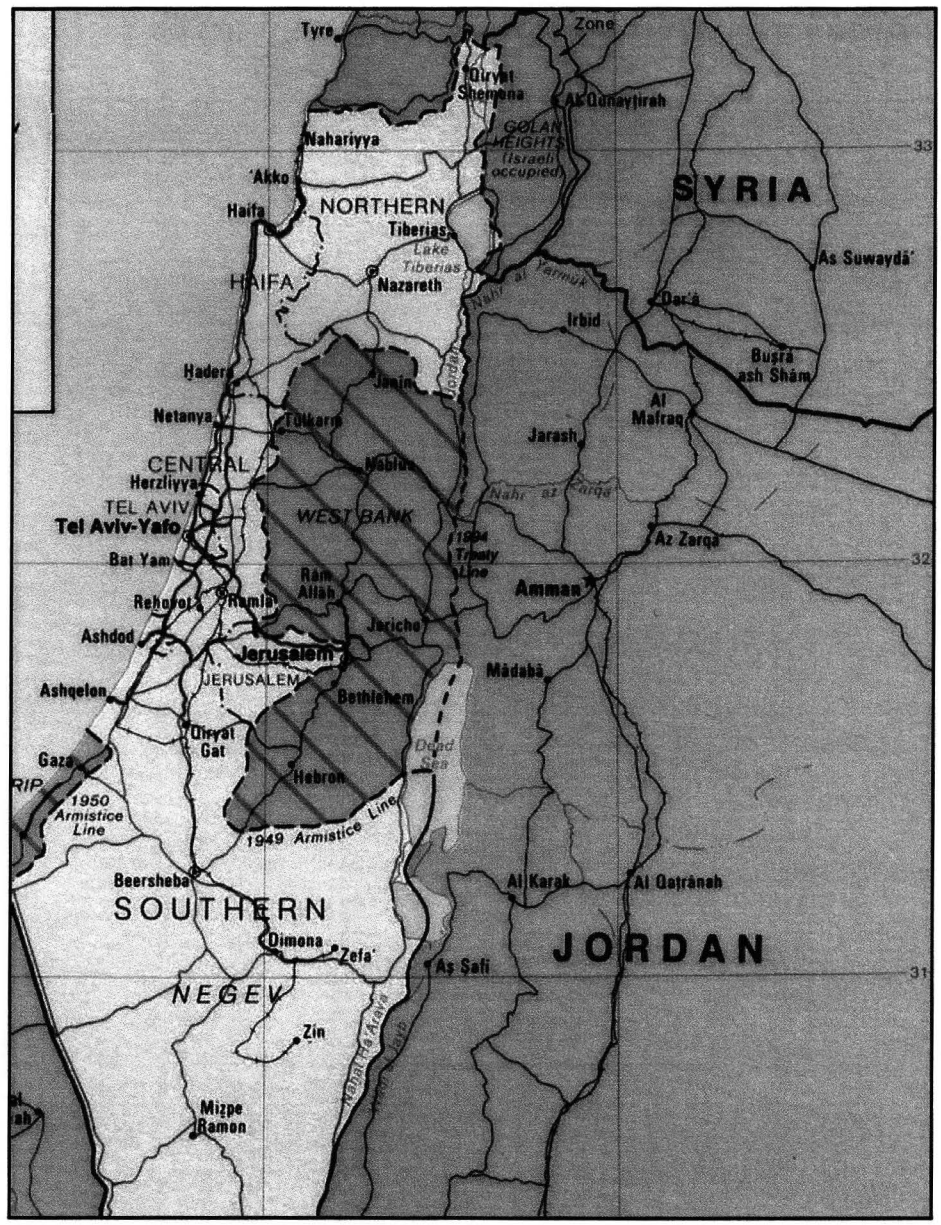
[118] Palva (1994) discusses the case of the Jordanian city of al-Salṭ (about 30km north-west of Amman), which 'displays important typological markers of both Bedouin and sedentary dialect type', and discusses whether it is a 'bedouinized ex-sedentary dialect or, rather, a sedentarized ex-Bedouin dialect' (p.459). He concludes the former, arguing that 'during the first centuries of the Ottoman era Salṭi was a rural sedentary dialect that was strongly influenced by neighbouring Bedouin dialects...In the nineteenth century, the linguistic development took another course, toward the *ḥaḍari* [sedentary] type, a development which recently has started affecting the Bedouin dialects of the area' (p.469).

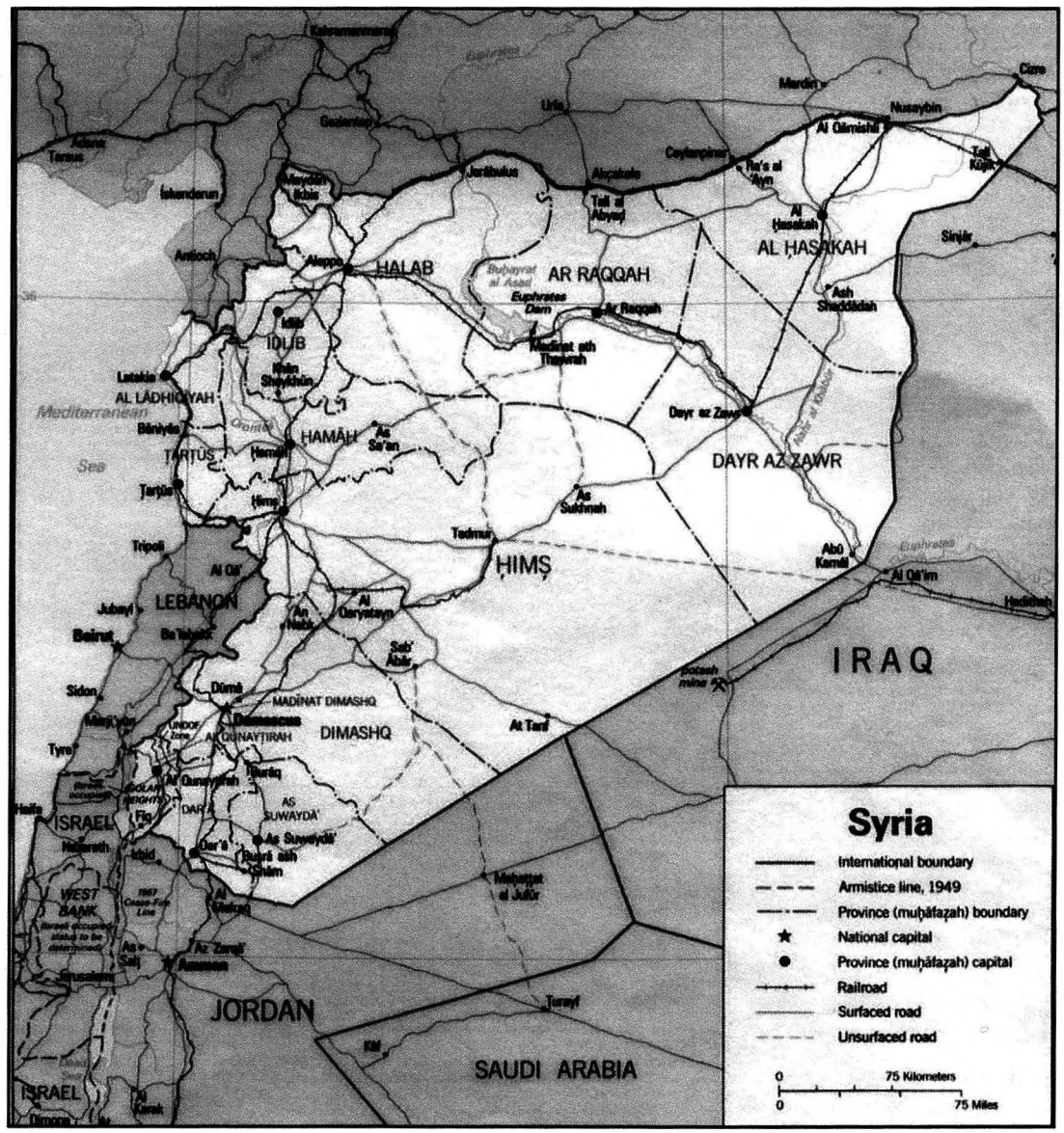
[119] Cleveland (1963:59) states that 'In ᶜAmmān the *bə'ūl*-group is found among refugees from Haifa, Jaffa and Jerusalem. This dialect grouping...has greater similarity to the dialects of Damascus and Lebanon...and should be regarded as a variety of Levantine Arabic.' However, Palva (1994:466) notes sociolinguistic variation along gender lines: 'the "masculine variety" tends to be /g/ (*bigūl*), whereas the "feminine variety" tends to become /ʔ/ (*biʔūl*).'

Map 5.3 The Levantine dialect area: map of the Palestine–Jordan area[120]



[120] Map israel_pol_2001 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps/.

Map 5.4 The Levantine dialect area: map of the Syria–Lebanon area[121]



In this section I give details for three Levantine dialects: Damascene (a major urban dialect), Ḥōrāni and rural Palestinian. The former is group (1) of the above classification and the latter two are both group (3). Perhaps more importantly, the first is urban and the latter two are both rural.

[121] Map syria_pol_1990 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps/.

5.4.3.1 Damascene

The data for this dialect (DA) are taken from Cowell (1964), Ambros (1977), Ferguson (1961) and Grotzfeld (1965), but have all been checked with an informant (born and raised in central Damascus.

Table 5.8 Phonological features of Damascene

1	OA *q* > *ʔ*
	OA *k* > *k*
	OA *ǰ* > *ʒ*
2	3 short vowels: *a i u*, although *i* and *u* have almost completely merged (> *ə*) and are contrastive only in unstressed final syllables (where they are usually transcribed as 'e' and 'o')[122]
	diphthongs *ay* and *aw* > *ē* and *ō*
3	DA has no interdentals; the regular reflexes of OA interdentals are the stops *t d ḍ*; however, there are also many examples[123] of **θ *ð *ḍ́* > *s z ẓ*
	OA **ḍ / *ḍ́* have effectively merged to *ḍ*; however, there are examples of **ḍ́* > *ẓ* (MSA borrowings), and *ẓ* arising through emphaticisation
4	lexical (segmental) emphatics: *ṭ ṣ ḍ (ẓ)* additionally, there are examples of emphatics in words not containing the

[122] In all open unstressed syllables *ə* is elided, e.g. *kátob* 'books', *šáreb* '(a) drink', vs *ṭlūᶜ* 'going out / up' (<*ṭəlūᶜ* <OA *ṭulūᶜ*), *t'īl* 'heavy' (<*tə'īl* <OA *θaqīl*). The final example also shows OA *a* > *i* because of the following *ī* (although analysed 'phonemically' as neutralised schwa). Also, *a* is preserved in unstressed syllables. Note that the transcriptions 'e', 'o' reflect a difference here in the phonetic realisation of *i* and *u*, which led to the assumption that such varieties of Arabic have five phonemic short vowels. However, the distribution of the apparent mid vowels 'e' and 'o' is restricted to the final (realised) vowel of a word (and notably always unstressed positions), i.e. _# or _C#, and when suffixation occurs (causing also the vowel in question to be in a tonic position), these vowels are 'neutralised' to schwa (or merged *i* and *u*). Hence, 'kāteb' 'clerk' → *kātəb-na* 'our clerk' and 'byətrok' 'he is leaving' → *byətrəkna* 'he is leaving us'. Moreover, word-finally, these vowels generally reflect the feminine suffix '-e' (<OA *-a*) and the masculine possessive suffix '-o' (<OA *-u(h)*), whereas what appear to be the high vowels 'i' and 'u' word-finally are in fact cognate to OA long vowels *ī* and *ū*. The reflex of all word-final long vowels in these dialects is short. Compare 'bišūfo' 'he sees him', 'bišūfu' 'they see'. See the neutralisation schema in Ambros (1977:17). Cantineau & Helbaoui (1953:15) also give only three short vowels for DA. See Table 10 for discussion of this point for Rural Palestinian.

[123] Ambros (1977:111–12) calls these sibilant reflexes 'classicisms'.

	above coronal emphatics (and many loanwords) – these are all with the low vowel *a*, but there are minimal pairs which researchers propose suggest a degree of phonemicisation of *ḅ ṃ ṇ ḷ*[124] (e.g. *bāb-a* 'her door' vs *ḅāḅa* 'Daddy')[125]
5	Cowell (1964) and Ambros (1977) both say (impressionistically) that *t* is lightly aspirated while *ṭ* is not; however, Lebanese Arabic has slightly aspirated *t* and *ṭ*,[126] and my own measurements of VOT for Damascus Arabic show that both *t* and *ṭ* are similarly at least slightly aspirated,[127] or at least that VOT is not a factor in distinguishing the two
6	the voiced pharyngeal *ʕ* is realised predominantly as an approximant[128]
7	no resyllabification in guttural contexts ('coffee' = *ʔahwa* [ʔahwe])
8	• the emphatic property apparently spreads maximally to the beginning or end of the word, including affixes; it is said to spread through (and affect) the segments noted in (4) above, as well as laryngeals *ʔ h*, and

[124] Cowell (1964:8) states that DA has 'no contrast between *r* and *ṛ* in the same contexts', noting that *žāri* 'flowing' and *žāri* 'my neighbour' are homophonous, but that other parts of 'Greater Syria' do indeed have such contrasts (and thus, supposedly, phonemic *ṛ* and *r*). Ferguson (1961:228) also notes that DA 'differs from most sedentary Syrian Arabic in not having the r:ṛ pair which is very common throughout the Syrian area...and in having the n:ṇ pair which is very rare elsewhere'. However, most generally, in DA, *ṛ* occurs except next to *i*. This is discussed in Chapter 6.

[125] Card (1983), for Jerusalem Arabic (i.e. urban Palestinian, classified along with the other major city-dialects of the Levant), gives the (lexical) emphatic consonants as *ṭ ḍ ṣ ẓ ḷ ṃ ḅ*.

[126] See Chapter 2, details from Yeni-Komshian *et al.* (1977), see also Khattab (2002). Obrecht (1968) makes no mention of VOT variation for his (rural north) Lebanese subject, noting (pp.24–5) for *t* a 'gap of approximately 20–25 msec between burst and onset of vowel resonance' and for *ṭ* that '[d]urational features match /t/'. The southern rural Palestinian dialect of Yaṭṭa also appears to have a two-way distinction in the voiceless series: in the spectrograms and waveforms in El-Haleese (1971), it is very clear that whereas *t* and *k* are (voiceless) aspirated, *ṭ* is unaspirated and voiceless.

[127] See Chapter 2. Additionally, data from soundfiles which have subsequently become available – Liddicoat *et al.* (1998) (available online at www.syrianarabic.com) – show under analysis that both *t* and *ṭ* are generally slightly aspirated. The VOT range appears to be somewhat variable for both of these segments, and there is no clear distinguishing zone.

[128] Obrecht (1968:27) notes that for his (northern) Lebanese subject (from Kfarsghab, near Tripoli) *ʕ* has a 'rasping onset which consists of irregular and abnormally wide spacing between voice striations', which may be termed 'voiced noise, having a generally harmonic structure, but with some of the scatter and blurring associated on the spectrogram with noise'. He observes 'four bands of resonance...corresponding to the subsequent formants, but with some blurring'. This is not like any of the fricatives described (*f s ṣ z ẓ x ɣ*) in that those have much random noise in the top half of the spectrogram and no clear bands of resonance, although *h* and *ḥ* 'have noise-filled formants', but it seems that the latter are much more 'noisy' than *ʕ*, and the description of *ʕ* is more consistent with it being an approximant. Cantineau & Helbaoui (1953:14) note that *ʕ* is easily confused with *a*, implying that in DA it is not produced as saliently as in some other dialects (see the discussion in Chapters 2–3): 'On évitera de confondre *ɛ* avec le voyelle *a*...'

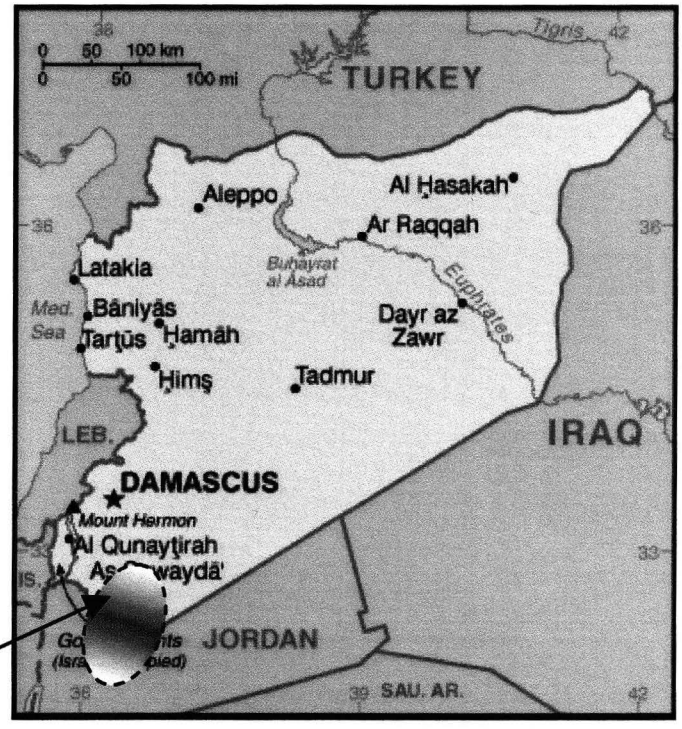
[129] Also noted by Cowell (1964:26).

	pharyngeals ʕ ħ; with the presence of a primary emphatic the spread is strongest (and may effect emphaticisation of other coronals), whereas with (other types of) *tafxīm* the overall auditory effect is weaker (and it generally doesn't cause *t s d* to become emphatic); I therefore see only the coronals as 'emphatic', whereas *tafxīm* is effectively 'neutral' (i.e. a non-front / non-*māla* context) – this is discussed in Chapter 6 • most generally, where a word has more than one coronal obstruent, they are either all emphatic (*ṭ ṣ ḍ ẓ*) or all non-emphatic (*t s d z*)[129] – cf. examples of etymological emphatic becoming 'plain', as in *dərs* 'molar (tooth)' (<*ḍirs*), *dayyi?* 'tight' (<*ḍayyiq*), *sadda?* 'he believed' (<*ṣaddaqa*) – these examples apparently show the influence of other (non-emphatic) coronals or the palatal glide (i.e. *māla*)
9	potential blockers to the spread of the emphatic property seem to be: rightwards: the ('traditional') syllable boundary leftwards: palatals
10	non-segmental emphatic triggers are generally not noted (as they are in, e.g., Baghdadi), see Chapter 6

5.4.3.2 Ḥōrāni

The Ḥōrān is a volcanic region to the far south-west of Syria, abutting the Golan Heights and Lake Tiberias to its west, and overlapping the Jordanian border up to around Irbid.[130] The area has a considerable number of Druze villages, the Druze being later incomers to the region, [131] and remaining distinct, culturally and linguistically, from the other Arab inhabitants of the region.[132]

Map 5.5 Syria and environs showing the Ḥōrān to the far south[133]



Ḥōrān

The data given here are for the Central Ḥōrāni dialect. It is clear that there are what may be termed 'peripheral' Ḥōrāni dialects which show some features in common

[130] See the detailed description in Cantineau (1946:1–8).

[131] The Druze are a secretive and introspective minority sect of Shi'i Islam, often considered heretical by the mainstream. The largest communities are in Syria and Lebanon. Cantineau (1946:6) notes that about two and a half centuries ago, Druze migrations from Lebanon and Mount Hermon (Jabal aš-Šayx) to Jabal ('Mount') Ḥōrān caused a gradual exodus of the sedentary Ḥōrānis. The mountain is occupied now solely by the Druze, along with some Christian groups, and has come to be known as Jabal ad-Drūz.

[132] The Druzi dialects are considered to be Lebanese-type.

[133] Map syria_sm_2007 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps/.

with dialects of the surrounding areas, and are thus somewhat 'transitional' in the dialect continua.[134]

Table 5.9 Phonological features of Ḥōrānī[135]

1	OA *q* > *g*
	OA *k* > *č* in some environments, mostly palatal, so that OA *k* has split into two phonemes: *k* (which is always 'back') and *č* (which is always 'front')
	OA *ǰ* > *ǰ*
2	short vowels: *i u a*[136]
	long vowels *ī ū ā ō ē*, i.e. **ay* > *ē*, **aw* > *ō*[137]
3	interdentals are preserved: *θ ḏ ḍ*
	OA **ḍ* / **ḍ̄* > *ḍ̄*
4	lexical (segmental) emphatics are *ṭ ṣ ḍ̄*; however, 'secondary' emphatics are *ḅ ṃ ḟ ṛ ḷ ẖ ˁ* (these are described as consonants which may become '*mufaxxam* by position'; additionally, *w k g x γ* are described as '*mufaxxam par nature*', that is, they are intrinsically 'back' and spread this back property)
5	VOT contrasts: no information on this is given
6	no information is given as to the exact realisation of the voiced pharyngeal *ʕ*
7	no resyllabification in guttural contexts ('coffee' = *gahwa*)

[134] Cantineau (1940, 1946), but see also Behnstedt (1997:Map 515).

[135] All data from Cantineau (1946).

[136] Cantineau (1946:176–9) reflects various realisations of these vowels in his transcriptions. Short *a* is often 'pure' (something like [a]), especially next to postpalatals, velars, pharyngeals and laryngeals; it is backed 'å' [ɑ] next to emphatic or *mufaxxam* consonants and labials; it is fronted 'ä' [æ] next to interdentals, dentals, sibilants and prepalatals 'à condition qu'aucun des phonèmes capables de maintenir le timbre pur *a* n'exerce une influence contraire'. Short *i* is never 'pure': its normal phonetic realisation is 'e' (presumably a somewhat lax [ɛ]), next to labials and *mufaxxam* consonants it is often closer to 'ö'. There are also cases of **i* > *u* next to labials. Short *u* is generally realised as such next to labials, and sometimes next to postpalatals and velars; however, the most common realisation of *u* are 'o' and 'ö' (the latter seems mostly to be the result of the influence of emphatics, pharyngeals and *mufaxxam* consonants). Generally, there is a considerable degree of neutralisation of *i* ~ *u* word-internally, although examples such as *bent* 'girl' (**bunt*) indicate that this is not entirely the case.

[137] Cantineau (1946:156) argues that this is purely phonetic: 'les sujets parlants sentent dans ce cas, non pas des voyelles longues *ē* ou *ō*, mais bien des groupes *ay* ou *aw*...Ce qui renforce ce sentiment, c'est l'existence d'autres formes de la même racine où le *w* ou le *y* apparaissent nettement – ou bien encore l'existence de grandes séries morphologiques qui imposent, par analogie, l'analyse de *ē* et de *ō* en *ay* et en *aw*. Ainsi les pluriel *byūt* et *twāṛ* [*θwāṛ*] font que le sujet parlant sent *bēt* 'maison' et *tōṛ* 'taureau' comme représentant **bayt* et **tawṛ*...Les voyelles longues *ē* et *ō* n'auraient donc pas en ḥōrânais (non plus qu'en beaucoup de parlers arabes) d'existence phonologique.'

8	• according to Cantineau, influence of *mufaxxam* ('backed') consonants spreads rightwards, and tends to spread to the end of the word (but rarely leftwards); his data show that *ṭ ṣ ḍ̌* may spread R–L, however • minimum domain = CV or VC unit – Cantineau seems to differentiate *tafxīm* from 'emphasis' proper; *tafxīm* may spread into suffixes, although suffixal *t* does not become *ṭ* (which again seems to differentiate *tafxīm* from 'emphasis')
9	1) the few words in the data which show a 'primary' emphatic and another coronal show that 'emphasis' may spread leftwards (e.g. *ṣaṭ°l̩* 'pail', from OA *saṭl*), although not necessarily to the beginning of the word (e.g. *smanṭāṛa* 'cover', where leftward spread may have been blocked by the *n*, or may be due to the syllable structure since *ṭ* here is preceded by a 'closed' syllable) 2) general (L–R) backing caused by the adjacency of back vowels to the intrinsically back consonants *w k g x γ* is blocked by coronals / palatals and *i*; coronal *t s ḍ̌* in words with *tafxīm* do not become emphatic (e.g. *ṛūs* 'heads of cattle' **ṛūṣ* and *ḍaṛṛa* 'he winnowed' **ḍaṛṛa*) and block the rightward spread (e.g. the feminine possessive suffix added to *rūs* would be *ṛūs-he*, **ṛūs-ḥa*) 3) rightward spread may be blocked by a historical (elided) *i*, as in *bayāṭre* 'blacksmith' < OA *bayāṭire*, *ṛuṭbe* 'damp' < OA *raṭiba*; the block of spread in both directions is exemplified by *γalīḍ̌* 'thick', * *γaḷīḍ̌*, where the presence of the *ī* prevents the *l* from being 'backed' under the influence of either *γa* or *ḍ̌*
10	in addition to the backing effect of *ṭ ṣ ḍ̌*, general 'backing' (*tafxīm*) is seen: 1) to the right of *w k g x γ* 2) where one of the 'neutral' segments *b m f l r ħ ᶜ h* is found next to a back vowel *u a*, or to the right of one of the above 'inherently back' (*mufaxxam*) or emphatic (*muṭbaq*) consonants) in which case the 'neutral' consonant is backed and may then spread this backing rightwards

To add to the information given in the table above, one could see the entire consonant system of Ḥōrāni as follows:

Figure 5.4 The Ḥōrāni consonant system

FRONT	NEUTRAL	BACK
(block backing)	('*mufaxxam* by position')	(*iṭbāq* / '*mufaxxam* by nature')
t	*b*	*w*
d	*m*	*k*
n	*f*	*g*
θ	*r*	*x*
đ	*l*	*γ*
s	*ħ*	*ṭ*
z	*ʿ*	*ṣ*
č	*h*	*ḍ*
ǰ		
š		
y		
ʔ		

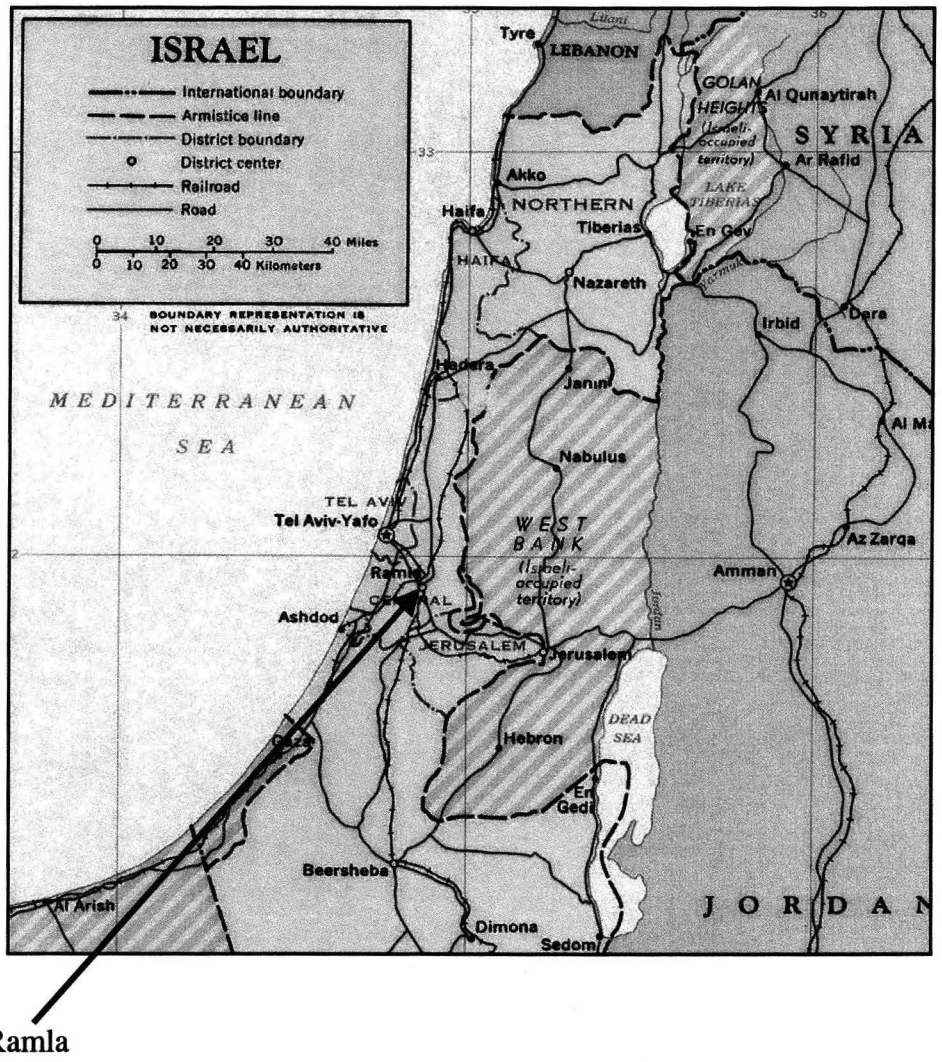
What clearly differentiates the 'front' consonants is that they are all coronals / palatals. The 'back' consonants are the dorsals, labio-dorsal *w* and emphatic coronals. The neutral consonants are the labials, liquids, pharyngeals and glottal *h*. Chapter 6 discusses the unifying phonological factors of these classes, especially since the most immediately obvious natural class here is that of the 'front' consonants, which are normally implied to be the 'inactive' members of this oppositional process in Arabic. Furthermore, Cantineau clearly sees *tafxīm* as somewhat different from *iṭbāq*, as the Arab grammarians originally did. In modern (Western) linguistic theory, however, 'emphasis' is generally seen as one phenomenon. This conflict between the two views is, I believe, the major cause of most of the controversy in the debate over Arabic

emphatics and their analysis within current phonological frameworks. Again, this point is taken up in Chapter 6.

5.4.3.3 Rural Palestinian

The details here are of the Abū Šūša dialect, which is a western central rural (*fallāḥi*) Palestinian dialect which was spoken in the pre-1948 village of Abū Šūša, a few kilometres south of Ramla.[138]

Map 5.6 *Israel and the Palestinian Territories*[139]



[138] Other rural Palestinian dialects are dealt with in Generative Phonology frameworks by Herzallah (1990), Younes (1993) and Davis (1995). Younes reports for Yaṭṭa that L–R emphatic spread is apparently blocked by *w* and palatals. This is in addition to the slightly different analyses, which themselves may be partially responsible for what is otherwise analysed as differing spread.

[139] Map israel_pol_1972 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps.

All the data for this dialect are from Shahin (2002).

Table 5.10 Phonological features of Abu Šūša Palestinian

1	OA *q* > *k* / *ḳ*
	OA *k* > *č*
	OA *ǰ* > *ǰ*
2	short vowels: *i u a*[140]
	OA diphthongs **ay* and **aw* are realised as *ē* and *ō*
3	OA interdentals *θ ð̣ ð̣* are retained
	OA **ḍ* / **ð̣* > *ð̣*
4	lexical (segmental) emphatics: *ṭ ṣ ð̣ ḳ ṛ ḷ ṃ ḅ*[141]
5	there is no mention of VOT contrasts or aspiration for this dialect, so it is not possible to assess this point[142]
6	voiced pharyngeal *ʕ* is predominantly an approximant,[143] with no mention of any stop realisation
7	no resyllabification in guttural contexts ('coffee' is presumably *ḳahwa*)
8	the (maximum) domain of spread is the word – two types of 'post-velar harmony' are proposed:

[140] However, see the discussion, following.

[141] Shahin (2002:55–9) posits emphatic *ḳ ṛ ḷ ṃ ḅ*. She argues for only one rhotic, *ṛ*, which is 'de-emphaticised' in certain contexts. Also, *ḳ ḷ ṃ ḅ* are presumed to exist in the inventory alongside non-emphatic *k l m b* (note *k* / *ḳ* < OA *q*, and most instances of OA *k* > *č*). Most of these 'lexical emphatics' are argued for on the basis of a small lexical set including *ḅāḅā* 'dad', *ṃāyy* 'water', *ṃaṛṛa* 'occasion', *alḷāh* 'God', etc, although it is well known that they occur only in the environment of *a*. However, since there is no other (primary, coronal) emphatic in these words to trigger this emphasis, it is often argued that either these consonants have (marginal) emphatic counterparts, or that the low vowel has split into two phonemes *a* and *ạ*. Shahin proposes that the gutturals in her dialect *γ χ ʕ ħ ʔ h* trigger vowel pharyngealisation, whereas the emphatics (including *ḳ*) trigger both vowel pharyngealisation and vowel–consonant uvularisation. There is an interesting parallel here with such analyses as Cantineau, for Ḥōrāni, Blanc, for Mesopotamian *gilit* and Negev Bedouin, and Ingham, for Khuzistani.

[142] The two spectrograms each for *t* and *ṭ* in Shahin (2002:160) are not clear enough (or labelled) for VOT to be obvious. This point would be interesting to ascertain for rural Levantine dialects. However, spectrograms and waveforms of the rural southern Palestinian dialect of Yaṭṭa, on the West Bank, south of Hebron (see Map 5.6), show that *t* and *k* are aspirated, whereas *ṭ* is unaspirated (Younes, 1993).

[143] Shahin (2002:57) concludes that *ʕ* is an approximant (although her discussion of the literature on guttural approximants does not take into account any possible cross-dialectal variation in its realisation, which has presumably obliged her to disregard the results of al-Ani (1970), who found Iraqi *ʕ* to be predominantly a stop, and she thus perhaps over-generalises, assuming that this is the same for Arabic pan-dialectally). From analyses of her own fieldwork, she states (fn.3): 'Tokens of Palestinian word-initial /ʕ ʁ/ are frequently voiceless for most of their duration and accompanied by frication. In a word-medial, voiced context...they are voiced throughout and high amplitude, with full formant structure.'

	1) pharyngealisation ([RTR]) triggers: emphatics, gutturals, vowels pharyngealised by being in a closed syllable targets: short vowels opaque segments: stem-final vowels, long vowels 2) uvularisation (emphatic-spread) triggers: emphatics targets: (short and long) low vowels, consonants opaque segments: palatal obstruents *š č ǰ* • pharyngealisation harmony affects all (non-final) vowels in a word • uvularisation spreads both ways into prefixes and suffixes, and may be blocked in either direction by the palatal obstruents (under this analysis)
9	as per (8), potential blockers to emphatic spread are palatal obstruents *s č ǰ*
10	the analysis that vowels in closed syllables are pharyngealised (i.e. 'lax' or RTR vowels) assumes a non-segmental trigger (see Chapter 6, however, for discussion of what Shahin analyses as lexical 'emphatics' *ḳ ṃ ḷ ḅ*, which, when not 'emphaticised' by another segment, occur only next to *a*, suggesting that this type of backing may be due to certain segmental combinations)

In Table 5.10, I gave three short vowels for this dialects. However, Shahin (2002) argues that there are five lexical short vowels: *i u a*, as well as the mid vowels *e* and *o*. Nevertheless, the status of these mid vowels seems at best marginal, if indeed they exist. The three examples of short *o* seem likely to be (phonetically) shortened *ō* (*lobia* 'type of bean', *bomali* 'pomelo', and the 'endearment' suffix in *sid-o* 'grandpa' and *xal-t-o* '(maternal) auntie'). These are all realised as [o], and there are no examples of 'lax' [ɔ]. It is thus comparable with *e* [e], as follows. Examples of *e* are of two types. Firstly, those which I think are likely to be (phonetically) shortened *ē* (realised as [e]); the example is *teta* 'grandma' – most other examples of nouns of the form CVCV show V_1 as a shortened vowel, as in *sid-o* 'grandpa' (</sīd/) and *dud-a* 'worm' (</dūd/). Secondly, there is *e* which I think has undergone *imāla* and significant laxing (realised as [ɛ]). This latter *e* only occurs in the data as the first

vowel in a word – notably, with the exception of two verbs, *melle*, 'he filled', *kela* 'he fried', always as V_1 in CVCVC nouns, where V_2 is *a* (they are *belad* 'country' and *leban* 'yoghurt'). Otherwise, most CVCVC nouns have a harmonised epenthetic [i] or [u] as V_2 – the two exceptions (CVCVC nouns which have V_2 as *a*) are *ḳamaṛ* 'moon' and *ʕalam* 'flag', where *imāla* would not occur because of the emphatic environment or the pharyngeal. The remaining example of *e* is the adjective *selik* 'boiled', for which I suggest V_2 is not epenthetic but lexical (the corresponding Standard form would be *salīq*, of the form *faʕīl*). Moreover, there are no true minimal pairs (in particular, no examples of *o* vs *ō*, *e* vs *a*, or *e* vs *ē*), and, significantly, no examples of what she posits as lexical *e* in the environment of a guttural or emphatic (although she does note [p.70] 'faux amis' instances of apparent *e* and *o* which are clearly lowered *i* and *u* after a pharyngeal). The issue of phonemic mid-vowels is also relevant to Syrian Arabic, see Table 5.8 on Damascus.

Lastly, an interesting point argued by Shahin (2002:57), who cites also Younes (1993; 1994), is that the rhotic (at least in these rural Palestinian dialects) is inherently 'back', i.e. *mufaxxam* (they both say 'emphatic') *ṛ*, and that in certain contexts it is 'de-emphaticised' [r], which is what is often found with other dialects (see the discussion in Chapter 6).

5.4.4 Egyptian

Very broadly, the Egyptian dialects can be divided into two major groups: Upper and Lower Egyptian (Cairo is included in the latter).[144] These can to a degree be characterised by their respective reflexes of **ǰ* and **q*: *g* and *ʔ* in Cairo and part of the Delta, *ǰ* and *g* in Upper Egyptian. This typical classification, however, ignores the position of the East and Central Sudanese Arabic dialects, and also Nigerian, which are generally considered to pattern with Egyptian and should thus be added.

As noted by Fischer & Jastrow (1980:29), the Egyptian group takes a special position between Eastern and Maghribi Arabic. Very roughly, (to the) west of the Delta and the Nile Valley, the dialects are often classified as Maghribi. An important

[144] Fischer & Jastrow (1980:29).

isogloss runs north–south through the western part of the Delta and very approximately along the Nile.[145]

Until relatively recently, the dialect of Cairo was seen as the Egyptian dialect *per se*, and little was known about Arabic dialects of the rest of Egypt. While recent work is going some way to redress the balance,[146] it has proven difficult to find work relevant to the purpose of this chapter other than on Cairene. It would perhaps have been instructive additionally to be able to detail the sound systems (and emphatic behaviour) in, say, an urban Delta dialect such as that of Alexandria, and rural Upper Egypt and Middle Egyptian dialects. Up to this point, it seems that it is what may be seen as 'rural' dialects which display the most divergence across the Arabic-speaking world, and it is therefore these which may be particularly useful to future research on this topic. This section therefore details the system of (urban) Cairene, and leaves rural Egyptian (and East African) for future research.

As for the actual classification of Egyptian dialects, the general consensus[147] seems to be: (1) Delta[148] (divided into Eastern, Western and Central, with the latter including Cairene), (2) Middle Egyptian (from Giza to Asyūṭ); (3) Upper Egyptian (from Asyūṭ to the south) – divided into four groups: (i) from Asyūṭ to Nagᶜ Ḥammādi; (ii) between Nagᶜ Ḥammādi and Qēna; (iii) between Qēna and Luxor; (iv) between Luxor and Esna.[149] In addition are the Oases dialects of the Western Desert (i.e. the Libyan Desert), which are presumably seen as Maghribi dialects, and the dialects of central and west Africa, which include at least Nigerian and Sudanese Arabic as well as Chadic. This 'belt' of the dialect area stretches from Sudan through the Central African Republic, Chad and Cameroon to Nigeria; however, all these are

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[145] Versteegh (2001:134–5). The isogloss is the first person singular of the imperfective verb, which in Maghribi Arabic is *n-*, so that 'I write / we write' is *n-əktəb / n-kətb-u* in Moroccan, but *ə-ktob / n-əktob* in Damascus.

[146] The work of Manfred Woidich and Peter Behnstedt is particularly important in this respect, see in particular Behnstedt & Woidich (1985).

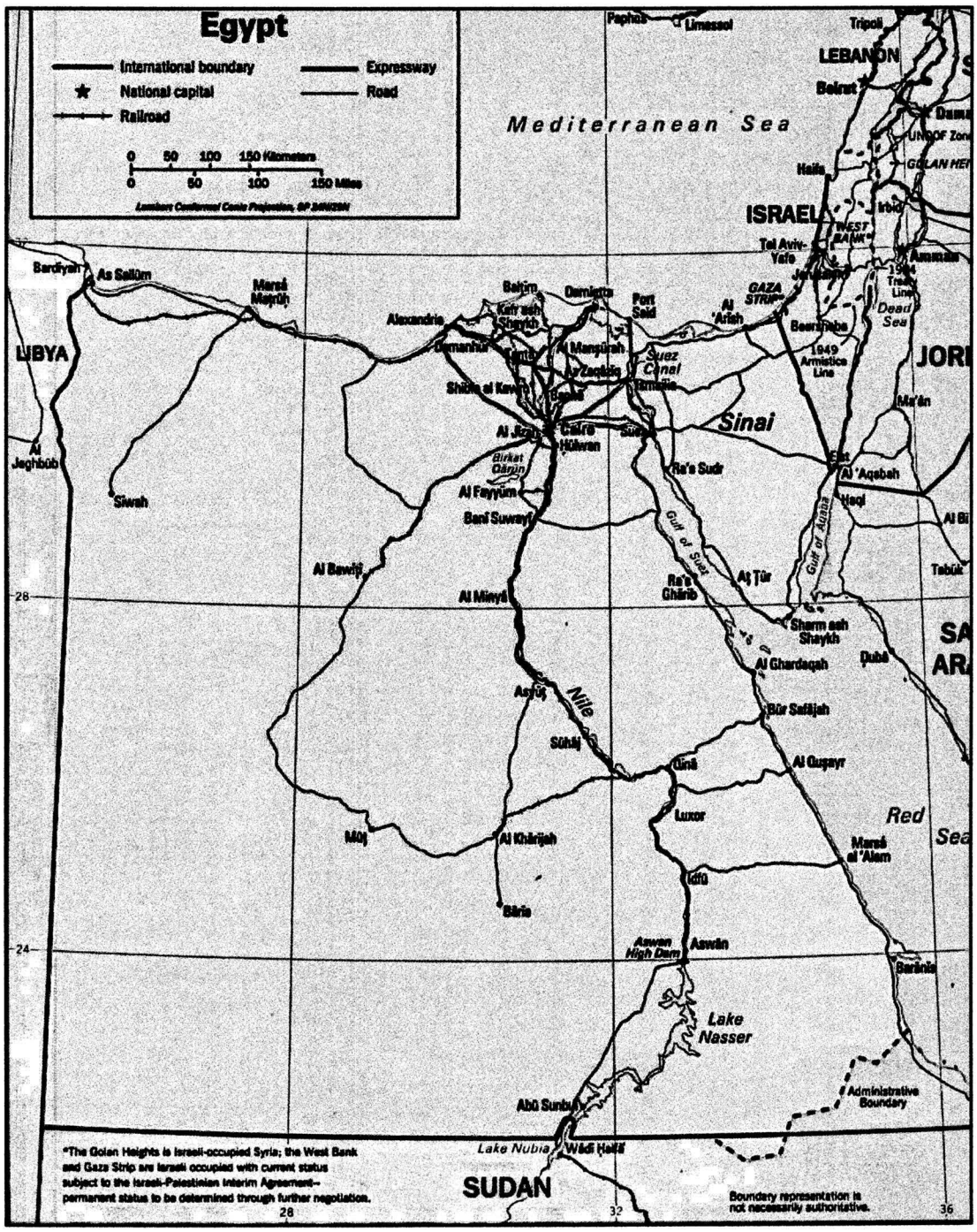
[147] Although here I incorporate the conclusion of Woidich (1994) that Cairene is generally central Delta. As noted, Holes (2004) classes Cairene along with the major urban centres of the Levant.

[148] The Delta is the part of northern (Lower) Egypt where the River Nile spreads out and drains into the Mediterranean. It spreads along the Mediterranean coastline from Alexandria in the west to Port Said in the east, and from north to south is about 160 km long, beginning a little north of Cairo. Because it is a rich agricultural region, in contrast with much of the rest of Egypt, the population here is much denser (with the exception of Cairo itself).

[149] Upper Egypt generally, i.e. roughly to the south of Cairo, is known as the Saᶜīd, and Egyptians themselves usually call all southern varieties of Egyptian Saᶜīdī, in contrast with the prestige dialect of Cairo.

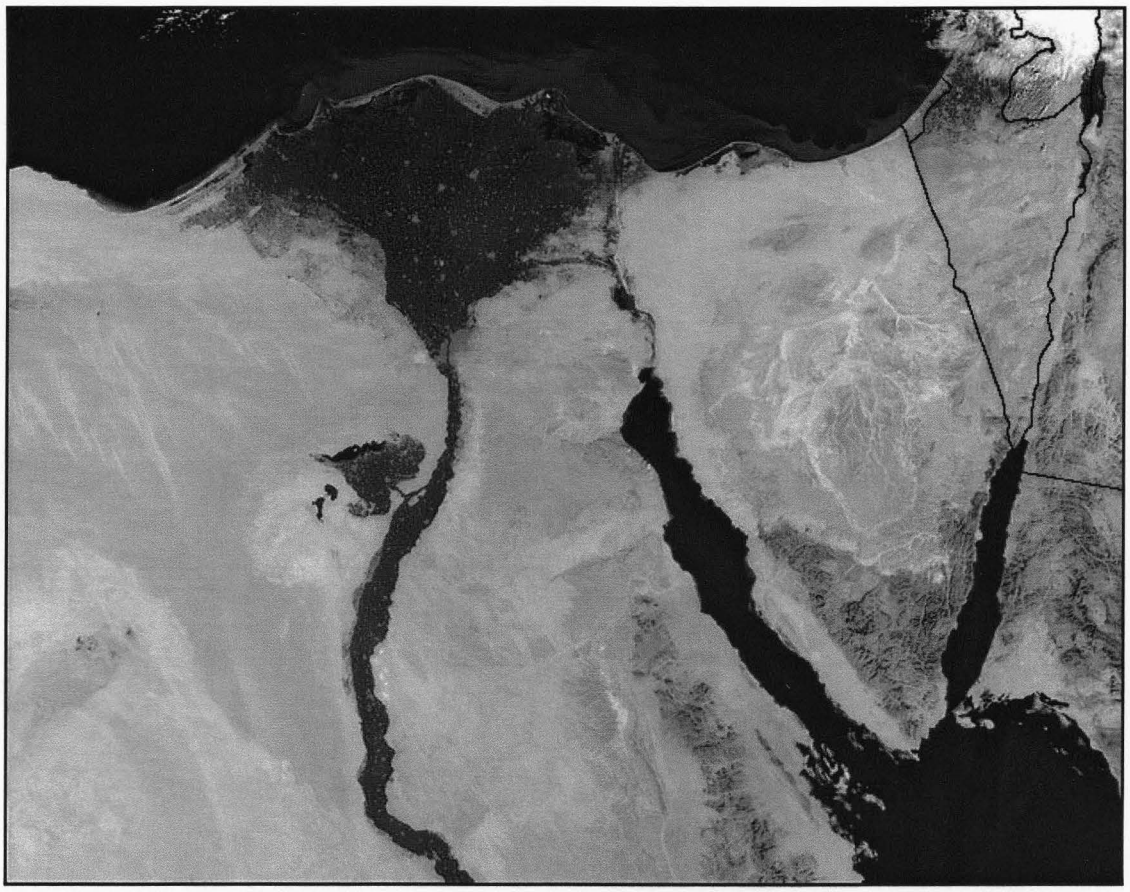
Bedouin (*baggāra*) dialects, and may in fact turn out to be better classified along with the Arabian Bedouin varieties.

Map 5.7 The Egyptian dialect area[150]



[150] Map egypt_pol97 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps.

Map 5.8 The Nile Delta[151]



5.4.4.1 Cairene

As noted by Watson (2002), Cairene is an urban, innovative dialect. It is also a prestige dialect, and often taken as 'standard' Egyptian. Two particularly salient features of Cairene for non-Egyptians, and which thus clearly mark out Egyptian (more strictly, Cairene) speech, are the *g* reflex of **ǰ* and the stress system under which Cairene stresses the penult where other dialects stress the antepenult, e.g. Baghdadi *màdrasa*, Cairene *madràsa* 'school'. Woidich (1994) concludes that Cairene is a central Delta dialect, although it shares quite a number of features with dialects of the region to its south, probably due to immigration from rural areas, as well as displaying innovations of its own.

[151] Map downloaded from http://en.wikipedia.org/wiki/Nile_Delta (accessed 3 Aug 2006).

Table 5.11 Phonological features of Cairene[152]

1	OA *q* > *ʔ* (some lexemes, usually considered classicisms, realised with *q*)
	OA *k* > *k*
	OA *ǰ* > *g*
2	short vowels: *i u a* (although the *i* ~ *u* opposition 'reduced', i.e. restricted only to certain positions; this is less the case for Cairene than for e.g. Damascene)
	long vowels *ī ē ā ō ū*[153]
3	no interdentals: generally, OA *θ ð ḍ̌* > *t d ḍ* ; some lexemes show OA interdentals as sibilants (*s z ẓ*), generally seen as later loans from Standard Arabic[154]
	OA **ḍ / *ḍ̌* > *ḍ* (sometimes *ẓ*)
4	lexical (segmental) emphatics: *ṭ ṣ ḍ ẓ* , and marginally *ṛ ḷ ṃ ḅ*[155]
5	CA has a two-way VOT contrast: *t* and *ṭ* have similar VOT values, generally slightly aspirated, [156] as per Chapter 2 (see below for discussion of palatalisation)
6	Cairene appears to have a predominantly approximant-type *ʕ*[157]
7	no resyllabification in guttural contexts (coffee = *ahwa*)
8	the minimum domain of spread is the syllable (CV unit) and the maximum is the word; according to Hoberman (1989), following Broselow (1976), the feature [+CP] is underlyingly associated with lexical emphatics, but spreads

[152] Watson (2002), Fischer & Jastrow (1980). See also Broselow (1976), Behnstedt & Woidich (1985).

[153] The diphthongs *ay* and *aw* are attested in certain lexemes, mostly considered to be later imports from Standard Arabic. Watson (2002:23) suggests that it may be the case that 'coalescence in Cairene is a historical process which no longer applies', and she cites evidence in Badawi & Hinds (1986) of many items with diphthongs, as well as Broselow (1976:152–3), who argues that forms adopted in Cairene after 'the rule of coalescence dropped out' maintained the diphthongs, since the already existing forms with coalesced long vowels were reanalysed as having 'underlying' long mid-vowels.

[154] Watson (2002:15).

[155] Broselow (1976) has *ṭ ḍ ṣ ẓ ḷ ṛ*. Watson (2002:20–1) notes that *ṛ* is the 'most common and most phonemic-like of the marginal phonemes', which is found in loans and 'native words with guttural vowels', providing for a number of minimal pairs. There are a few minimal pairs involving *ḅ*, one with *ṃ*, and ('phonemic') *ḷ* is found in the word *aḷḷā* 'God' and derivatives.

[156] For Watson (2002:43), this means that Cairene emphatics have a [voice] contrast, since Cairene has the two four-term systems *t-ṭ, d-ḍ, s-ṣ, z-ẓ* , i.e. that all voiced obstruents have the (monovalent) feature [voice], whereas all voiceless obstruents lack this feature.

[157] Heselwood (2007:4) cites Shaheen (1979), who 'did not find any stopped realisations in Cairo Arabic'. However, note that Watson (2002) analyses Arabic pharyngeals as phonologically emphatic laryngeals (i.e. *ʕ* as an emphatic *ʔ*).

	'automatically' within the syllable (due to the 'universal principles of autosegmental spreading', since it is the syllable that is the domain of 'emphasis'), and in certain contexts to adjacent syllables; he states (p.82) that 'in Cairene a syllable must be emphatic or plain as a whole – no syllable is part emphatic, part plain'. Hoberman summarises Broselow's (1976:45–6) 'rules' for L–R and R–L spread: 1) L–R: 'emphasis spreads from an emphatic syllable to the following syllable if the emphatic syllable is closed and the vowel of the following syllable is low' 2) R–L: 'emphasis spreads from an emphatic syllable to the preceding syllable in the same word' leftward spread does not apply across a word boundary, but rightward spread can, if the syllable also crosses a word boundary
9	Watson (2002:273–7) gives a slightly different analysis (in terms of spread being blocked) and shows the following: • leftward spread from 'primary' emphatics is unbounded within the stem, whereas rightward spread is optionally blocked by non-tautosyllabic [dorsal] vocoids *i y* • for 'secondary' emphatics, Watson (2002:275) notes that *ḅ ṃ ḷ* are extremely marginal, but she shows the behaviour of *ṛ* as follows:[158] 1) both leftward and rightward spread from *ṛ* is blocked by *i* or *y* 2) where *ṛ* is directly adjacent to *i* or *y*, it is de-emphaticised and no spreading takes place 3) this de-emphaticisation occurs directly preceding an analytic suffix[159] *-i* (e.g. the relational / *nisba* ending, as in *baʔari* 'beef

[158] (Non-emphatic) *r* is given as a separate phoneme from ('secondary' emphatic) *ṛ*. However, the distribution of non-emphatic *r* is not entirely clear. That is, although *ṛ* is apparently de-emphaticised in certain contexts, *ṛ* itself seems to appear always in the context of the back vowel *a* / *ā* (or *ō*). It is a somewhat chicken-and-egg situation, in that the appearance of *a* as back is normally itself triggered by emphatics, yet if there is an emphatic *ṛ* then why does it not occur, for example, with *i*? The analysis thus assumes an emphatic *ṛ* with a non-emphatic counterpart *r*, yet the distribution is limited enough to question whether there are really two separate phonemes. However, Woidich (2006), to which I have not yet had access, gives minimal pairs for *r*-*ṛ* (I thank Janet Watson for bringing this to my attention).

[159] Analytical morphology is that occurring at an earlier derivational stage, so that any applicable phonological processes occur across the morpheme boundary; non-analytical morphology occurs at a

	(adj.)'), but not if a suffix is non-analytic (e.g. the 1PS possessive *-i*, as in *ḅaʔaṛi* 'my cows')
10	there are no analyses to my knowledge of non-segmental triggers of the emphatic property in Cairene (i.e. combinations of certain consonants appearing to be 'velarised'); however, there are contexts where non-coronal consonants are seen as 'emphatic', which I argue are simply not in a front context (and in this sense 'neutral'), as discussed in Chapter 6

A couple of further comments are necessary here. Firstly, Watson (2002:272) analyses the lowering of vowels adjacent to pharyngeals and uvulars as an instantiation of emphasis spread although the target is adjacent vowels only. Additionally, preceding a syllable-final pharyngeal, *i* is lowered to [ɛ] (as in *tiᶜmil* [tɛʕmɪl] 'she does, makes') and *u* when tautosyllabic with a pharyngeal is lowered to [o] (as in *ħubb* [ħobb] 'love', *yikuħħ* [yikoħħ] 'he coughs'). Under this analysis, not only the domain of emphasis spread is less, but also the effect. However, there are a couple of puzzling facts in the data given. Firstly, in is not clear why V_2 has a back realisation in *qidir* [qɨdɨr] 'fate'. Compare this with *ṭiliᶜ* [ṭɨlɛʕ] 'he went up' (where it is presumably *ṭ* which triggers the realisation of *i* as [ɨ]), but *yikuħħ* [yikoħħ] 'he coughs' (where the *i* vowel is realised as [i]).[160] It seems unlikely that there is some sort of vowel harmony in *qidir* [qɨdɨr], since there is no other evidence of this. Rather, it would seem that the [ɨ] realisation is due to the presence of *r*, which is apparently emphatic, and not de-emphaticised by the preceding *i*.

In comparison with some other dialects outlined in this chapter, it is apparent that Cairene does not seem to equate emphatics (or 'backing') with *u*-quality. Firstly, *u* and *i* are distinct in emphatic environments. Secondly, as discussed presently, it seems to be *i*-quality (palatalisation) which is a salient feature of Cairene. Thirdly, an interesting point is made in the 'discussion' appended to Ali & Daniloff (1972): Harold Paddock notes that his perceptual experiments on Egyptian subjects showed

later stage (or different level) of the derivation such that the morpheme boundary is 'visible' to the phonology. This could be equated to 'level-one' and 'level-two' morphology. See Kaye (1989).

[160] There were no other phonetic transcriptions given to show the realisation of *i* in words with no gutturals or emphatics, but it is presumably either [i], or [ɪ] in closed syllables.

that 'Any lowering of F1 (in addition to F2) in the synthetic E[gyptian] C[olloquial] A[rabic] syllables was immediately rejected by ECA subjects as rounding rather than "emphasis".' This indicates that *u*-quality is indeed distinct from the emphatic property for these speakers.

Now, lastly, to the palatalisation of coronals, which is an apparently increasingly salient feature of Cairene speech.[161] The results of Haeri (1997) show this to be a fairly recent innovation which is strongest in the speech of (young) women, and to affect the coronal stops *t ṭ d ḍ*. It may be weak palatalisation [tʲ] [dʲ], or strong palatalisation [tʃ] [dʒ], and is triggered by a following *y i ī*, epenthetic [ɪ] or occasionally *ē*. There are two potentially interesting points arising: the first concerns the nature of the emphatic, and the second relates to voicing contrasts.

Firstly, there is an apparent hierarchy in terms of the target is *t* > *ṭ* > *d* > *ḍ* (i.e. *t* is most likely and *ḍ* least likely to undergo palatalisation). This at first glance seems puzzling since one would expect the emphatics to be least likely to undergo palatalisation. However, Haeri (1997:57) notes that 'pharyngealization' is weaker in Cairene than in other dialects, and concludes that *ṭ* 'loses its pharyngealization variably' and becomes 'plain' (i.e. non-emphatic). Although she does not present any acoustic evidence, her implication is that the emphatics become non-emphatic when palatalised. There is no discussion of how palatalisation affects other segments in words which would normally be entirely emphatic.

The second point concerns aspiration: Haeri (1997:48) shows that *t* in *ḥayāti* 'my life' has a significantly longer VOT lag when strongly palatalised (106ms in this one example) than when weakly palatalised (56ms).[162] The fact that this lengthened VOT is concomitant with degrees of palatalisation implies that non-palatalised voiceless stops (i.e. *t*) are probably 'plain' voiceless and that the slight voicing delay (as seen in Chapter 2) does not relate to distinctive aspiration.

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[161] Haeri (1992, 1997).

[162] Unfortunately, no other measurements were given for comparison; in particular it would have been interesting to compare the VOT of non-palatalised *t*, especially since the value of the weakly palatalised *t* seems significantly higher than the measurements for *t* (and *ṭ*) obtained by Heselwood (1996), as shown in Chapter 2. Haeri gives these two measurements to show the difference between weakly palatalised and strongly palatalised stops.

5.4.5 Maghribi[163]

The Maghribi, or Western dialect group is generally thought to be broadly divided into two major sub-groups, Pre-Hilali and Hilali, which are then classified as follows:[164]

A) Pre-Hilali: sedentary dialects of North Africa, spoken in cities, the Tunisian Sahel, and regions north of some of the large urban centres Constantine, Tlemcen and Fes:

(1) (eastern) pre-Hilali: Libya, Tunisia, eastern Algeria (characterised by the preservation of three short vowels)

(2) (western) pre-Hilali: Morocco (Rabat and Fes) and western Algeria (they only have two short vowels and use *waḥd* + *əl-* as definite article)

B) Hilali group: Bedouin dialects of North Africa (Bedouin dialects are spoken not only in the rural areas but also some cities Bedouinised at a later date, e.g. Tripoli; Libya is largely Bedouin-speaking):

(1) Sulaym (in the East): Libya and southern Tunisia

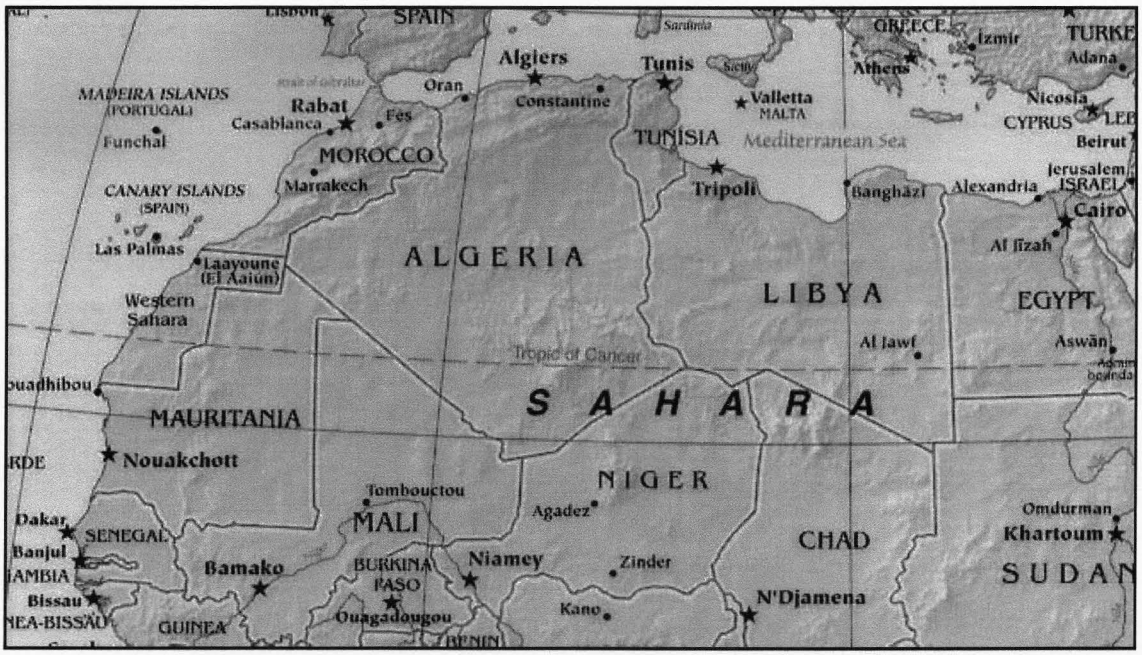
(2) Eastern Hilal: central Tunisia and eastern Algeria

(3) Central Hilal: south and central Algeria, especially the border areas of the Sahara

(4) Maᶜqil: western Algeria and Morocco (including Casablanca), the Ḥassāniyya dialect of Mauritania

[163] For a general study of the dialects of the Maghrib, see Marcais (1977).
[164] Versteegh (2001:164).

Map 5.9 The Maghribi dialect area (North Africa)[165]



5.4.5.1 (Sedentary) Moroccan

The data here are taken from Heath (1987) and relate to the dialect of the Fes / Meknes region of the central plains of Morocco. This is a sedentary western pre-Hilali dialect. Heath calls it MCA, Moroccan Colloquial Arabic, thus assuming it as somewhat of a standard for (sedentary) Moroccan Arabic.

[165] Map africa_ref01 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps.

Map 5.10 Morocco showing Fes and Meknes[166]

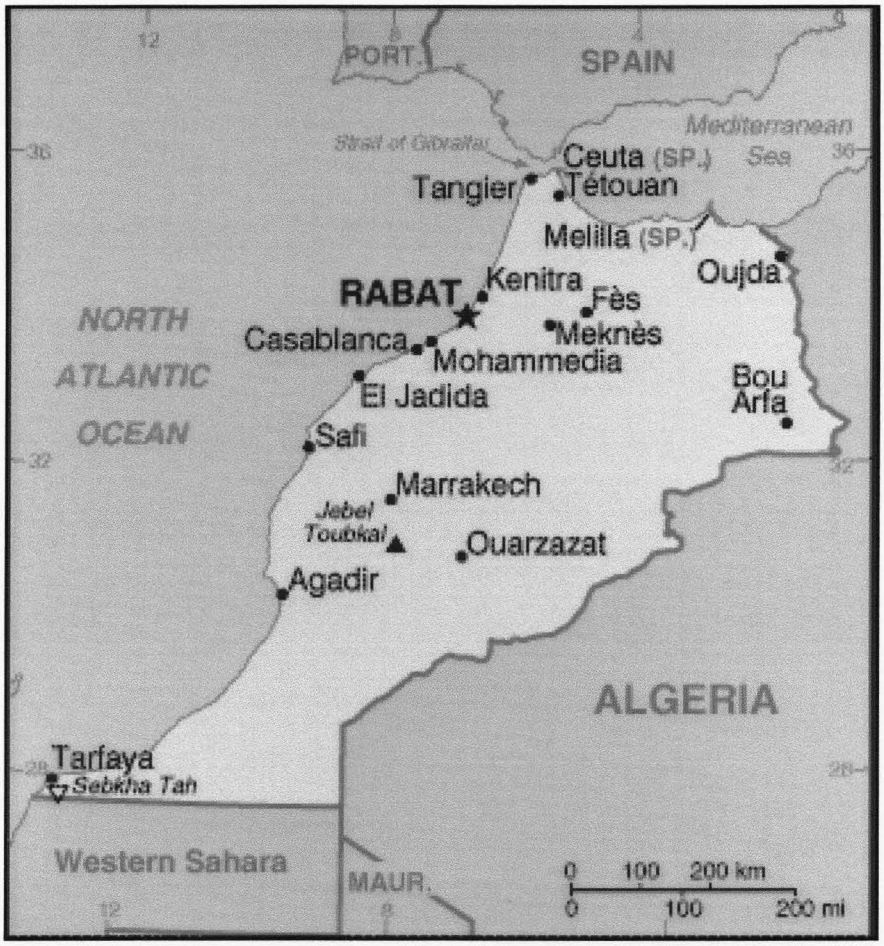


Table 5.12 Phonological features of Fes / Meknes Moroccan

1	OA *q > q
	OA *k > k
	OA *$ǰ$ > $ž$
	1. Heath notes 3 'full' vowels, but is 'reluctant to call /i a u/ "long" Vs, since they have no one-to-one relationship to shorter counterparts'[167] and are not phonetically long, although they roughly correspond to OA *$ī$ $ā$ $ū$; these vowels are subject to allophonic variation depending on C environment, especially a > backed 'ạ' word-finally and next to emphatics, and ä 'when all adjoining Cs are plain'; i = 'i' and u = 'u' except in 'pharyngealized' environments, when they are 'e' and 'o'

[166] Map morocco_sm_2007 from the collection of the Perry Castañeda Library, University of Texas, available at http://www.lib.utexas.edu/maps.
[167] Heath (1987:23).

	respectively 2. OA short vowels (**i a u*) in MCA = 'unrounded ə' and 'rounded ŭ'; schwa 'ə' has values ranging from [ɨ]–[ă]–[ə]; 'ŭ' ranges from [ʊ]–[o] – both of these are positionally restricted (word-medial only); 'ŭ' 'regularly adjoins a velar or uvular C' (for which reason Heath proposes a set of labiovelars/uvulars, k^w etc, meaning that 'ŭ' would be a variant of schwa, and schwa then 'epenthetic')
	OA **ay* and *aw* generally > *i u*
3	OA interdentals are generally stops (*θ* > *t*, *ð* > *d*, *ḍ* > *ḍ*)
	realisation of OA **ḍ / *ḍ* > *ḍ*
4	lexical (segmental) emphatics: *ṭ ṣ ḍ ẓ ṛ*[168]
5	VOT contrasts: *t* has a 'heavily aspirated and often affricate-like release...while /ṭ/ consistently has an abrupt release',[169] *q* is 'consistently glottalized, with little or no aspiration, while /k/ is never glottalized and usually aspirated'[170]
6	the realisation of *ʕ* may be similar to the more conservative dialects above: 'it lacks a true fricative constriction. It has some characteristics of a stop...In MCA, it is not glottalized as in is in Mauritanian Hassaniya'[171]
7	no resyllabification in guttural contexts: due to the vowel system, MCA has strings of Cs not permitted in other dialects, 'coffee' = *qhwa*
8	domains of spread of the emphatic property: within the stem, coronals tend to harmonise in terms of emphatic / non-emphatic; some exceptions indicate that spread is generally leftwards (and much less rightwards); vowel alternations are a little more complex: see Chapter 6
9	potential blockers to the spread of the emphatic property: there are some

[168] In Moroccan Arabic, *r* and *ṛ* are phonemically distinct, although Heath (1987) analyses some instances as predictable, indicating that historically it was generally predictable but that it has split into *r* and *ṛ*, although their distribution is not (yet?) quite parallel to that of the other coronal emphatics, and Heath suggests that 'the separate-phoneme model is gradually displacing the allophonic one' (p.298). Moreover, unlike other dialects, 'phonemic' *ṛ* apparently has long-range effects exactly like the other coronal emphatics. This is discussed in Chapter 6, following. Cantineau (1946) also states that Moroccan has both lexical *r* and *ṛ* (he specifically contrasts this with Ḥōrāni, which has only *ṛ*, as discussed, which 'de-emphaticises' next to *i*).

[169] Heath (1987:17).

[170] Heath (1987:13). Zeroual (2002) also shows a three-way voicing contrast for the Moroccan dialect of Oujda, a city in north-east Morocco close to the Algerian border (and also a sedentary dialect).

[171] Heath (1987:13).

	instances of *š ž y* blocking rightward spread
10	virtually all instances of emphatic presence were due to segmental coronal emphatics or uvulars

5.5 Conclusion

To conclude this chapter, I shall reiterate that the main aim was to show the sound systems of the contemporary Arabic dialects, according to the traditional five-group classification, and to see how emphatics fit into this. Due to the limitations of a project of this size, this has had to be kept briefer than it could have been, and while a representative of each dialect group has been detailed, the Cairene and Maghribi groups are under-represented in this survey. In terms of general sound systems and emphatics, there does seem to be a pattern in which the Bedouin-type dialects have 'back' contexts (typically seen as 'emphatic') in which there are no coronal emphatics, but where the 'emphasis' seems due to combinations of certain consonants. The intended focus of future research is therefore to see the extent to which this may or may not be true of varying types of north African and rural Egyptian dialects, and also the *qəltu* Mesopotamian dialects (as discussed).

Generally, as is known, the Bedouin(-origin) dialects, as well as many rural Levantine, tend to have *g* < **q* (sometimes *č* <**k* and *ǰ* < *g* <**q*), they retain the OA interdentals, they have a three-way voicing contrast, and perhaps a 'stronger' (creakier and more stop-like, rather than approximant-like) pharyngeal *ʕ*. Moreover, these dialects are those which tend to be thought of as having more 'emphaticness, or at least being more 'guttural'. From much of the details and data in this chapter, the reason does not seem entirely clear, and the spreading of the emphatic property itself (into coronals) doesn't seem to differ considerably. Certainly as far as the coronals are concerned, most dialects report leftward spread and limited or variable rightward spread, and that affixal coronals only become 'emphatic' when directly adjacent to a stem emphatic. What seems to be different is the number of 'back' segments a system has, and how this in some dialects seems to result in sequences of certain segments which are seen as emphatic, and which seem to involve labials and velars. Looked at in reverse, we could therefore say that some dialects seem to have more 'front'

contexts, typically signalled by *i*, where other dialects have more prominent *u*-contexts along with 'back' labials and velars. In Chapter 6, following, I therefore investigate this angle, and I argue that 'emphatic' is not the same as *u*-quality (I argue that there are [A]-domains and in some dialects [U]-domains), and, moreover, I argue that these typically oppose *i*-quality (or [I]-domains). It is this *u*-quality which has been associated with 'emphasis', but which I argue is different. In dialects without such prominent *u*-quality, it is contexts in which there is no *i*-quality or *a*-quality which cause problems in analysis of 'emphasis' spread. In this sense, it is the *i*-quality which needs investigating.

We could also make the point here that since dialects seem to have a 'front'–'back' contrast, the 'back' contrast can be more or less 'velarised' according to the dialect. That is, in some dialects 'backness' is phonetically more velarised, whereas in other dialects 'backness' (not necessarily the emphatics, although they may be less pharyngealised / uvularised) is signalled predominantly by non-front vowels. Whether the dialect chooses to signal these oppositions with domains that are phonetically strongly velarised vs something more plain, or whether the contrast is more one of 'backness' vs palatalisation is a phonetic choice. However, what this chapter has sought to discover is whether or not this corresponds to any other variables of the (segmental aspects of the sound) system, and whether this can be correlated with dialect type.

Chapter 6
The Behaviour of Arabic Emphatics: Domains and Elements

The objective of this chapter is to investigate more closely how Arabic emphatics work, and in particular to look at those environments where the traditional generative analysis is that 'emphasis' spreads across, or is triggered by, non-coronals. Therefore, I go back to the representational framework presented in Chapter 3 and show how this is crucial in understanding the behaviour of the various segments in Arabic, looking at data from a representative sample of dialects. I begin by looking at Muslim Baghdadi (MB), in particular because this is one of the dialects in which there are clearly very back contexts in which the traditional coronal emphatics play no part. I then compare other dialects with MB to see what generalisations emerge with reference to the type of dialect: §6.2 deals with Ḥōrāni, §6.3 with Damascus Arabic, and §6.4 with an urban Moroccan dialect.

6.1 Muslim Baghdadi[1]

In this section I consider the case of Muslim Baghdadi (*gilit* Mesopotamian). I look at data showing coronal emphatics, and also at data showing both 'front' and 'back' contexts. This involves a more formal account of what I see as *imāla*. As discussed previously, *imāla* means 'inclination' (of *ā* towards [æ:]–[e:]), and it is well known that short *a* also tends to raise in most dialects to [æ]–[e], and that this happens generally in non-guttural, non-emphatic contexts. The medieval grammarian Sībawayh uses the term to refer to the fronting / raising of *ā*, and sees *imāla* as an active process which may be blocked by the presence of the *musta^{c}liya* consonants *ṣ ṭ ḍ ḏ̣ q γ x*, and also by *r* when this precedes the *ā* (i.e. *r* when not 'de-emphaticised'). I extend this notion of *imāla* somewhat to mean the *i*-effects induced not just by *i* but also the 'front' (*i*-quality) consonants. In this sense, my analysis harks back to the intuitions of the early Arab grammarians and goes somewhat against the more recent generative analyses.

[1] See Chapter 5, §5.4.2.1.

The situation in MB *vis-à-vis* emphatics is further rather complicated by the appearance of what seem to be *u*-domains, by which I mean the appearance of an *u*-type vowel (where other dialects would have an *i*-type or schwa-type vowel), or the combination of labials with certain consonants which then seem to be 'back' and are often seen as emphatic.

The emphatics themselves (*ṭ ṣ ḍ̠*) seem to spread into other coronals (*t s ḍ*) generally leftwards, and rightwards optionally.[2] Into suffixes, the spread appears to occur optionally if the coronal emphatic is directly adjacent to a suffixal coronal. Generally, (historical) emphatic coronals rarely become non-emphatic,[3] so, for example, *t* > *ṭ*, but rarely *ṭ* > *t*. The following data show stem-initial (and one example of stem-medial) emphatics with a non-emphatic coronal to the right:[4, 5]

(1)	*ṣāmit-a*	[ʂɑ:mɪtɛ]	'silent (f.s.)'
	ṭumas	[tʊ̟mas]	'he got bogged down'
	ṭumas-at	[tʊ̟msɛt]	'she got bogged down'
	ṭass-a	[tˤʌssɛ][6]	'hole (in the road)'
	ṭašit	[tˤʌʃɪt]	'wash basin'
	ṭās-a	[tˤɑ:sɛ]	'drinking cup'
	ṭaqis	[tˤʌqʲɪs]	'weather'
	fuṭas	[fʊ̟tˤas][7]	'he dropped dead'

[2] Optional rightward spread appears to involve initial *ṣ*. OA **ṣawt* in MB may be realised as *ṣōṭ* (as per Woodhead & Beene, 1967), although I have heard from other MB informants *ṣōt*.

[3] One exception is *marīḍ̠* [mɛri:ð] < OA **marīḍ̠* 'ill (m.s.)', although this is anomalous, since the same root also gives rise to *tmarraḍ̠* [tmʌrrʌð̞] 'he got ill' and *marīḍ̠a* [mɛri:ð̞ɐ] 'ill (f.s.)'. Clearly here the *r* is not 'backed' because of the following *ī*, since normally the sequence *mar* is backed, as in *marra* [mʌrrə] 'time, occasion', *marr* [mʌrr] 'he passed (by)', *mara* [mʌrə] 'woman', *marga* [mʌrgɐ]. In *marīḍ̠* [mɛri:ð] the *ī* appears to have de-emphaticised the *r* meaning that thus the *mar* sequence is no longer a 'back' domain and is subject to *imāla*; moreover, when *ḍ̠* has no following vowel to serve as a cue, it also de-emphaticises.

[4] In common with other dialects, leftward spread of the emphatic property (which I argued in Chapter 3 is the element [A]) occurs even where a palatal or long *ī* intervenes, e.g. *ṣayṭara* < OA **sayṭara*.

[5] Data as per Woodhead & Beene (1967), checked with a MB informant (whence the phonetic realisations). In these sets of data I demarcate affixes for clarity.

[6] The vowels in many dialects of Arabic are peculiarly unstable. In this context, following an emphatic (but here, since the following 'front' *s* has a following vowel which serves as a salient enough cue to its non-emphaticness, the vowel following the emphatic seems 'fully emphatic'), the vowel is [ʌ] because it is short, although the target is probably [ɑ].

[7] The short *a* vowel here is not 'fully emphatic' (i.e. [ʌ]), neither is it 'front' (i.e. [ɛ]). It is transitional between the two. In slower speech, it may sound somewhat more of a glide from one to the other. In

All other examples of words with more than one of *t s ḏ ṭ ṣ ḍ* had either both emphatic or both non-emphatic, but in all of the emphatic words it seems that the emphatic property either spreads from the rightward-most *ṭ ṣ ḍ*, or that there is reduplication. (2) shows examples of words with more than one coronal emphatic, where the spread can either be assumed to be leftward, or it is clearly reduplication:

(2a)	*ṣiraṭ*	[sˤɪrʌtˤ]	'he gulped (food)'
	ṣiṭar	[sˤɪtˤʌr]	'he chopped (meat)'
	ḍaɣuṭ ~ ḍaɣiṭ	[ðˤʌʁˠʊtˤ] ~ [ðˤʌʁˠɪtˤ][8]	'pressure'
	ṭawwaṭ	[tˤʌwwʌtˤ]	'he hooted (the horn)'
	ṣimīṭ	[sˤɪmɪˠtˤ]	'simit (like bagel)'
(2b)	*ṣurṣur*	[sˤʊrsˤʊr]	'cockroach; cricket'
	ṭanṭan-a	[tˤʌntˤʌnɛ]	'it hummed, buzzed'
	ṭamṭam	[tˤʌmtˤʌm]	'he covered (sth) up'
	ḍaʕḍaʕ	[ðˤʌʕðˤʌʕ]	'he weakened (sth)'

However, the question arises as to what is generally assumed to be synchronic spreading of the emphatic. Written forms are generally used as a basis for deciding which consonant is the lexical emphatic. For example, in **saṭl* 'pail', written Arabic encodes the assumption that the *ṭ* is lexically emphatic, so that where dialects overwhelmingly (in this example, to my knowledge) have both *ṣ* and *ṭ*, e.g. MB *ṣaṭal*, it appears to be R–L spread. One may refute not only that the (apparently archaic) written form is relevant to synchronic processes, but also that any dialect of Arabic would ever have realised such a form with *s-ṭ-l* (rather than *ṣ-ṭ-l*). However, what is evident is that for many dialects, roots contain either Ç-Ç or Ç-C, but not C-Ç (i.e. an emphatic coronal may precede a non-emphatic coronal, but generally not vice versa).

The emphatic property does not spread into affixal consonants unless they are directly adjacent to a primary emphatic, and word-finally (i.e. rightwards) this appears

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faster speech, it sounds more like 'plain' [a], which is how I have notated it here. In some other examples of such conflicting environments, I have notated the glide–vowel as heard.

[8] This variation may perhaps be dialectal, i.e. a *xaššˠ*-type ('original' Baghdadi) speaker may be more likely to use *ḍaɣuṭ* and a *ṭabb*-type (mixed or of rural origin) Baghdadi speaker may be more likely to use *ḍaɣiṭ*. My informant for this set of data used both. Historically, the root is **ḍ-ɣ-ṭ*.

to be optional (i.e. there is variation between emphatic *ṭ* and non-emphatic *t*). The examples below show prefixes (3a) and suffixes (3b):

(3a)	*sta-wṭan*	[stawtʌn] ~ [stōṭʌn]	'he settled down'
	t-waḍḍaf	[ˈtwʌðˤðˤʌf]	'he got a job'
	ta-wṣiya	[tawsˠˈijɛ]	'(on) commission'
	t-ḍaxxum	[təðˤʌχχˤum] ~ [ˀðˤðˤʌχχˤum]	'you (m.s.) inflate (sth)'
	da-t-ḍaxxum	[dɛðˤðˤʌχχˤum]	'you're inflating (sth)'
	yi-t-ṭāfaħ	[jɻtˤtˤɑ:faħ]	'it's overflowing (m.s.)'
	l-ṭifil	[ˀtˤɻfɪl]	'the child'
	l-ṣurṣur	[ˀsˤsˤɻrsˤɻr]	'the cockroach; cricket'
(3b)	*ḍaxxam-t*	[ðˤʌχχʌmɪt]	'I inflated (sth)'
	γilaṭ-tu	[ʁˠlʌtˤtu] ~ [ʁˠlʌtˤtˤɻ]	'you (pl.) made a mistake'
	gambaṣ-ti	[gʌmbʌsˤti] ~ [gʌmbʌsˤtʲˈɪ]	'you (f.s.) squatted'

The data in (3a) show that coronals in a prefix are realised as emphatic only when they are directly adjacent to a ('primary') emphatic, and in (3b) that coronals in a suffix may only be realised as emphatic when they are directly adjacent to a ('primary') emphatic, and that this is optional. My informant produced the emphatic forms [ʁˠlʌtˤtˤɻ] and [gʌmbʌsˤtʲˈɪ] only in citation form, and preferred my realisations without the emphatic. This point will be returned to presently after I show what happens to suffixal vowels next to an emphatic.

First, however, to the issue of the spread of the emphatic property itself. I claim that generally, within roots, [A] spreads from *ṭ ṣ ḍ* into *t s d*, in a leftward direction. How far this is synchronic is not clear, since this appears to be the case across most dialects for which analyses have been presented. Therefore, the majority of these cases may be claimed to be lexical roots such as *ṣ-ṭ-l* (not **s-ṭ-l*, despite the written form). Nevertheless, I suggest that this occurs at a consonantal level (and along an [A] tier), and is thus somewhat separate from the remaining issues to be discussed in this section. However, in the case of suffixes (as seen in (3b), above), what does seem to be synchronic (evidenced by alternations) is that when consonants

are directly adjacent, they assimilate in terms of 'emphaticness'. One does not need a suprasegmental analysis of this case, since it is local and limited (and also, in MB, optional when rightwards). This could therefore be seen as segmental [A]-spread.

Returning to the issue of suffixal vowels, a final emphatic causes the *-a* vowel of both the feminine suffix (*tā marbūṭa*) and the masculine object suffix, to be realised as [ɐ] rather than [ɛ] (4a–d):[9]

(4a)	*γalṭ-a*	[ʁʌlṭɐ]	'(a) mistake'
(4b)	*raḏraḏ-a*	[rʌðrʌðɐ]	'he smashed it to pieces'
(4c)	*sall-a*	[sɛllɛ]	'(a) basket'
	dabk-a[10]	[dɛbkɛ]	'(a) (type of) dance'
(4d)	*šagg-a*	[ʃɛggɛ]	'he tore it up'

It is also pertinent here to discuss the identity of the feminine suffix in Baghdad Iraqi, as in many dialects it is given as *-i*. In MB, the evidence is that the feminine suffix is indeed *-a*, although in non-back / non-emphatic contexts it is realised word-finally as [ɛ], which in fast speech is somewhat schwa-like (because it is word-final and unstressed). In 'back' or emphatic contexts it is lower and sounds much more like a rather low schwa, which I notate as [ɐ]. The target appears to be [ɑ], but because it is word-final and post-tonic it is produced more centrally.[11] However, when this suffix is in construct state (and followed by a possessor nominal), the 'epenthetic' *t* shows up. This I analyse as a 'floating' *t*, so that the feminine suffix is actually *-a(t)*. The realisation of this suffix when not word-final gives the clue as to its identity. That is, if the feminine suffix were actually *-i(t)* (as it is in some other dialects), then one would expect this in non-backed contexts to show up as [ɪt] when non-final (and thus stressed), so that the apparent (final) [ɛ] form would be a very lax

[9] In fact, this vowel is very schwa-like in MB, and the difference is really between a slightly lowered schwa [ə̝] ~ [ɐ] and a schwa with some *i*-quality, which I notate as [ɛ]. After a pharyngeal, the vowel is lower and less schwa-like [a].

[10] Also *dabča* [dɛbtʃɛ].

[11] It should also be noted that the vowel notated as [ʌ], which is (short) *a* in emphatic / 'back' contexts has as its target [ɑ], which is more apparent when an informant repeats a word very slowly or syllable by syllable. When *a* is long, it is much more clearly [ɑ:].

[ɪ]. This is not the case, as exemplified by the data below, of which the base forms all end in the feminine *-a(t)* (with stress notated):

(5a)	*san-a+ha*	[ˈsɛnɛ]	[sɛˈnɛthɛ]	'her year'
	simč-a+na	[ˈsɪmtʃɛ]	[sɪmˈtʃɛtnɛ]	'our fish'
	ħčāy-a+ha	[ᵉħˈtʃaːjɛ]	[ᵉħtʃaːˈjɛthɛ]	'her story'
(5b)	*baṭṭ-a+ha*	[ˈbʌṭṭɐ]	[bʌṭˈṭ^ɛthɛ][12]	'her duck'
	qurṣ-a + xubuz	[ˈqʊrsɐ]	[ˈqʊrsat ˈχʊbʊz][13]	'round of (flat) bread'
(5c)	*tiffāħ-a+a*	[tɪfˈfaːħa][14]	[tɪfˈfaːħatɛ]	'his apple'

The data above show that the feminine suffix is [ɛ] after a 'front' consonant (although when final and unstressed, it is reduced and sounds rather schwa-like). After an emphatic, *a* is realised when final and unstressed as a rather low schwa, but in construct, when both stressed and not final, the realisation is somewhat transitional

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[12] I transcribe *a* between *ṭ* and *t* rather narrowly as [^ɛ] since in slower speech there is a change in quality between [ʌ] and [ɛ] (which could equally be transcribed as [ʌᵋ]). This vowel is rather variable, with the quality closer sometimes to [ʌ], sometimes to [ɛ]. In fast speech it often sounds more like [a] or even [æ], so that one may prefer to notate it as [ʌ̟] or as [ɐ] depending on whether it is thought of as raised [ʌ] or lowered [ɛ]. Strictly speaking, it seems to be neither exactly, but more of a transition between the two. In the slightly less narrow transcription of the same vowel in *fuṭas* (in (1) above), I use [a], i.e. [fʊṭas]. For other front consonants, e.g. *n*, when a vowel follows, the preceding *a* has a slightly more [ʌ] quality, although slightly raised. I have transcribed this as [ʌ] in *ṭanṭan-a* [ṭʌnṭʌnɛ] (in (2b) above), but there is a slight raised / fronted off-glide, so in fast speech perhaps more narrowly [ʌᵃ], but in slow speech where the syllables are demarcated, this is realised as [ṭʌn ṭʌ nɛ]. Thus, the back vs front quality of the *n* is phonetic rather than a phonemic contrast (unlike *t* vs *ṭ*), firstly, and secondly because the vowel following *n* is fronted [ɛ] this provides a salient enough cue that the preceding *a* may remain predominantly low. Also, because the vowel is not stressed it is rather centralised anyway.

[13] The *a* after *ṣ* in *qurṣat xubuz* is again hard to identify, but perhaps closest to [a]. This is likely due to the fact that in this example it is unstressed, since in stressed position, as in *qurṣatna* 'our disc', then it is similar to that following *ṭ*, thus [qʊrˈṣ^ɛtnɛ] ~ [qʊrˈṣʌᵋtnɛ], although again, because of its transitional nature between emphatic and non-emphatic, it is particularly hard to identify. Moreover, generally, short vowels are extremely unstable in MB (as in many other dialects of Arabic). Often, short vowels are either slightly higher or slightly lower or slightly more rounded, with other nuances depending on surrounding consonants. The clearest instances are stressed *a* [ɛ] in entirely front contexts, or after a pharyngeal, [a], or instances of stressed *i* in front contexts [ɪ]. Otherwise, the short vowels can be very indistinct (indeed, literally transitions, i.e. *ħarakāt*), and they vary from utterance to utterance.

[14] This is a good example of where MB seems to have merged *i* and *u*. Woodhead & Beene (1967) give this as *tiffāħa* '(an) apple', but my informant's realisation of the *i* vowel wasn't [ɪ], although perhaps not as rounded as [u], and slightly higher than [ə]. It is unstressed, and between ('front' unrounded) *t* and (round) *f*, so in fast speech it is unclear whether it has more of an *i* quality or more of an *u* quality, or whether it is simply schwa. One may prefer to transcribe this narrowly as [ᵻu] or [iᵘ].

between low and mid(-front), but noticeably different from 'front' [ɛ]. After a pharyngeal, this vowel is [a] – a slightly front-of-central low (unround) vowel. Lastly, when the *t* is realised (in construct state), the preceding *a* vowel is noticeably affected, presumably partly to cue the presence of *t* (signalling that it is not *ṭ*).

To recap, the argument is that in MB, the feminine suffix is *-a(t)*, and likewise that the masculine possessive is *-a* and the feminine possessive *-ha* (not *-i(t)*, *-i*, *-hi*).

MB shows interesting differences from other dialects when labials and velar *k* and *g* are looked at. Firstly, in certain contexts, the labials seem to induce a *u*-type environment, while in other environments they seem subject to an *i*-type environment. Secondly, the velar *g* (generally < OA *q*)[15] in combination with labials towards the beginning of a word is generally an *u*-type domain, in contrast with *k*, which seems generally to be 'front', except where next to *u* (not *a*) when it is then not front. Lastly, *g* word-finally usually triggers suffixal [ɛ], indicating frontness in this context, unless there is a preceding *u* and an emphatic. Compare the suffixal forms of the following data, which reveal whether the stem-final consonant is 'front' or not:

(6)		*back*	*front*	
a.	*guṣb-a*	-ɐ		'straw'
	ḍarb-a	-ɐ		'(a) hit, blow'
	ṣurr-a	-ɐ		'navel, belly'
	gabl-a	-ɐ		'before him'
	gamr-a	-ɐ		'moonlight'
	ǰarb-a[16]	-ɐ		'mangy (f.s.)'
	galb-a	-ɐ		'his heart'
	rukb-a[17]	-ɐ		'knee'
	labw-a	-ɐ		'lionness'

[15] As noted above, not all cases of OA *q* become MB *g*; in many cases *q* is indeed realised. In a handful of cases, the reflex is *k*. This latter seems to obtain in *i*-environments, which the *k* reflex then enhances. Examples are *wakit* 'time' and *kital* 'he killed'.

[16] The *ǰ* here is a front context, so the word is realised as [dʒɛ̆rbɐ], i.e. the *a* is realised like [ɛ], but more centralised, perhaps more like [ɛ˚]. The *r* is not entirely front, but neither is it entirely back.

[17] The *u* is slightly lowered [rʊkbɐ], in comparison with *tunga* 'large clay water pot' [tʉngɛ], in which *u* has a slight *i* quality (although not [y]). The *u* is not exactly the same as in *ruṭba* '(ripe) date', which is slightly lower, i.e. [rʊṭbɐ] ~ [roṭbɐ]. The quality of the *u* in *rukba* indicates that the *r* is back, but that the *k* is not inherently back, although it sounds somewhat back here, although not actually 'emphatic'.

	galub-ha	-hɐ	'her heart'
b.	*faras-a*[18]	-ɛ	'his horse'
	gamz-a[19]	-ɛ	'(a) jump, leap'
	ragg-a[20]	-ɛ	'turtle'
	gamrag-ha[21]	-hɛ	'he customs-inspected it (f.s.)'

What is intriguing in the data is that *g* word-finally is front, whereas word-initially, and where no non-emphatic coronal or palatal is present, *g* is 'back'. In contrast, *k* tends to be front:

(7)	*karrada*	[kɛrɑ:dɛ] ~ [karɑ:dɛ]	Karrada (district in Baghdad)
	kammal	[kɛmmɛl]	'he completed'
	karrah	[kɛrrah] ~ [karrah]	'he made hate'
	karam-a	[karʌmɐ]	'his generosity'
	kahrab-a	[kahrʌbɐ]	'it electrocuted him'
	gadd	[gɛdd]	'equal to'
	gammal	[gʌmmʌl]	'he got lice'
	garrab	[gʌrrʌb]	'he brought close'
	garraʕ	[gʌrraʕ]	'he made bald'
	gahwa	[gahwɐ] ~ [gɑhwɐ]	'coffee'

[18] The first syllable here is clearly 'back', and the word is realised as [fʌrasɛ].

[19] This example has an initial 'back' syllable and is realised as [gʌmzɛ]. The verbal form *gammaz* 'he jumped around' is realised as [gʌmmaz] if not actually [gʌmmᵘaz] or [gʌmmˆaz].

[20] Again, the first syllable is emphatic, i.e. [rʌggɛ].

[21] The base of this form is realised as [gʌmrag], which is interesting because it shows that the final *g* is not 'back', although the rest of the word is (including the *r*, which is clear because if the *r* were 'front' then the realisation would be *[gʌmrɛg]). If the final *g* were 'back', then not only the suffix would be [hɐ], but the final syllable would have the backed *a*, i.e. *[gʌmrʌg]. This example shows that analyses whereby the labials or *g* are emphatic in the same sense as *ṭ ṣ ḍ* do not entirely make sense.

The data indicate that *g* is 'back' in combination with labials or emphatics, but if a 'front' consonant is present then it doesn't appear to be 'back'. However, *k* is generally front, and in 'conflicting' environments (before *r* or a labial where the latter is not in a 'front' environment) behaves like any 'front' consonant; compare *karrah* above with *tarrab* [tarrʌb] ~ [tɛrrʌb] 'he got (sth.) dusty'.

Additionally, whereas the labials in combination with *r* (where no *i* is present) or *g* (where no *i* or front consonant is present) seem to be back (in that they yield [ʌ]), they seem to become fronted where a front consonant or vowel is present.[22] The following data exemplifies more labial contexts, with (8a) showing labials in a front context, while (8b) shows labials in a back context, and (8c) shows conflicting environments:

(8a)	*balad*	[bɛlɛd]	'country'
	ṣudfa	[ṣʊdfɛ]	'coincidence'
	*bēḍ (<OA *bayḍ)*[23]	[biʌð̞] ~ [biɐð̞]	'eggs'
	ywaswas	[jwɛswɛs]	'he whispers'
	kitab	[kɪtɛb]	'he wrote'
	labba	[lɛbbɛ]	'(a) kick'
	ṭabība	[ṭʌbi:bɛ]	'doctor (f.s.)'
(8b)	*gaml*	[gʌmʊl]	'louse'
	gumar	[gʊmʌr]	'moon'
	gabur	[gʌbʊr]	'grave'
	baggāl	[bʌggɑ:l]	'grocer'
	rukba	[rʊkbɐ]	'knee'

[22] Here, the [ɛ] realisation of *a* also counts as front. Also, where *l* is usually front, it can be emphatic where a historical *q* has become *g* (and apparently left a trace of its [A], which is interpreted on the *l*), or next to another coronal emphatic (*ṭ ṣ ḍ*). Examples of this are *gaḷub-ha* [gʌlʊbhɐ] 'her heart', *baḷḷaṭ* 'he paved'.

[23] This example is interesting because it shows that *b* before *ē* is not back. In MB, long *ē* (most often from OA **ay*) induces a glide effect (somewhat like [iɛ] or [C^{j}ɛ] on certain preceding consonants, which are the (non-emphatic) coronals (and palatals), the labials, and the velars. It does not occur if the preceding consonant is uvular (*x γ*), pharyngeal, laryngeal or emphatic. For example, the following words all have the off-glide: *bēt* 'house', *mēz* 'table', *zēn* 'good, well', *lēš* 'why?', *kēf* 'mood, will', *sēf* 'sword', *ligēt* 'I found'; the following words do not have this offglide: *hēl* 'cardamom', *ħēl* 'more, very much' [southern dialect], *xēl* 'horses', *wēl* 'woe', *ʕēn* 'eye', *ṣēf* 'summer', *rēl* 'railway', *ḍēf* 'guest'.

	rugba	[rʊgbɐ]	'neck'
	buram	[bʊrʌm]	'he plaited'
	gēmar[24]	[giɛmʌr]	'(buffalo) cream'
	ṭabb-a	[ṭʌbbɐ]	'he entered it (m.)'
(8c)	*gabban*	[gʌbban]	'he weighed'
	gammaz	[gʌmmaz]	'he leapt around'
	gamza	[gʌmzɛ]	'(a) jump'

The data clearly show that where there is no clear front consonant,[25] labials are apparently 'back'. Where there is an adjacent front consonant, [ɛ] (fronted) variant of the vowel *a* caused by a front consonant, or front vowel (*ī* or *ē*), then labials are in a 'front' context, and can trigger the [ɛ] variant of the *a* suffix. Lastly, where there is a conflicting environment, as in (8c), where the labial is flanked by a front and a back environment, while the labial itself is apparently back (otherwise *[gɛbbɛn], *[gɛmmɛz], *[gɛmzɛ]), there is no 'emphatic' property that spreads into the following front consonant, and the vowel caught in this conflicting environment is neither [ɛ] nor [ʌ]. As seen, *k* does not behave like *g* here, so *kammal* [kɛmmɛl] 'he completed' compares with *gammal* [gʌmmʌl] 'he got lice'.

Overall, while much of the data shows predictable front and back contrasts, there are times when the situation is somewhat circular (or 'chicken-and-egg'), in that e.g. a consonant is front because of the presence of the [ɛ] realisation of *a*, yet this [ɛ] itself only appears in certain contexts. Moreover, some consonants seem rather chameleon-like in that their allegiances change readily. This applies to *r l g*, in particular, although the labials also behave slightly oddly. Lastly, there are occasions where *k*, although usually 'front', seems in an otherwise non-front context to be itself non-front. This is seen in *rukba* [rʊkbɐ] 'knee', where *k* seems to be de-fronted, in that it doesn't trigger *[bɛ], and the preceding vowel is *u* (not *i*, i.e. **rikba*, in which

[24] The initial *g* here also shows the glide discussed previously, and the actual realisation can vary, i.e. [gʲɛ:mʌr] ~ [giɛmʌr].

[25] In (8b), both *gamul* 'louse' and *baggāl* 'grocer' are usually transcribed with an emphatic *ḷ*, since it triggers the back [ɐ] variant of suffixes. However, this *l* is itself predictable in this context, since if *ī* were present *l* (and in the first case then the whole word) would be 'front', i.e. *[gɛmi:l]. In *rukba*, while *k* is generally (if anything) 'front', here it is apparently not front following *r* and *u*, and thus the final *b* triggers the [ɐ] variant of the suffix.

case it would be realised as [rɪkbɛ]). Therefore, it seems that velars are susceptible to *u*-quality (i.e. the so-called 'back' *k* and *g* are velarised). This is also evidenced by the fact that uvular *q* behaves like an emphatic *k*, i.e. *q* is like *k* with [A] quality, whereas these apparently 'back' realisations of *k* and *g* are not actually uvular.

Overall, therefore, it seems that there are general 'domains' which seem flagged as *i*-domains or *u*-domains. In the case of emphatics, pharyngeals and uvulars (*x* and *γ*), there also seem to be *a*-domains. The emphatics *per se* do not seem to be *u*-domains, since they occur with *i* but without any 'unbacking' or de-emphasis.[26] However, since the effect on this *i* is backing, the realisations may be something like [ɪ], or without *i*-quality and closer to schwa [ə]. An *u* does sometimes show up here, but usually where there is a (back) labial in the word, and this too can alternate with schwa:

(9)	*ṭirab*	[tɪrʌb] ~ [tʊrʌb]	'he was mesmerised'
	ṭiraḥ	[tɪraḥ] ~ [təraḥ]	'he laid flat'
	ṭirad	[tɪrad] ~ [tərad]	'he banished, drove away'

The form I verbal template (CVCVC), as above, is apparently *ə–a*, which is generally notated as *i–a*, since this is what is most commonly found. However, where the first two consonants are a labial and an emphatic (in either order), *u–a* obtains (this generally does not occur where an emphatic co-occurs with anything other than a labial). Examples are as follows:[27]

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[26] There are a few interesting counter-examples to this. Firstly, as noted above, *marīḍ* [mɛri:ð] is usually entirely non-emphatic, although cf. *tmarraḍ* [tmʌrrʌð̰] 'he got ill' and *marīḍa* [mɛri:ð̰ɐ] ~ [mɛri:ðɛ] 'ill (f.s.)'. Secondly, OA **waqt* is generally *wakit* [wɐkɪt] ~ [wʌkɪt]; it may be heard as *waqit*, but is much more often *wakit*, as in *šwakit* 'what time?'. This indicates that *q* is 'emphatic' or 'back' *k*, and shows that *k* often seems to be the front counterpart to *q* (and thus often to its common reflex *g*). While *k* doesn't become *q*, the reverse is attested in some words, generally where there is a front context. *g* seems to arise from *q* where a back context is clear.

[27] Data from Woodhead & Beene (1967), although checked with informants. The pharyngeal environment is not notated in W&B (the first vowel is given as *i* in these contexts), but my informants clearly had *a* in V_1 where there was a pharyngeal.

(10)[28]	*u*-verbs		*i*-verbs	
ṣumax	'he endured'		*kitab*	'he wrote'
ḍubaṭ	'he controlled'		*tibaʕ*	'he followed'
ḍufar	'he plaited'		*silab*	'he robbed'
ṭumas	'he sank down'		*ṣiqal*	'he polished'
rufas	'he kicked'		*bizaʕ*	'he became exasperated'
buṭal	'it became invalid'		*sihar*	'he stayed awake'
buṭaš	'he knocked down'		*simaʕ*	'he heard'
buṣaṭ	'he beat (up)'		*ṣiṭar*	'he chopped'
fuqad	'he lost'		*ṭilag*	'he divorced'
fuṭar	'he broke his fast'		*ṭirag*	'he whipped (food)'
murad	'he squashed'		*milak*	'he owned'
muṣax	'he scolded'		*fiham*	'he understood'
ɣumaz	'he winked'		*risam*	'he drew'

In the above data, *ɣ*, *x*, *q* and *r* are 'back' (and pattern with emphatics). The coronal emphatics may occur on both sides of *i*,[29] in which case it is realised roughly as schwa [ə], although this may have a little *i*-quality and be slightly higher, [ɪ]. In this context, *q* patterns with the emphatics.[30] Lastly, in non-front domains with an

[28] As regards the pharyngeal-environment exception, which induce *a–a*, this initial *a* is then subject to the usual variations ([ɛ] in front environments, [ʌ] in emphatic environments, but otherwise [a]). Examples are *liʕab* [laʕab]' he played', *ʕitab* [ʕɛtɐb] 'he complained', *ʕiǰan* [ʕɛǰɐn] 'he kneaded', *ṭiħal* [tʌħal] 'it caused indigestion', *tiʕab* [taʕab] 'he got tired'. The last example is interesting (in comparison with the first example), as it seems to show the pharyngeal blocking the *i*-domain, so that *b* (and thus the entire second syllable) is not in an *i* environment, whereas the first syllable shows that in the conflicting *i–a* domain, the pharyngeal *a* is stronger (hence *[ɛ]).

[29] Two labials rarely co-occur flanking *i*. The only co-occurrence of two labials would be with a *m* prefix. Where the stem is CVCVCVC, then no vowel intervenes, e.g. *mbahdal* [ˈmbɛhdɛl] 'sloppy', *mbaṭṭil* [ˈmbʌṭṭɪl] 'having quit'. In other contexts, the intervening vowel is normally lexically *a*, yielding [ʌ] or [ɛ] (depending on the following environment), e.g. *mabrūma* [mʌbru:mɐ] '(type of) twisted sweet pastry', *mablūl* [mɐblu:l] 'damp, moistened'. Where a form would usually have *i* (i.e. an otherwise front environment), this seems to be realised optionally as schwa, e.g. *miflis* [məflɪs] ~ [mɪflɪs] 'broke'. If the context is otherwise not front, then *u* occurs, as in *mubram* [mʊbrʌm] 'hell of a [used adverbially] / knotty problem'.

[30] In this context, *g* sometimes behaves as a 'back' consonant, e.g. *gumaz*. If this were not the case then *[gɪmɛz] would result. Also, if there are no other front consonants, then *k* may also co-occur with *u*, as in *kufar* (**kifar*), 'he blasphemed', which contrasts with *kifas* [kɪfɛs] 'he packed together' and *kimal* [kɪmɛl] 'it was finished'.

emphatic, *u*-quality may spread from a final labial into the first nucleus, as in *ṭirab* [ṭɪrʌb] ~ [ṭʊrʌb].

In conclusion, then, it seems that Muslim Baghdadi Arabic has not just *i*-domains (which I shall argue for other dialects), but additionally *u*-domains and *a*-domains. These *u*-domains, meaning that *u*-quality can spread, seem to be what differentiate *gilit* Iraqi Arabic from many other dialects, as we will see, because it means that there are fewer 'front' domains (that is, *i*-domains), and, impressionistically, there is much more of a 'labial' sound to this dialect than many others.

The way it works in terms of the elements seen in earlier chapters is that the vocalic elements [I] [U] and [A] signify particular sequences (i.e. domains). In other words, these elements are active at a higher level of representation (the CV level), rather than merely segmentally. This means that they appear to spread unless blocked. Moreover, there seems to be a hierarchy in which [I] appears 'stronger' than [U]. This is borne out by examples such as *balad* and *kitab*, where both words are entirely [I] domains, due to the influence of 'front' consonants. It seems that where [I] can spread it will, whereas [U] spreads only where [I] is not present to block it.

Further, the (non-emphatic) coronals (as well as the palatals, of course) seem inherently front, i.e. 'front-specified'. The data show that these coronals have some [I] realisation, since this apparently spreads (as in *balad* [bɛlɛd]). This contrasts with the emphatic coronals (and *r*), which I have already claimed have [A] in their representation. The liquids are somewhat chameleon-like; *l* is most often front, but in some contexts behaves as a non-front (or back) consonant, cf. *gabla* [gʌblɐ] 'before him', *mballal* [ˈmbɛllɛl] 'wet', *ħammalha* [ħammɛlhɛ] 'he loaded it (f.s.)', where in the latter two examples, the front environment can only be due to the presence of *l*. I thus suggest that *l* usually has an [I] interpretation, but that in a certain set of words, which to my knowledge always contain a labial and *g* from historical **q*, this historical *q* has left a vestige of its backness in the form of a floating [A]. This seems to prevent an [I] interpretation of *l*. On the other hand, *r* is back unless adjacent to *i*, in which case it seems then to be 'front', as seen in examples such as *marīḍ* 'ill', which

is most often realised as [mɛri:ð], or *farid* [fɛri:d] 'Farīd [name]', vs *farda* [fʌrdɛ] 'one of a pair'[31] (where the adjacency of a front consonant has not fronted the *r*).

The last point here is that [A] seems to spread left into other stem coronals, including *n*, although this latter only seems regular when *n* is next to the emphatic:

(11)	*manfūḍa*	[mɛnfuuḝɐ]	'shaken out (f.s.)'
	manḍara	[mʌnḝʌrɐ]	'spectacles'
	naḍāfa	[nʌḝɑ:fɐ] ~ [nɛḝɑ:fɐ]	'cleanliness'

In the case of *r*, as noted before, although it otherwise seems to be emphatic, it does not spread [A] (in addition to being 'de-emphaticised' next to *i*):

(12)	*manbara*	[mɛnbʌrɐ]	'his pulpit'
	niđar	[nɪðar]	'he pledged'
	niđarit	[nɪðɛrɪt]	'I pledged'

The labials are interesting in that although they are [U] consonants, they seem to form [U] domains only in conjunction with other labials, or where an [I] domain is prevented by emphatics. This is evident in the following data:

(13)	*waḍḍafa*	[wʌḝḝʌfɐ]	'he employed him'
	tawaḍḍafat	[ˈtwʌḝḝʌfɛt] ~ [ˈtwʌḝḝɐfɛt]	
			'she got a job'
	ṭabība	[ṭʌbi:bɛ]	'doctor (f.s.)'
	ṭabba	[ṭʌbbɐ]	'he entered it'
	maħbūba	[maħbu:bɐ]	'adorable (f.s.)'
	ṣudfa	[ṣʊdfɛ]	'coincidence'

[31] The (non-feminine) cognate is actually lexicalised as *fadd* [fɛdd].

In the data above, labials (with the exception of *w*, which word-finally always triggers the [ɐ] variant) seem not to prevent an [I] domain from triggering the [ɛ] variant of suffixal *-a*, although where there is no [I] environment, suffixal *-a* is [ɐ].

In conclusion, I therefore claim that in this dialect, the emphatic property [A] spreads generally leftwards from coronal emphatics into other coronals. This prevents an [I] domain. Additionally, I claim that [I] also spreads leftwards, and is present in non-emphatic coronals. The segment *r* is most generally 'back', although next to *i* it becomes non-emphatic. The segment *g* is most often 'back', unless in a clear [I] environment. I therefore claim that it is lexically 'unspecified' (i.e. it doesn't have a resonance / vocalic element), meaning that it is thereby vulnerable to [U]-spread from a labial to its right, meaning that *g* + labial is an [U] domain, and then not vulnerable to [I] spreading. This is seen in examples such as *gamza* [gʌmzɛ] and *gadar* [gɛdʌr] ~ [gɛdar] 'measure(ment)', and *gaẖẖa* [gaẖẖɐ] '(a) cough', where *g* in itself is clearly not 'back', and also means that *gahwa* has two variants, firstly, [gahwɐ] because there is no [I] environment (*[gɛ]), and *a* is not subject to [I], [U] or [A], and is thus in its 'pure' form; secondly, the labial [U] of *w* may be interpreted as spreading (through 'neutral' *h*), hence [gʌhwɐ]. Both these realisations of *gahwa* are heard and are freely variable. As far as *g* is concerned, since it is not lexically 'back', this means that word-finally it is vulnerable to [I] (which is realised on word-final obstrents which do not have a resonance element), hence *ṭagga* [tˤʌggɛ], etc. This in fact gives further evidence that *g* when apparently back is not emphatic (i.e. having [A] quality), since in this respect it patterns with the labials. That is, with (non-front) labials and *u*, velar *g* is 'backed', apparently having [U] quality. Compare *ṭagga* [tˤʌggɛ] '(a) bang, burst' and *furaga* [fʊrʌgɛ] 'he parted [the hair]', with (*bēḓa*) *maṭgūga* [mʌtgu:gɐ] 'broken (egg) (f.s.)' and *ufruga* [fʊrgɐ] 'part it! (imper.)'.

Lastly, this means that both *k* and *l* are generally lexically specified as containing [I]. In the case of *l* there are examples of it being apparently emphatic, where I argue that this is due to historical [A] presence, which is left interpreted on the coronal *l*. This is seen in *giḷa* 'he fried' (and derivatives, e.g. *galḷa* 'he fried'), where the *l* is clearly not front. Historically, *giḷa* is derived from **qalā*, so that where

*$\bar{a}$ is shortened in this position in MB, it leaves its [A] quality interpreted on the *l*.[32] In the case of *k*, it seems that this is normally lexically palatalised, i.e. effectively k^j, and that even where this palatalisation is not overt on the consonant itself, it is realised in the following vowel (*a* → [ɛ]). However, *k* appears not to have this 'front' quality if the environment is otherwise labial (or labial–emphatic), as in *rukba* [rʊkbɐ] 'knee' (*[rʊkbɛ], *kufar* [kʊfʌr] 'he blasphemed' (*[kɪfɛr] ~ [kɪfar]), which can be compared with *ṣudfa* [ṣʊdfɛ] 'coincidence'). This apparent 'de-palatalising' of *k* in [U] domains appears parallel to the 'de-emphaticising' of *r* in [I] domains.

A final note here is that it is these [I] domains which sometimes appear anomalous. That is, where there are clear back domains ([U] domains and [A] domains, and combinations of these), this little *i*-quality pops up in otherwise unexpected contexts, particularly word-finally. It seems almost as though this [I] is rather belligerent, and lurks around waiting to pounce unless actually blocked. This is particularly evident in the case of stem-final labials and velars. (13) above showed that stem-final labials are subject to *i*-quality if preceded by *i* or a 'front' consonant, such as a coronal (the feminine ending in *ṭabība* and *ṣudfa* is clearly [ɛ] in both cases). Stem-final *g*, too, is vulnerable to this [I], even where it follows an emphatic, as in *ṭagga* [ṭʌggɛ] 'a bang' and *gamraga* [gʌmragɛ] 'he customs-inspected it (m.s.)'. In these cases, it seems that *g* cannot be 'back' because it is not in an [U] domain. Compare this with *maṭgūga* [mʌṭgu:gɐ] 'broken (egg)', where stem-final *g* is not followed by [ɛ], apparently because it is in a [U] domain.

To return to the issue of representations, we are now in a position to go back to those proposed in Chapter 3. I have claimed that in Arabic not only the palatals but also the coronals are [I] consonants.[33] I am not claiming that all languages have [I]-specified coronals,[34] and, as discussed previously, phonological representations are

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[32] This compares with *gāl* 'he said' (< OA *qāla*), in which *l* is front, cf. *galli* [gɛlli] 'he told me'

[33] In fact, this [I] analysis correlates with the analysis of certain consonants as 'lip-spread' vs 'neutral lip position', and so on. This can be seen in Ingham (1973, 1974, 1976), whose analysis in such terms, alongside the *i*-, *u*- and *ə*-environments of Blanc (1964), and the analyses of Cantineau (1946), was the inspiration that finally pushed me into realising the relevance of [I] and *imāla* in the behaviour of emphatics and labials in Arabic.

[34] There are, however, other theoretical works arguing that coronals are 'front' (i.e. [I]-specified). The major works on this are Clements (1991) and Hume (1992). Moreover, one Element-Theoretical model in particular formalises this, see Rubin (2004), who proposes that [I] is the 'coronal' element. As stated, I do not support this in its entirety, but hold that certain languages have [I]-specified coronals,

not necessarily the same for what may seem to be equivalent consonants in different language varieties. Rather, since a language's segments participate in an overall sound system, it would actually be expected that there would be a degree of cross-linguistic variation in representations, depending on the role of various segments within this sound system. In fact, it seems to be the case that in Arabic, consonants[35] need to have some sort of resonance colouring. That is, at least at the level of realisation, consonants may not have bare 'resonance' nodes (i.e. where a consonant has RESONANCE or FUNDAMENTAL, as seen below, this may not be 'unfilled'). This could perhaps be a cross-linguistic parameter, since this is probably not true of all languages; however, I claim that it is the case for the various dialects of Arabic.

I shall show here the representations which, having looked at more phonological evidence, differ from those given in Chapter 3. Firstly, the coronals, which I represent as follows.[36]

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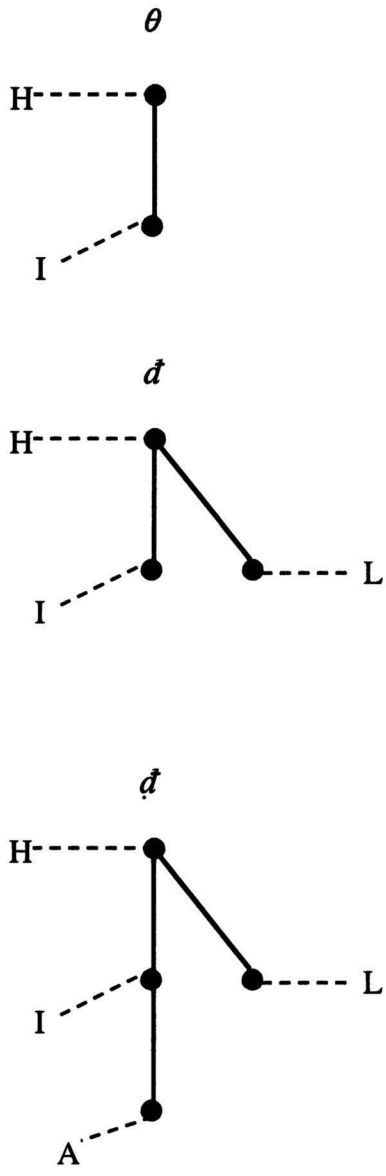
depending on the contrasts inherent in individual sound systems. It is outside the scope of this thesis to go into this further here, and I therefore confine the analysis to Arabic.

[35] One may wish here to specify obstruents. The case of *h* (and, marginal, *ʔ*) is not entirely clear. They have been classed as 'gutturals' (which in my scheme equates to [A]-specified), yet they don't behave as other gutturals in the sort of contexts under discussion here. For instance, the feminine *-ha* variation discussed indicates that *h* is 'neutral' (no other [A]-specified consonant shows this variation when preceding word-final *a*). The *gaháwa* syndrome, which is usually given as evidence for the 'guttural' class including laryngeals, could perhaps be analysed as the non-[U] and non-[I] consonants. See McCarthy (1994), Hayward & Hayward (1989). I leave this point to future research, but note here that I differentiate the laryngeals on the basis of having only a ROOT node (unlike other consonants).

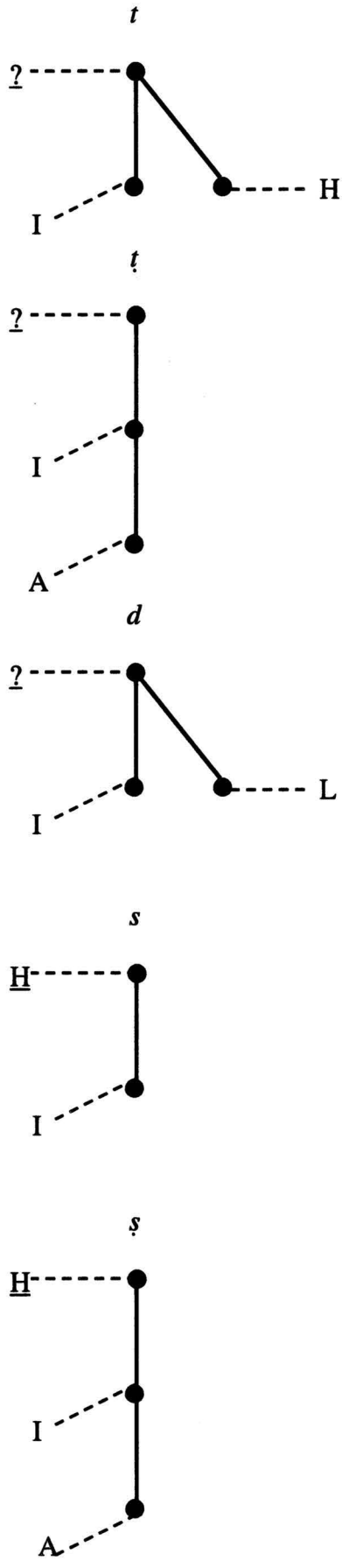
[36] Headedness is shown by underlining the head. In the case of coronals, [I] is not head (unlike the palatals, which are headed by [I]). This means that in coronals [I] is effectively a secondary quality. Further, I represent denti-alveolar coronals as manner-headed (as seen in (15)), whereas I assume interdentals to be headless (14). This means that in the case of *s š* and *θ*, which all have the elements [I.H] and an otherwise identical structure, the difference is in headedness (*s* is headed by [H], *š* by [I] and *θ* is headless). One may also wonder that perhaps in dialects which are more urban, it is the interdentals which have neutralised, perhaps because they are headless, indicating a potential constraint on headless consonants in such dialects. From an atheoretical angle, it could be said that perhaps such dialects disprefer so many coronal contrasts, and that the interdentals are presumably the least salient, or maximally distinct (which partly backs up my claim that it is the interdentals which are headless, under the view of Harris (1994), who assumes that headedness generally corresponds to saliency).

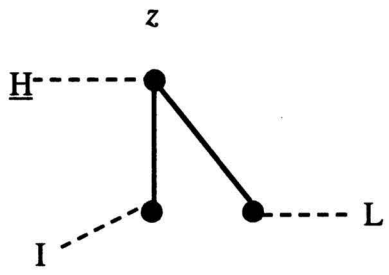
Figure 6.1 The representation of MB interdentals[37]



[37] In Chapter 3, §3.1.3, I discussed an alternative possibility for the representation of fricatives.

Figure 6.2 The representation of MB coronals





As can be seen in the representations given, where (in Chapter 3) I supported the representational model of Nasukawa and Backley under which coronals are characterised by a structure ending in a RESONANCE node, I now modify this somewhat. For N&B, coronals end in bare RES, whereas I have argued that in languages like Arabic, coronals have [I] attached to RES. As noted, they are different from palatals since palatals have [I] as head. Moreover, while the emphatics end in a FUNDAMENTAL node, it is the presence of [I] in RES that gives the coronal interpretation. By contrast, velars end in bare FUND, although may be interpreted with [U] on RES, giving them a 'back velar' interpretation.[38] The uvulars have [A] on FUND, but have bare RES, and thus cannot have coronal interpretation.[39] Before showing the representation of velars, I give *l* and *r*. For *l*, I follow both Harris (1994)[40] and Jonathan Kaye[41] in assuming that *l* has [?] in its representation. For Arabic, historically, the laterals can be assumed to have been part of the obstruent system (since there was a lateral 'triad', as discussed in Chapter 4). Moreover, synchronically,

[38] I am not claiming that these are necessarily lexical representations (in MB, at least). However, GP should be able to handle such contrasts, since there is not such a strong dividing line between 'underlying' and 'surface' (hence the preferred terms 'lexical' and 'phonetic realisation'), as there is in 'traditional' feature frameworks. That is, elements are fully interpretable in isolation, and a phonological expression has full interpretability at any stage of the derivation. Further, since GP focuses not only on output, even if one doesn't want to claim these as lexical representations, the point is that this is how they can be perceived, i.e. they have some cognitive reality somewhere, even if predominantly at some auditory 'level' of representation, and thus we need to show that we can deal with such a representation, since with elements the point is that they do have an auditory reality. This view is more in line with the Harrisian school of thought than the Kayesian, since the latter strongly demarcates phonetics and phonology and opposes the view that phonology has any grounding in phonetics (his arguments on this point, however, concern articulatory phonetics and he does not discuss acoustic / auditory representations – I concur with him in his rejection of the relevance of articulatory phonetics to the phonology). See Kaye (1989).

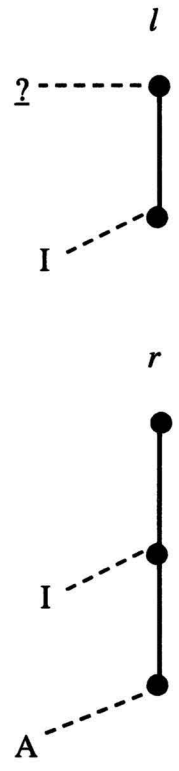
[39] As stated, representations vary cross-linguistically. Therefore, the representations given here would not be the same in a language that has, say, palatalised vs labialised vs 'plain' velars contrasting with both coronals and uvulars (which have secondary articulations). While extremely marked, it does occur (notably, of course, in Caucasian – in these languages, representations are clearly far more complex).

[40] P. 125 in particular explicitly discusses this.

[41] Monik Charette, p.c. I am not aware of any published works showing Jonathan Kaye's representation of consonants, but phonologists working at SOAS with elements, who generally follow Kaye's model always have *l* with [?]. As discussed previously, I refute the assumption that coronals always have [A].

ɫ is the most common 'marginal' emphatic, and where it occurs it is generally assumed to be able to spread its emphatic property. The data shown here for MB doesn't seem to show any instances of *ɫ* spreading [A] into other consonants (since in the cases where it occurs either there is another coronal emphatic, or the other segments are velars / uvulars / labials). However, it doesn't behave like *r*, which is a sonorant, and I therefore assume that it does indeed have [?]. Moreover, on theory-internal grounds, if *l* had no [?], then it would have the same representation as *r* (when emphatic), since I claim that coronals are manner-headed, which would mean that *l* would be headless if it didn't have (the manner element) [?]. I do, however, assume that *r* is headless. Its slightly odd behaviour (in seeming generally 'back', but being easily 'de-emphaticised') could be argued to be due to the fact that it is a sonorant. However, notably, *y* and *w* don't have such chameleon characters. I therefore assume that *r* is easily 'de-emphaticised' because it is both sonorant *and* headless.[42] These segments are shown in Figure 6.3.

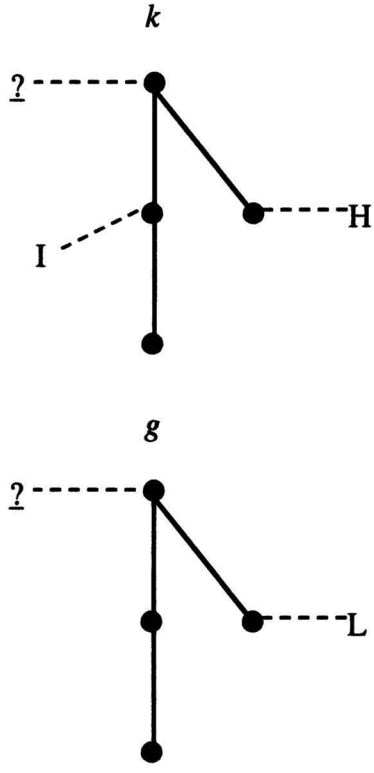
Figure 6.3 The representation of MB liquids



[42] Moreover, if *r* loses its 'back' quality, at some level of representation it must be [I] (where normally it is [A.I]). If it were headed, the head would thus have to be [I], making its representation identical to *y*. This is another theory-internal reason why *r* must have a headless phonological expression.

Moving on to the velars, I assume that their representation in MB is as follows.

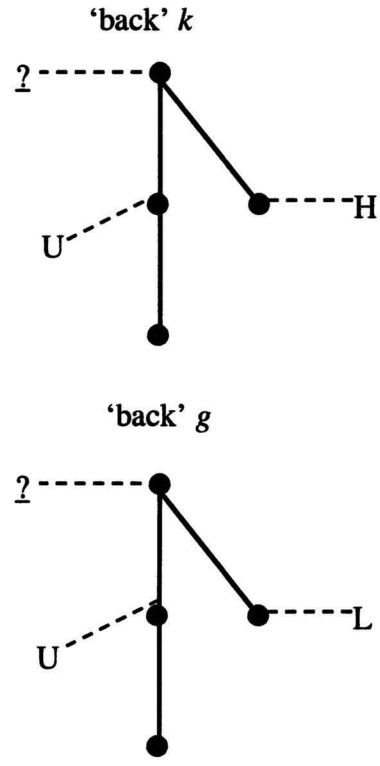
Figure 6.4 The representation of MB velars



I assume that, by analogy with the coronal stops, the velars are manner-headed. Their representation is distinct from the coronals structurally, since they terminate in bare FUND.[43] Moreover, since I have argued that at some level of representation, velars may be interpreted as being 'back', I also show this representation below.

[43] As discussed, Harris (1994) sees velars as being headed by a 'default' [@] element. Since in vowels, where Harris has [@]-head, other researchers have a headless expression, one may equate [@]-headed velars in a system that has a [@] element, to velars being headless in a system that has no [@] element. However, Kaye assumes that velars simply have no resonance element, not that they are headless. In my system, although I assume headed expressions by analogy with the coronals, I note that one may wish to argue that they are headless. Space constraints prevent me here from investigating such issues as phonotactic constraints which would usually be used to evidence (consonantal) headedness claims. However, in this repect, velars again seem not to behave any differently from coronals, or at least in any way which I am aware of which may necessitate different headedness.

Figure 6.5 The representation of MB 'backed' velars



The representations of 'back' velars are distinct from those of labials since labials are [U]-headed (i.e. exert full [U] quality).[44] Moreover, these 'back' velars are additionally distinct from labials in that they terminate in bare FUND. [45] To reiterate here, I assume that the uvulars are [A}-specified, as shown in Chapter 3. Again, by analogy with the velars, they would be manner-headed. Note here the difference between the emphatic coronals (which have [I], but terminate in [A] on FUND), and the uvulars (which also terminate in [A] on FUND, but have no element, or lack of [I] associated with RES).

As per Chapter 3, the pharyngeals are [A]-headed. I reiterate here the representation given for ʕ in dialects such as MB, since I claim that the representation of ʕ varies cross-dialectally (which I believe to correlate with other differences in dialectal sound systems):

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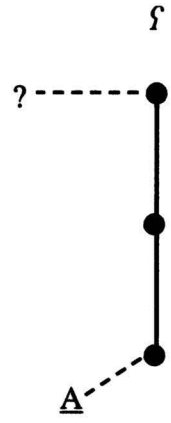
[44] See Harris (1994:126), who argues that 'As a head, U is free to assert the full elemental pattern it displays in isolation'. However, he argues that labials are manner-headed, while [U] as head defines doubly-articulated *kp* and *gb* (as in certain West African languages).

[45] In Russian, the velars pattern with the velarised consonants (against the palatalised consonants), and *k* is 'back', but never 'front'. I therefore assume that in Russian velars have the representations in Figure 6.5, above. Without a formal analysis, it is not clear why the labials palatalise, but the velars don't, although here one may wish to use headedness. See the data in Padgett (2003).

Figure 6.6 The representation of the MB voiced pharyngeal



As a final note here, I assume for laryngeals the representations given in Chapter 3, whereby they have only a ROOT node. Laryngeals I assume to be headless, which one could argue (in addition to the fact that they have no resonance element) is why e.g. *h* is apparently completely 'neutral'. Cf. for instance *fahad* [fɛhɛd] 'leopard', *nahar* [nʌhʌr] 'river', *gahwa* [gʌhwɐ], compared with (respectively) *fadd* [fɛdd] 'one, a single, some (unspecified)', *nār* [nɑ:r] 'fire' (generally noted as 'emphatic'), *gawwād* [gʌwwa:d] 'pimp', etc. In these examples, *h* has absolutely no effect on the environment, and in terms of resonance quality may as well not be there.

To conclude this section, I shall comment briefly on a couple of remaining points concerning elements. Firstly, it is noticeable that both in the consonantal representations given, as well as in terms of vowel quality, [U] does not appear to combine with [I].[46] Secondly, there appears to be somewhat of a hierarchy for these resonance elements. In many ways, [A] appears to be the strongest. For instance, although I claim that coronal emphatics have both [I] and [A] (neither of which is head), they only spread [A], whereas the 'front' coronals apparently do trigger [I] domains. Secondly, with emphatics, a following *a* is not normally realised as [ɛ] (i.e. *a* with [I] quality), which indicates that [A] is stronger. Moreover, in pharyngeal

[46] For vowels, [A.U] is rounded mid back [o] or [ɔ], with expressions differentiated by headedness; [A.I] is unround (often mid) front [æ], [ɛ], [ɛ] (again differentiated by headedness). The combination [U.I] is a high round front vowel [y], as in French or Turkish. This does not occur in many languages which otherwise have combinations, e.g. Arabic. It should be noted here that some scholars assume that this is due to tier conflation (whereby U and I occupy one conflated tier in many, but not all, languages). This is the view of Harris (1994) and Backley (1998). On the other hand, some scholars handle this through licensing constraints, whereby a language-specific constraint disallows U and I in the same expression. The major work on this is Charette (1991), Charette & Göksel (1998).

environments, [A] again appears to be stronger, although doesn't actually prevent [I] from occurring For example, *liʕab* [laʕab] 'he played' and *ʕitab* [ʕɛtɛb] 'he complained'. In *liʕab* (which is the form given in Woodhead & Beene, 1967), there is clearly no reason for *u* to occur in V_1 (cf. *ḍurab* etc in (10) above), but since *l* is 'front' in such contexts, one may expect to find *i* (perhaps lowered to [ɛ] next to the pharyngeal). However, clearly, here it is [a] (in both nuclei), and *l* has no effect. By contrast, in *ʕitab* the influence of 'front' *t* in the middle of the stem gives a clear [I] domain (compare *kitab* [kɪtɛb] 'he wrote'), meaning that V_1 has *i*, yet [A] still manages to exert its influence by lowering *i* to [ɛ].

It also seems that [I] is 'stronger' than [U]. That is, it is noticeable that labials may occur in an [I] domain, even allowing suffixal *-a* > [ɛ] (e.g. *laṭīfa* [lʌṭɨifɛ] 'pleasant (f.s.)', *balad* [bɛlɛd] 'country', *tifal* [tɪfɛl] 'he spat'),[47] whereas even where 'front' coronals occur next to *u*, it does not seem to prevent the domain overall being an [I] domain (as in *tunga* [tungɛ] 'large clay water-jug'). While noting that this perhaps oversimplifies a little, we could still posit a hierarchy A > I > U (at least for this dialect).

In the following sections, I shall show how other dialects of Arabic differ from Iraqi. The major differences seem to be in the extent of [A]-spread, the degree of *imāla* (in that some dialects have a clear variation in *ā*, which may be [ɑ:] or [æ:]), and the presence vs absence of [U] domains (or [U]-spread).

6.2 Ḥōrāni[48]

The first point of comparison here is the Ḥōrāni dialect detailed in Cantineau (1946). According to Cantineau (1946:86), *tafxīm* spreads predominantly left–right in this dialect:

> D'une façon générale, l'influence des consonnes mufakkama et des voyelles postérieures se fait sentir surtout sur les phonèmes placés *après elles* dans le mot: le tafkîm a tendance à s'étendre vers le fin du mot beaucoup plus qu'à remonter vers l'initiale.

[47] This is with the exception of *w*, which does seem to block [I] domains in this dialect. Word-final *w* is always followed by the [ʁ] variant of suffixal *a*, as in *labwa* [lɛbwʁ] 'lionness', *ḥilwa* [ħɨlwʁ] 'beautiful, sweet (f.s.)'.

[48] See Chapter 5, §5.4.3.2.

Under the analysis presented in the current work, it is not generally *tafxīm* that spreads, but *imāla*, or [I] quality. My position is that *tafxīm* is a non-[I] domain. Ḥōrāni is remarkably similar to MB in most respects, but one apparent difference is that *k* and *g* are apparently 'inherently' back.[49] Cantineau also gives the following consonants as 'neutral' in that they may become *mufaxxama par position*: *b m f l r ħ ʕ h*. These consonants become 'back' in the environment of other *mufaxxam* consonants, or the coronal emphatics, or next to *u*, *o* or *a*. In looking at the consonants which may be *mufaxxama par position*, and at the supposed triggers, i.e. the vowels *u o a* and other *mufaxxam* consonants and coronal emphatics, it is striking that these do not form a natural class. In fact, what they have in common is that they are not 'front' (i.e. precisely those vowels and consonants that I analyse as having an [I] element).

The data are mostly very similar to MB, except that *k* is generally 'back', except when in an entirely front environment. I therefore assume that *k* and *g* in Ḥōrāni are both 'unspecified' in terms of resonance. The following data exemplify *k* (14) and *g* (15) in various environments:[50]

(14)	*ṛ̈kḅa*	'knee'
	makrūḅa	'stretched out (f.s.)'
	maskaḅa	'area of irrigated vegetables'
	ʷ̈ħkūṃa ~ ħʷ̈kūṃa	'government'
	bukṛa	'tomorrow'
	mōkaṛa	'lair'

[49] As noted in Chapter 5, Cantineau gives the following as 'inherently back' (*mufaxxama par nature*): *w k g x γ*, in addition to the coronal emphatics.

[50] I retain the vowel transcriptions of Cantineau, because the variance is not always clear. This is: '*a*' is 'pure' *a* – he notes (p.176) that generally '*a*' 'reste également à peu près pure, ou à peine teinté en *å* au voisinage des consonnes emphatiques ou mufaxxama et au voisinage des labiales'. He doesn't notate this in his data, however, which means that it is not always clear exactly what the environment is. However, he also notes that '*a*' 'se réalise en *ä* au voisinage des interdentales, des dentales, des sifflantes et des prépalatales, à condition qu'aucun des phonèmes capables de maintenir le timbre pur *a* n'exerce une influence contraire.' He does notate *ä* in the data, as below. Also, '*e*' is the notation of *i*, which 'n'est...jamais resté pur; sa réalisation phonétique normale est *e*.' Lastly, *u* 'tend à se maintenir intact, au voisinage des consonnes labiales...aussi au voisinage des postpalatales et des vélaires...[mais] les réalisations phonétiques les plus fréquentes du timbre *u* sont *o* et *ö*'. The '*o*' and '*ö*' realisations seem to be over-lax realisations of *u*, but as Cantineau notes, it is not clear exactly when they occur (with respect to both each other and to '*u*'), although it does seem to be in conflicting environments or environments with only one adjacent velar or labial. Lastly, I also retain Cantineau's transcription of 'emphatic' labials, etc, although I refute their analysis as emphatic.

sukkāṛa ~ sukkaṛa	'wooden bolt'
šakkāṛa	'settled nomads near the villages'
kundaṛa	'European shoe'
köswa	'effects'
käbš	'ram'
käddāne	'*collier de trait*'
kärš	'animal stomach'
käsäl	'laziness'
kätef	'shoulder'
seker	'he got drunk'
mällīka	'owner (f.s.)'

The data are not entirely clear,[51] but if anything seem to show some leftward spread of [I] (as in e.g *käddāne*, *käbš*, *käsäl*). Interestingly, *käbš* indicates that the labial may be in a 'front' context, meaning that [I] characterises the entire word. The example of *kundaṛa*, where V_1 has *u*, contrasts with the sedentary Damascus Arabic reflex *kindara*, perhaps showing that *k* in the latter is not 'front'. Lastly, it should be noted that the form I past-tense verb template in Ḥōrāni differs from MB. Where OA has **CaCiC*, Ḥōrāni has *CiCiC*, and where OA has **CaCaC*, Ḥōrāni also has *CaCaC*. This compares with MB, which has *i–a* (or *u–a / a–a* in the contexts discussed in §6.1). In examples such as *seker* this means that there is an *i*-environment in V_2, where MB would always have *a* (which would then be a 'back' environment).

(15)	*gaṭṛūḅa ~ göṭṛöḅa*	'plough hook'
	ṛagaḅa	'(front of) neck'
	gerbe	'waterskin'
	garībe	'near'
	goṭṃa	'a little'
	masgūfa	'covered by a roof (f.s.)'

[51] It is possible that the vowel transcriptions are not clear enough for this, especially since Cantineau assumed that there is a property of *tafxīm* spreading rightwards, which may to some extent be reflected in the data. I suspect that the vowels (especially when unstressed, and especially the high vowels) are highly likely to be very schwa-like.

gṭāfa	'sieving, sifting'
ᶜagafa	'wooden hook on the ceiling for hanging baskets'
gaḥwa	'coffee'
gaṃla	'louse'
gulla	'ball, *boulet*'
gullāye	'cooking pot for clarifying butter'
gāla	'she said'
nugra	'(a) hollow'
ragīg	'thin (m.s.)'
esgaf	'he roofed (a house)'

The data for *g* are a little more limited than for *k*. However, there are no examples of *g* with *ä*. This may be a limitation of the data, but it is interesting that *g* appears more often with following *u* than does *k*. I can only conclude from this that *g* is generally 'back', although where followed by *i* it would presumably not sound 'back' (although this is perhaps analogous to the labials, which can appear in front contexts without needing to assume that they themselves are front). Cantineau specifically states that both *k* and *g* stem-finally are always followed by the '*e*' variant of suffixal *-a*.

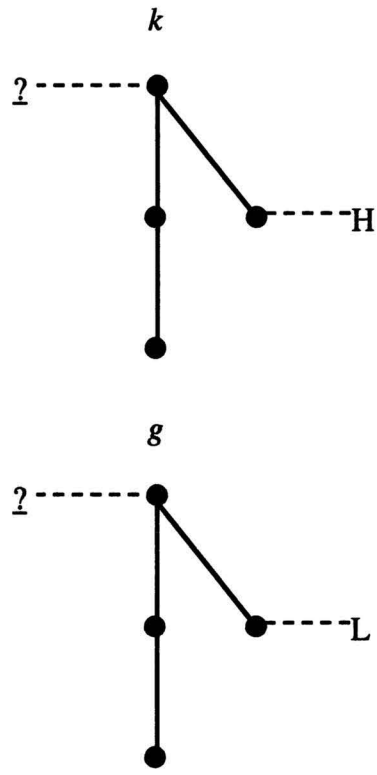
With respect to the feminine suffix '*-a*', it seems likely that in Ḥōrāni it is actually an empty nucleus, such that the '*a*' variant is actually schwa [ə], and the '*e*' variant is the over-lax *i* vowel. This would be similar to the Syro-Lebanese sedentary dialects (although in other respects related to its sound system, Ḥōrāni seems closer to the Bedouin-type dialects).

Labials trigger the suffixal '*a*' vowel variance exactly as Iraqi (i.e. most often '*a*', except where the labial is in a 'front' environment, with the exception of *w*, which only ever triggers '*a*'), but according to Cantineau the velars always trigger what he assumes to be the 'back' variant. I therefore suppose firstly that, unlike in MB, the [I] environments are triggered segmentally, and that [I] doesn't 'attach' itself to stem-final domains unless actually blocked. Moreover, [I] seems to spread rightwards into

the word-final suffixal '*a*', which I have proposed is an empty nucleus, from a preceding [I]-specified nucleus. This is not blocked by labials (or any consonant which has a representation terminating in RES),[52] but is not allowed across consonants which terminate in FUND (i.e. pharyngeals, velars, uvulars and emphatic coronals). Notably, the examples seen above of *käddāne*, *käbš*, *käsäl* (14, above) do not contradict this, since consonants most strongly seem to influence preceding consonants, and, in these examples, the appearance of *ä* does not necessarily mean that the [I] quality spreads across the velar (it may be further blocked from spreading leftwards). In fact, this is what we seem to find in the data in (14), e.g. *sakkāṛa*, *maskaḅa*, where V_1 is apparently 'pure' '*a*', not the fronted variant.

The consonants which differ from MB are the velars, for which I propose the following representations:

Figure 6.7 The representation of Ḥōrāni velars



Otherwise, consonantal representations are as in MB.

[52] This is with the exception of *w*. Cantineau himself notes (1946:99) that the inherently backed nature of *w* makes this dialect more similar to the Bedouin North Arabian dialects, and differentiates it from sedentary Syro-Lebanese: 'ce tafkîm inconditionné est une particularité qui rapproche les parlers ħōrânais des parlers de nomades nordarabiques...et les distingue des parlers de sédentaires libano-syriens'.

A point which I should note explicitly here is that Cantineau notates labials in non-front contexts as 'emphatic'. My analysis does not concur with this, since in my view labials in a non-front environment are simply asserting their full characteristics (bearing in mind that the characteristic pattern of [U] is near convergence of F_1 and F_2, as discussed previously, which also has a 'back' interpretation, which I associate with 'velarisation').

In some respects, then, Ḥōrani Arabic seems to have less strong [I] domains that does MB. It is interesting, therefore, that Cantineau notates what I assume to be lexically *i* as '*e*', and specifically states that short *i* is never 'pure', but lower and more central. In MB, as I notate in the data, short *i* in 'front' contexts is clearly [ɪ]. It is thus interesting that Cantineau's data show short *a* as being fronted to '*ä*' in clearly front domains, but apparently not raised, as I have shown that it is in MB in similar contexts.[53]

Overall, as noted, while Ḥōrāni is very similar to MB with respect to much of the (segmental) sound system, it seems to have less strong [I] domains than MB, although there are clear [U] domains. There was not enough data to show whether the contexts in which MB has predictable *u* are exactly the same in Ḥōrāni. There are indeed instances of what looks like predictable *u*, or at least *u* which signifies 'back' contexts, but other contexts in which *i* appears (as noted, for instance, in Form I verbal paradigms, but also in such instances as *geme^{c}he* 'her thimble', where Iraqi would have *u* rather than *i*, and in which the *i* vowels can only be assumed to be lexical).

These factors may give the impression auditorily that Ḥōrāni has less [I] quality than MB (although MB itself has less [I] quality than dialects such as Damascene, or the Mesopotamian *qeltu* dialects, and also has fairly strong [U] quality). This may also make Ḥōrāni sound impressionistically more 'guttural' than many adjacent (urban and rural) Syro-Lebanese dialects.[54]

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[53] It is not clear to what extent the raising of short *a* to [ɛ] (but not long *ā*, which is well known to be somewhat central even in front contexts) in MB may be due to the influence of the *qeltu* dialect group which was present in Iraq beforehand, or whether this *imāla* of the short vowel may be similar to (Bedouin) North Arabian dialects. This would be an interesting subject of future research.

[54] My own impression of Ḥōrāni and also Jūlāni (Golan Heights), which was unfortunately before I started this project, was that it was impressionistically fairly similar to MB in terms of sound system

6.3 Damascene[55]

A comparison of Damascus Arabic (DA) with the MB and Ḥōrāni dialects discussed is rather interesting, partly because of the differences that emerge, but also because of the similarities.

Firstly, a note on the feminine *tā marbūṭa* suffix is a good place to start, as the data that I start with concerns the variants. In common with the transliteration systems used for many other dialects, this suffix in DA is given as *-e ~ -a*.[56] However, while the *-a* variant sounds like a slightly lowered schwa, [ə̯] or [ɐ], the *-e* variant sounds like a rather over-lax *i* (between [ɪ] and [ɛ]). In fact, the word-internal (lexical) short vowel *i* is generally given as 'e',[57] because it too is like a rather over-lax *i*. Additionally, in DA, this vowel is elided in some construct forms, for example *žāmʕa* 'university' > *žāmʕet Dimašq* 'University of Damascus' and *žāməʕtak* 'your university'.[58] The fact that this *-a* vowel may be elided in exactly the same way as the schwa vowel (notated as *ə*), whereas other *a* vowels generally are not elided, provides further evidence that it is schwa (i.e. an empty nucleus) rather than lexical *a*. As the following discussion makes clear, I thus assume that this suffix in DA is actually schwa, i.e. an empty nucleus. With any 'non-back' consonants (to be discussed presently), an 'epenthetic' *i* is triggered[59] (I shall discuss presently why I propose that this is a suprasegmentally present [I]), whereas with any 'back' consonants, the realisation is an [A]-coloured schwa.

Following are some data exemplifying the realisation of the feminine suffixal *-a ~ -e*.[60]

(although in non-phonological respects more similar to Syro-Lebanese), especially in comparison with Damascene Arabic.

[55] See Chapter 5, §5.4.3.1.

[56] Cowell (1964), Cantineau & Helbaoui (1953), Ambros (1977).

[57] As noted in Chapter 5, for these dialects, *i* is transliterated as 'e' and *u* as 'o'.

[58] This compares with MB *sayyāra* 'car' > *sayyārtak* 'your (m.s.) car', *ṣadīqa* > *ṣadīqtič* 'your (f.s.) friend (f.s.)'; however, in MB a lexical *a* vowel may be elided in other positions too, e.g. *yisʔal* 'he asks', *ysiʔlūn* 'they ask', whereas in DA this is generally not the case, cf. *yəsʔal* 'he asks', *yəsʔalu* 'they ask'. (Although note that in central to northern Lebanon, these *a* vowels are elidable, such that these dialects are termed by Cantineau (1938) '*parlers différentiels*'.)

[59] The epenthetic vowel in DA is generally *i*, providing that the consonantal environment doesn't affect this. This is the vowel transcribed in the data as *ə*. However, where a word boundary is flanked by sequences of consonants, an 'epenthetic' *ə* is realised, and this is generally most like [ɪ], e.g. *bint + kbīre* > *bint əkbīre* (*ə* = [ɪ]) 'a big / old girl'. In Cairene Arabic, too, this vowel is *i* (Watson, 2002:12).

[60] Consonantal transcriptions are standardised to the scheme used in this thesis, although note *ž* (IPA [ʒ]) for OA **ǰ*. I retain the vowel transcriptions of Cowell (1964). The long vowels are as standard;

(16)	'front' *-e*		back *-a*	
	raʔbe	'neck'	*žabha*	'front'
	zīne	'decoration'	*ṣīγa*	'jewellery'
	səkke	'track'	*ʔəṣṣa*	'story'
	ʕāde	'custom'	*ħāra*	'quarter'
	ʕāṣfe	'storm'	*ṣānʕa*	'maid'
	ʔasāwe	'harshness'	*safāra*	'embassy'
	natīže	'result'	*ṭarīʔa*	'method'
	dfīre	'braid'	*fḍīħa*	'scandal'
	ħafle	'party'	*marra*	'time'
	ʔazme	'crisis'	*bēḍa*	'an egg'
	farše	'mattress'	*ʔəžra*	'fee'
	ʕawze	'bend'	*ħažara*	'a stone'
	xaṭwe	'step, pace'	*ṣəde*	'rust'
	šōke	'fork'	*dəra*	'corn'
	huwwe	'precipice'		
	barake	'blessing'		

The data show (as stated in Cowell, 1964) that the 'back' variant *-a* is found after the emphatics *ṭ ṣ ḍ ẓ* and also *x γ q ħ ʕ h ʔ*, as well as after *r*, providing that *r* is not preceded by *ī* or *i*. The following consonants are 'front' in this respect: *w b f m d t s z l n ž š k*.[61] Moreover, the *-e* variant is found after these front consonants even when the preceding consonant is 'back' or emphatic, and whatever the preceding vowel. Also, since *h* patterns with the 'back' consonants in DA, this means that the feminine possessive / objectival suffix *-ha* 'her' is always *-ha* (and there is no *-he* variant), for example *sēf-ha* 'her sword', *tīn-ha* 'her figs'.

An interesting point arising from the data in (16) is that the labials stem-finally always trigger the 'front' variant of the feminine suffix, whatever the preceding

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however, the short vowels are: '*e*' = *i*, '*o*' = *u*, '*a*' = *a*, in addition to schwa '*ə*', which, as Cowell (1964:10) notes, varies between [ɪ], [ə] and [ʊ], with other slight variations, depending on the consonantal environment. Cowell also gives *i* and *u*, but these are shortened long *ī* and *ū*.

[61] In DA, *g* is found in loans, interdentals have merged with coronal stops / sibilants, and OA **q* is usually *ʔ*, but occasionally (in Classicisms) *q*.

segment. Since an emphatic can cause a right-adjacent (susceptible) consonant to become emphatic (as will be shown presently), and since it is often claimed that labials (especially *b* and *m*) can become emphatic, this provides counter-evidence. Examples of where one might otherwise expect a stem-final labial to be followed by a 'back' variant of the feminine suffix are: *rabābe* 'rebab (viol)', *huwwe* 'precipice', *ṭābe* '(foot)ball', *ḍaffe* 'edge, bank', *waṣfe* 'prescription', *xaṭwe* 'step', *ʔanẓime* 'systems'. Examples such as these (along with all other examples of stem-final labials) cast doubt on the assumption that labials may become 'emphatic'.

Moving on to the issue of the spread of emphatics into other coronals, I shall deal first with the 'emphaticisation' of *t s d z*, firstly within stems and secondly into affixes.

It seems that spreading within the stem is much more likely leftwards than rightwards. As noted previously, it is generally assumed in the literature that this spread works in the same way as spread into affixes (as well as involving labials, etc). This is one of the problems that I maintain has led to problems in the analysis of emphatic behaviour. I shall demonstrate shortly why I believe that we cannot assume that spread within the stem is necessarily the same as (or on the same level as) spread into affixes and other coronal assimilation. Whether the spread within the root is a synchronic process or lexicalised is not clear, especially since there is some possibly conflicting data.

Firstly, within the stem rightward spread from emphatics may be rather limited. However, it is noticeable that the only examples of this involve *ṣ*. The data in (17a) show the emphatic not spreading rightwards, and (17b) shows rightward spread: [62]

(17)	DA	written Arabic	
a.	*ṣəde*	*ṣadaʔ*	'rust'
	ʔarṣide	*ʔarṣida*	'balances, remainders'
	ṣadafe	*ṣadafa*	'seashells'
	tə-ʔṣod	*ta-qṣid*	'you consider (m.s.)'

[62] Data from Cantineau & Helbaoui (1953), Cowell (1964), Ambros (1977). I have not shown the final *-a* suffix separately (sometimes it is part of the broken plural pattern), but I demarcate the 2P verbal prefix separately (to show the consonant as non-root). Note that the final *-a* ~ *-e* vowel of DA is notated in the written form as *-a*.

b.	*ṣōṭ*	*ṣawt*	'voice, sound'
	ṣwāṭ	*ʔaṣwāt*	'voices, sounds'
	ṣəḍriye	*ṣadriyya*	'vest'
	ṭaraḍ	*ṭarada*	'he expelled, got rid of'
	ṣəḍfe	*ṣudfa*	'coincidence, unexpected encounter'
	ṣāḍaf	*ṣādaf*	'he happened upon'
	ṣāḍar	*ṣādar*	'he confiscated'
	ṭaʔṣ	*ṭaqs*	'weather'
	ḍəḍḍ	*ḍidd*	'against'
	ʕaṭaṣ	*ʕaṭas*	'he sneezed'

To add to the data above, the example of *ṣayyād* 'hunter' contrasts with *ṣēḍ* 'hunting', in which the first shows the emphatic not spreading across consonantal *y*, whereas the second shows spread across the long *ē* vowel. This seems to indicate that this instance at least is a synchronic process. Additionally, we should contrast the examples (from above) of *ṣadafe* with *ṣəḍfe* and *ṣāḍaf*, where the root is *ṣ-d-f* in both, but in *ṣadafe* '(a) seashell' the *d*, according to Cowell, is not emphatic, whereas in *ṣəḍfe* and *ṣāḍaf* the *ḍ* is notated as emphatic. This indicates a degree of lexicalisation, since if the spread were entirely a synchronic process, all these forms would show emphatic *ḍ*.

Leftward spread of the emphatic property into *t s d z* seems pretty much universal in DA. This is shown in the following data:[63]

(18)	DA	written Arabic	
	baṣīṭ	*basīṭ*	'simple'
	mabṣūṭ	*mabsūṭ*	'happy (m.s.)'
	ṣabbāṭ ~ ṣəbbāṭ	*sabbāṭ*	'(pair of) shoes'

[63] Cowell (1964:26) notes that 'Most roots which theoretically contain both plain and velarized dentals (judging from Classical spelling or from historical or comparative data), in fact usually have only velarized dentals in Syrian pronunciation'. However, the data do not reflect this, since L–R spread is much more limited, as reported for most dialects. Lastly, note also that I haven't listed here all the words which in written Arabic have more than one ('primary') coronal emphatic, such as *ṣūṣ* 'chick', *ḍaɣəṭ* 'pressure', etc.

mẓalḷaṭ	*muzallaṭ*	'naked (m.s.)'
ʔaṣāṭīħ	*ʔasṭuħ*	'roof terraces'
ṣaṭl	*saṭl*	'pail'

I could not find any examples of a stem containing *t s d z* followed (somewhere) in the stem by *ṭ ṣ ḍ ẓ*, as noted for other dialects, indicating that emphatic spread is most consistent R–L (whether or not this is historical and lexicalised). I deal presently with the other coronals *r l n*.

In terms of synchronic spread, this is clearly evidenced in affixal alternations. The data in (19) below show this spread occurring, and (20) shows this spread not occurring, in suffixes containing *t*. (19a) shows the feminine suffix *-a(t) ~ -e(t)* in construct forms (as seen for the dialects in the previous sections), while (19b) shows the plural feminine suffix *-āt*:

(19)	a.	*ʔūḍeṭ*	'room (of)'
		nəʔṭeṭ	'point (of)'
		fəḍḍəṭak	'your silver'
	b.	*ʕaṭṣāṭ*	'sneezes'
		xayyāṭāṭ	'seamstresses (f.pl.)'
		ṭābāṭ	'(foot)balls'
		maḍāfāṭ	'reception rooms'
(20)		*ṣūret*	'picture (of)
		xaṭəwto ~ xaṭuṭo	'his step'
		ʔaḍītek	'your case'

The data show that suffixal *t* of the feminine singular *-e(t)~-a(t)* becomes emphatic only when the final stem consonant is itself emphatic. Interestingly, this does not include *r*, even though this is emphatic (the non-construct form of 'picture' is *ṣūra*, with the 'back' variant of the feminine suffix). This fits with what we have seen before, whereby *r* seems to be emphatic (or at least 'back'), unless 'de-emphaticised', but does not itself spread this property. Moreover, the *xaṭəwto ~ xaṭuṭo* variant shows

that the spread may occur across a short vowel, but not across a consonant, even where this is labial. Lastly, *ʔaḍītek* shows the spread not occurring across long *ī*. This may be either because lexical *i* prevents this, or because long *ī* is a sequence of two nuclei with an intervening empty onset. There is not enough data for this point to be clear. However, with the feminine plural *-āt* suffix, the emphatic property apparently spreads not only from a stem-final emphatic, but also through labials. An interesting variation is seen in *ṭābāṭ* '(foot)balls', since the singular is *ṭābe*, with a very definitely non-back final *-e*,[64] which is also the case for *maḍāfe* 'reception room'. It therefore seems that where a labial is followed by *ā* which is not subject to *imāla*, then the spread of the emphatic property is not blocked. However, since labials are not themselves 'emphaticisable', they are susceptible to *imāla* where nothing prevents it.

Spreading into prefixes occurs where the stem begins with a coronal emphatic, or where the stem-initial consonant is (as Cowell puts it) 'conducive to velarization' from a subsequent sound, as shown below. (21) shows data in which spreading takes place, in (a) where the stem-initial consonant is emphatic, and in (b) where the stem-initial consonant is not itself emphatic. (22) shows data in which there is no spread (prefixes demarcated).

(21)	a.	*ṭa-ṣrīħ*	'declaration'
		ṭa-ṣmīm	'design'
		ṭa-ṣarrof	'behaviour'
		ṭə-ḍrob	'she hits'
	b.	*ṭ-ʔāṣaṣ*	'he was punished'
		bə-ṭ-xəṣṣ	'it (f.s.) concerns'
		ṭa-fḍīl	'preferring'
		ṭ-ħəṭṭ	'you (m.s.) put, place (sth)'

[64] This is something that I particularly remember noticing in DA, because I was struck by the difference between this form and the MB form *ṭōba*. The Hans Wehr dictionary gives *ṭāba* for 'ball' (without noting it as dialectal), although Turkish has *top* for 'ball' and *topçu* for 'artilleryman', the latter meaning of Turkish *top* also related to (at least) Egyptian and Iraqi *ṭōb* 'cannonball'. (My Persian dictionary lists *tūp* as a word of Turkish origin – Bruce Ingham (p.c.) tells me it means 'football / cannonball', and, by extension, 'cannon' in Persian.)

(22)	*tū-ṣef*[65]	'you (m.s.) describe'
	tū-ṣal	'you (m.s.) arrive'
	tə-t-raṭṭabu	'you (m.pl.) refresh yourselves'
	tə-t-waṣṣet	'you (m.s.) arrange [for s.o. to do sth.]'
	tə-ʔṣod	'you (m.s.) imply'
	tə-nṭāl	'it (f.s.) is [can be] reached'

The data here seem to show (according to the transliteration in Cowell, who notates emphaticisation of *t s d z*, but not of *n r*, and rarely of *l*), that a prefixal *t* can become emphatic where the stem-initial consonant is itself emphatic, whether the *t* is followed by lexical *a*, or by schwa *ə* or no vowel. However, if the stem-initial consonant is not itself emphatic, these examples show spreading occurring only if the prefixal *t* is followed by the short vowel *a* (as in the verbal nouns of Form II verbs, above), or where the prefixal *t* is adjacent to the stem-initial consonant. All the forms where the prefixal *t* is not shown as emphatic are where *t* is followed by schwa *ə* and then the (non-emphatic) stem-initial radical. In terms of analysis, this is not entirely clear. It is possible that these forms may be variable, but this is an issue that would benefit from a phonetic analysis of the data above.[66]

As concerns coronal *r*, as noted before, it appears to be lexically 'back' (i.e. emphatic). However, it is de-emphaticised by a preceding *ī* (there is no evidence of whether it is actually de-emphaticised by a preceding *i*, because in such a case the *r* would have no following vowel, as in *ʔərbe* 'bagpipes'), but not de-emphaticised by a preceding adjacent 'front' consonant, or preceding *ē*: *ħmēra* 'measles', *fəkra* 'idea'. However, 'r' is not entirely consistent in terms of de-emphaticisation, which is noticeable word-finally, where most often 'r' triggers the '*a*' variant of the feminine suffix, except after ī (i.e. *-īre*), but there are odd cases of *-īra*, most likely when the preceding consonant is 'back', but this is certainly not always the case. There appears to be perhaps a degree of lexicalisation in this, and also variation, since the sources sometimes give variant forms. In terms of spreading, however, *r* never itself actively

[65] *tū-ṣef* and *tū-ṣal* both have initial root radical *w* (hence *tū*, not **tə*).
[66] It was unfortunately not possible to do this for the current work, but is an issue that future research would need to investigate further to see how regular this spread is over a number of speakers.

spreads the emphatic property (cf. e.g. *dakar* 'male', **ḍakar*, where *r* is always notated as emphatic), although it does appear to participate in 'non-front' domains.

Additionally, in words like *markaz* 'centre', the low vowel *a* in the first syllable is not raised to [ɛ], even though the second is [ɛ]. This indicates that *r* prevents the *imāla* of the first *a*, i.e. that *r* here is not made 'non-emphatic'.

The coronals *l* and *n* are not entirely clear. Firstly, *l* is clearly not emphatic in the following forms (where it occurs to the right of an emphatic):[67]

(23)	*ʕāṭle* (< *ʕāṭel*)	'bad (f.s.)'
	mfāṣale	'bargaining'
	ṭəfle	'child (f.s.)'
	ʕəṭle	'holiday'
	ḍallet	'she remained'
	ḍaḷḷ	'he remained'
	ṭawle	'table'
	barṭale	'bribery'
	ṭāləb	'student (m.s.)'

The only instance in the data above where *l* is notated as emphatic is in *ḍaḷḷ*, which compares with the feminine form *ḍallet*, which of course has '*e*' (which I argue is lexically *i*), and thus presumably causes *l* to appear 'front'. As far as leftward spread is concerned, this appears to occur where *l* precedes an emphatic, although where there is no other preceding emphatic, the *l* doesn't 'pass on' this property, indicating perhaps that it is assimilation rather than phonological spreading across an entire word. This is not notated in the sources consulted; however, in *ballaṭ* 'he tiled (a floor)', the *l* is not front. An informant produced [ɪmballɑt̪] for this word, where the two vowels were markedly different (as indicated), but the first *a* was not as it would be in a 'front' context (compare *tballal* 'he got wet' [ɪtbɛllɛl]). In an example such as *laṭīf* 'pleasant', the *l* again is not 'front' (this is noticeable especially in the exclamation *ya laṭīf* 'good grief!, crikey!', although I suspect that here the *l* is actually

[67] Data from Cowell (1964), whose transcription of *l* vs *ḷ* is retained.

emphatic, as in *aḷḷa* 'God', through semantic emphasis, but I assume this to be a suprasegmental [A], rather than [A] attached to the structural phonological representation). However, in words such as *ʔalb* 'heart', *laff* 'he turned, wrapped', *balad* 'country', the whole word is 'front', and in all of these *l* behaves as a 'front' consonant. I thus suppose that *l* has the same representation as in Ḥōrāni and MB. It is noteworthy that when *l* does appear to be emphatic, or is notated as such, as in words like *aḷḷa* 'God', it is adjacent to a 'back' *ā* (which is shortened in *aḷḷa*). Moreover, *l* next to *u* (or *ū*) is not emphatic. I therefore suppose, as seen with prefixes, that the emphatic property [A] spreads leftwards, but only into coronals. However, where the coronal is *l* or *n* (which I return to presently), the consonant may appear to assimilate to a degree, but since it doesn't spread, the [A] is not part of the phonological representation of *l* or *n*. Likewise, while [A] can spread over labials where there are emphatics, the labials themselves don't become emphatic (although the [A] impedes *imāla*, or [I] spread).

This leaves coronal *n*. Stem-finally, *n* apparently does not become emphatic, since all instances of the feminine suffix have the front variant after *n*, even where an emphatic is present (as with *l*, above):

(24)	*šēṭane*	'mischief'
	ʔəħəṣne	'horses'
	maṭārne	'archbishops'
	ṣābūne	'bar of soap'

However, with the 1PPl possive / objective suffix *-na* (which does not have a *-ne* variant), Cowell (1964) notes that there is a degree of 'velarization', although this is not notated. My own perception of this is that it occurs only directly following a ('primary') emphatic, and is thus segmental assimilation (or phonetic co-articulation). This *-na* suffix is from OA **nā*, with the final *ā* shortened, and it is thus lexical *a* (which provides further evidence that the DA feminine suffix *-a* ~ *-e* is actually schwa, since *-na* doesn't vary in this way), which is not itself subject to *imāla* (in DA). There is also a prefixal *n-* which is a type of passive (verbal Form VII), and

this, according to Cowell, also 'velarizes'. However, there is evidence that although this may affect the adjacent vowel, the *n* itself doesn't become emphatic, or 'emphatic enough' to pass on this property, e.g. *ma b-tə-nṭāl* 'it (f.s.) is unreachable [lit. is not reached]', where the *ə* is realised as [ɪ] and the preceding 2nd person prefix *t* is not emphatic: [mɑbtɪnṭɑ:l]. Moreover, relating this to *l*, when the definite article *l* assimilates to an emphatic but is preceded by the demonstrative *ha-* 'this', the vowel is mid, indicating that *l*, although assimilated and itself emphatic, has left its [I] identity on the preceding vowel; since *h* always triggers the 'back' variant of the feminine suffix (as in *žabha* 'front' – see (16), above), this vowel would otherwise be expected to be emphatic [ɑ]. In an example such as *ha-l-ṭəfəl* 'this child', the realisation is [hatṭifɪl], with the *a* vowel (although perhaps often a little schwa-like) not emphatic (but not fully [ɛ] since it is in a conflicting environment with the preceding 'back' *h*). This actually leads us to question how 'emphatic' such affixes really are (i.e. that there are some co-articulatory effects, but there is unlikely to be phonological spreading into affixes in DA).[68] I therefore suppose that within the stem, *n* and *l* are generally not themselves subject to [A] spread, although when not in a 'front' environment, their [I] quality is suppressed.

The final point here before concluding this discussion concerns *r*. In DA *marīḍ* 'ill (m.s.)', the *r* is still emphatic despite the following *ī*, since its realisation is [mɑri:ḍ] (not [mɛri:ḍ]).[69] In DA, since a word like *Farīd* 'Farid (name)' is [fɛrīd],[70] this indicates that while 'm' in *marīḍ* is not emphaticised (the cue is in the following vowel), the presence of *ḍ* following *r* prevents the *imāla* affecting *r*, indicating that [A] here prevents *imāla* spread, even from *ī*, when there is no consonantal segment for it to dock onto, hence the *m* not being affected.

To conclude the above discussion, it seems that there is very likely a difference between [A] spread within the root, which I suggest is either at a higher

[68] Again, this is an issue that would benefit from acoustic analysis, which was not possible here, but which is left for future research.

[69] This compares interestingly with Iraqi complete de-emphaticisation [mɛri:ð]. This is the word that I always think of to exemplify dialectal variation in emphatic behaviour. In fact, as discussed, it is not so much the behaviour of the emphatics themselves, but other factors which affect what is commonly thought of as 'emphasis'.

[70] In fact, in normal speech, since the *a* is unstressed its realisation is central, but not low, [ə] (this is different from the realisation of *ə* in such contexts!).

(root) level, or is historical and thus lexicalised, whereas the evidence of affixes and *l* and *n* indicate that [A] spreads leftwards into coronal obstruents, but rightwards there is generally only segmental assimilation (co-articulation). In DA, the evidence is that [I] is suprasegmentally present (I assume at the right edge of domains), and spreads leftwards. This leftward spread is evidenced by words such as *maḅṣūṭ* 'happy (m.s.)',[71] where the emphatics prevent [I] from spreading. Otherwise one would expect **mabṣūṭ* [mɛbṣṵṭ]. Moreover, the few examples of *ā* being subject to *imāla* in DA (discussed presently), such as *māši* 'walking' and *bāli* 'worn out' (where *ā* is [æ:]) are in the context of front consonants with following *i* (the context in which this type of *imāla* of *ā* is found in other dialects), again indicating leftward spread. A last point here is that there do not appear to be [U] domains in DA, which is where it differs significantly from MB and Ḥōrāni.

With respect to representations, in DA, I think laryngeals have only a ROOT node, which for some reason gives them an [A] association. Since there are no [U] domains, anything else without an [A] in its representation is subject to [I] 'spread' (or domain). *r* is de-emphaticised by [I] in nucleus position only (generally not by adjacent [I] consonants). Also, [I] doesn't 'get a hold' in words like *bukra* 'tomorrow', or *baħr* 'sea', but is suprasegmentally 'associated' to all words and where it can get a hold it will. Thus, word-finally there is nothing to stop it being associated with any consonants which don't have [A] in their representation, hence e.g. *ṣəḍfe* or *xaṭwe* (despite [I] in the coronal emphatic, which is 'overpowered' by [A]). Lastly, since *k* behaves otherwise as in MB, I assume a similar representation (see Figure 6.4, above).

The final point here concerns a few forms which are reported in other Levantine dialects, although rarely in Damascus Arabic, and involve *imāla* of long *ā*. This is relevant because it supports my hypothesis concerning 'front' (or [I]) domains which refutes the analysis of labials as emphatic.

Cowell (1964:12) notes for DA that '*a* next to front consonants only is also somewhat raised and fronted by a following *i* or *e*, so that the *a* is slightly higher and more forward than standard', and he cites (for long *ā*) *māši* 'walking (m.s.)', *nāyem* 'asleep (m.s.)'. However, the relevance of this is that for much of Syria and Lebanon

[71] Cowell (1964:7) indicates this with emphatic labials, which I refute. However, the point is that they are not 'front'.

(but not Damascus) it is reported (Cowell, 1964:8) that there are minimal pairs isolating e.g. *ḅ* and *ṛ* from *b* and *r*. The examples given are very interesting because they tend to involve cross-morphemic domains, but they are often cited in the literature (and also for Cairene). These examples are as follows:[72]

(25)	'plain'		'velarized'	
	bāba	'her door'	*ḅāḅā*	'Daddy'
	mayyet	'dead (m.s.)	*ṃayy*	'water'[73]
	nāyem	'asleep (m.s.)'	*ṇāy*	'flute'
	žāri	'flowing (m.s.)'	*žāṛi*	'my neighbour'

What is interesting in all these examples is that they all involve morphemic boundaries which I believe affect *imāla*, i.e. [I] spread, meaning that they are not cases of minimal pairs in the strictest sense, and in the case of *ḅ ṃ* and *ṇ* don't involve 'emphatics' vs plain segments, and in the case of *ṛ* is also predictable. To take the case of *žāri* vs *žāṛi*, which are not distinctive in DA, but apparently are in other Syro-Lebanese dialects,[74] the adjectival form *žāri* is analogous to DA *māši*, where *ā* is subject to *imāla* because of the following *i*, and also because the intervening consonant is 'front'. However, in *žāṛi*, 'my neighbour', the 1PS possessive suffix *-i* is a clearly a much later suffix in terms of the stage of derivation,[75] and no *imāla* is

[72] Cowell (1964:7); I use his terminology 'plain' and 'velarized' here for demonstration, as well as his notation of supposed emphatics, although I maintain that these labials are not emphatic, and that 'plain' vs 'velarized' is not actually what the contrast is.

[73] Watson (2002:275) gives the minimal pair *mayyiti* 'dead (f.s.)' – *ṃayyiti* 'my water'; her examples of such minimal pairs involve some similar examples. Without knowing more about *imāla* in Cairene specifically I can't comment further on the other examples, but two interesting ones are *ṛāgil* 'man' vs *rāgiʃ* 'returning' and *ṛāʔid* 'major' vs *rāʔid* 'lying' because of the morphology of the forms (emphatic *ṛ* occurs in the nominal forms, and *r*, which appears to have been de-emphaticised due to *imāla*, occurs in the active participle forms). It may be the case that the *imāla* forms have lexical *i* whereas the other forms have schwa *ə* which is realised as [ɪ].

[74] Additionally, Watson (2002:275) gives *gāri* vs *gāṛi* for Cairene.

[75] In the terminology of Kaye (1989) this would be non-analytical (whereas the adjectival *ī* of *žāri* is analytical). Watson (2002) uses Level 1 and Level 2 morphology, showing how they relate to (Cairene and Ṣanᶜāni) Arabic. For her, although these suffixes are both Level 2, the possessive suffixes are much later than the adjectival. She notes in relation to examples such as those in (25) involving *r* that 'de-emphaticization of /ṛ/ is a process which is determined early in the derivation'. I go a step further in claiming that all the above examples are predictable precisely because of the non-analytical suffixes which mean that despite there being a suffix *imāla* doesn't occur, whereas with analytical suffixes an environment conducive to *imāla* occurs, meaning that [I] spreads leftwards, so that *a* is fronted. Where *imāla* doesn't occur, it is not that 'velarization' occurs, but that there is no *imāla* or [I] effect.

triggered. This is not dissimilar to *mayyet* and *nāyem*, where the *a* / *ā* is fronted through leftward [I] spread over a 'front' ([I]-specified) consonant. In *ṃayy* and *ṇāy*, the vowel is not fronted, because in *ṇāy* it is long but there is no *imāla* context (no following vowel), and in *ṃayy* the historical form is *mā'*, so although the vowel is phonetically shortened (because of the geminate *yy*) the non-frontness is retained. In such common forms as *ṃayy* it is likely that there is a degree of lexicalisation in the retention of the 'backness' (analogous perhaps to *aḷḷa* 'God', from **allāh*). In the word *ḅāḅa* 'Daddy', there is no context for *imāla* because of the final lexical *a* vowel (which is anyway historically long), whereas in *bāba* 'her door', the second *b* is stem-final, and, as seen for DA, in this environment labials are subject to [I] and are thus in a 'front' environment, meaning that the *-a* suffix is therefore the *-e* variant, and that the *ā* vowel is then subject to *imāla* (which in dialects which have more salient *imāla* of *ā* than DA means that *ā* is fronted to [æ:]). This in turn makes the labial sound 'front' as opposed to its basic state (which in a sense is 'neutral'). Therefore, while not many of these examples are specifically relevant to DA, they are relevant to other related or similar dialects (especially since DA is the only urban dialect dealt with in this chapter).

6.4 Moroccan[76]

The dialect analysed by Heath (1987) is that of Fes / Meknes, which is a sedentary (pre-Hilali) dialect. It is an interesting case to look at because of the well-known vowel reduction in these sedentary western dialects, which means that there are complex consonant clusters that are not found in other dialects. However, although this is an urban dialect, the sound system displays features which in eastern dialects are typically urban (such as the lack of interdentals), as well as some which in eastern dialects are typically non-urban (such as the three-way voicing contrast). It is therefore especially interesting to see how it compares to the eastern dialects already discussed. However, I should note here that while Heath (1987) is a detailed study, and moreover an analysis, and while it contains a considerable amount of data and

[76] See Chapter 5, §5.4.5.1.

detail, not as much data is available as that found for DA, MB and Ḥōrāni, and since the facts are somewhat complicated the analysis here is somewhat tentative.

The first place to start is with a discussion of the vowel system of Moroccan Arabic, since this greatly affects the facts presented. As noted in Chapter 5, it is well known that the Western dialects have greatly reduced vowel systems. In the dialect under discussion there appear to be no long vowels. I do not assume long vowels (i.e. VCV) which are phonetically shortened, but follow Heath's (1987) analysis of three 'full' vowels (i.e. lexical *i a u*), which roughly correspond to OA **ī ā ū*; I retain Heath's transcription of these, as follows. Firstly, *a* is backed [ạ] word-finally and next to emphatics, and fronted [ä] when all adjacent consonants are 'front'. Secondly, *i* = [i] (probably IPA [ɪ]) and *u* = [u] (probably IPA [ʊ]), except in emphatic / uvular environments, when they are [e] (probably IPA [ɛ]) and [o] (probably IPA [o]) respectively. OA short vowels (**i a u*) generally correspond in MCA to 'unrounded *ə*' and 'rounded *ŭ*'. Schwa *ə* has values ranging from [ɨ] – [ə̆] – [ə]; *ŭ* ranges from [ʊ] – [o]. Both of these are positionally restricted (word-medial only); *ŭ* 'regularly adjoins a velar or uvular C' (for which reason Heath proposes a set of labiovelars/uvulars, k^w etc, meaning that *ŭ* would be a variant of schwa, and schwa then 'epenthetic'). Moreover, where OA has short vowels, MCA often has no vowel, meaning that there are often quite complex consonant clusters.[77]

A second point to note here is that Moroccan Arabic has both *r* and *ṛ*, apparently phonemically. However, Heath (1987:297–302) observes that there is a 'complex synchronic situation' arising from this phonemic split. There are clearly instances where either *r* or *ṛ* can only be lexical, but there are other instances of variation indicating that there is still a degree of allophony, so that the split is not complete. Heath (1987:298) puts it thus:

> MCA has yet to fully resolve a structural conflict between an allophonic analysis in which /r/ and /ṛ/ are positional allophones of a single phoneme and a separate-phoneme analysis in which the two are lexically distinct. There is synchronic

[77] For a Government Phonology perspective on vowel–zero alternations in Moroccan, see Kaye (1990).

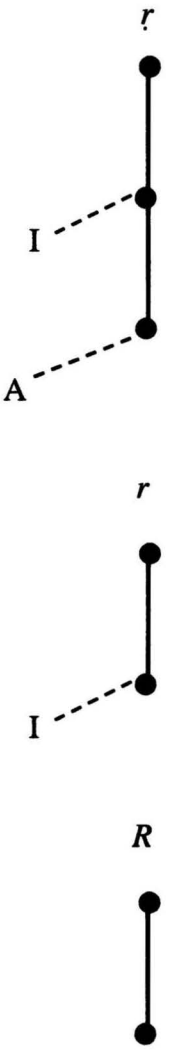
evidence for the continuing productivity of both models, but the separate-phoneme model is gradually displacing the allophonic one.

It is clear that the phonemic split arose from the situation seen in other dialects where *r* is generally 'back' (emphatic, but without actually itself spreading the emphatic property), but is 'de-emphaticised' next to *i*. Examples of phonemic *r* vs *ṛ* are *kbər* 'he grew up' and *kbəṛ* 'bigger' (among many others), whereas a non-phonemic distinction can be seen for instance in a certain singular > plural pattern, resulting in *zaṛ* 'neighbour', but the plural form *žiran* 'neighbours'. However, another indication that *ṛ* is sometimes phonemic and sometimes not is that sometimes *ṛ* itself spreads the emphatic property to other coronals, as in *ḍṛž-a* 'stair' (<OA **daraǰa*) and *ḍṛəṣ* 'study' (<OA **drus*). In both these forms, there is no other reason why *ḍ* and *ṣ* should be emphatic, since OA **d s* are both regularly maintained as *d* and *s* in MCA, and there are no other 'back' consonants in these words. However, one of the exceptions to the general preference in MCA for stems to have only emphatic coronals or only non-emphatic coronals is the example *tṛab* 'dirt', which is especially puzzling because *t* is to the left of *ṛ*, meaning that it would normally be emphatic, and also because they form a consonant cluster (and there are extremely few examples of non-homogenous clusters in MCA). Moreover, *t* is clearly distinct from *ṭ* in that there is a very salient aspiration contrast,[78] so this example is potentially puzzling, unless we suppose that *r* which appears to be back, but which de-emphaticises, is not lexically the same as *ṛ* or *r*, so that in the example of *tṛab* where *ṛ* does not spread [A] into *t*, it is not an emphatic which can spread [A]. That is, one would have to posit three lexical representations (phonemes) for what appear to be realised as *ṛ* and *r*. I suggest therefore that in MCA, there is emphatic *ṛ* which behaves as other emphatics in harmonising stems, there is non-emphatic *r* which is an [I] coronal, and there is

[78] In addition to other sources which show that Moroccan *t* and *k* are aspirated while *ṭ* and *q* are not, Heath (1987:17) states: '/t/ has a heavily aspirated and often affricate-like release...and may be represented phonetically as [t^{s}], while /ṭ/ consistently has an abrupt release'. He makes reference to the 'assibilation' of *t* in several places. Therefore, they are distinct enough that the difference would be salient in the example above.

another *R* which I assume to be unspecified for resonance elements. This can be seen as follows:[79]

Figure 6.8 The representation of the Moroccan rhotics



Such an analysis would explain why there are some instances where what appears to be emphatic *ṛ* does not spread [A] in the expected manner. In the example given, since *R* does not lexically have a resonance element, while it may sound emphatic next to *a* (or even assimilate), it can't actually spread this into *t*. Moreover, there are a few (albeit limited) examples of what I assume to be *R*, as follows:

[79] I do not assume a 'neutral' or resonance-unspecified representation for *r* in other dialects, because it does not fit with the facts. For instance, among other reasons, in Damascus Arabic, since the feminine suffix is lexically schwa, there would be no reason why *r* normally triggers the 'back' variant, when word-final consonants are otherwise targeted by [I] (as are the labials, for instance).

(26) *ṛḍḍ-u ~ ṛdd-u* 'give back (pl.)'
ṛaṣ-i ~ ṛas-i 'my head'

Otherwise, *ṛ* usually triggers other coronals to become emphatic (as in *dṛž-a* 'stair' and *ḍṛəṣ* 'study', above).

Heath (1987) notes that generally stems harmonise as to emphaticness. (27) below gives all the examples I found in his data which bear this out:

(27)	*ṣiṭ(ə)ṛ*	(<OA *sayṭara*)	'dominate'
	ṭṛṭəq		'explode, burst'
	ṭ-ṭṛṭiq		'exploding, bursting'
	t-ṣifəṭ		'be sent'
	ṣqəṭ	(<OA *squṭ*)	'fall' (MCA 'fail')
	ṣḍəq	(<OA *ṣduq*)	'be right'
	ṣṭəl	(<OA *saṭl*)	'bucket'
	ṣṭəħ	(<OA *saṭħ*)	'roof terrace'
	ḍṛəb	(<OA *ḍrib*)	'hit'
	ṭiẓ	(compare DA *ṭīz*)	'anus'

What is rather interesting in MCA, but also very puzzling, is vowel alternation. Firstly, there is one apparently invariant vowel in MCA: word-final *a*, for which all the examples given were the grammatical feminine suffix (including where this is part of a broken plural template), appears always to be the 'back' variant (which I assume from the acoustic measurements and Heath's description is something like IPA [ɑ]). Heath notes that 'word-final /a/, even following a plain C, has strikingly low F2 values',[80] and his acoustic measurements show it to be in the lower part of the range for medial [ạ]. It would seem logical, therefore, that the representation of this vowel is [A] (i.e. a headed expression). However, the fact that this is an invariant 'back' vowel indicates that in MCA we are looking at somewhat different processes from those

[80] Heath (1987:314).

seen for other dialects, since in other dialects the right edge of the stem is usually an [I] domain (unless this is blocked by an [A] consonant). Moreover, this, in conjunction with the fact that the vowels of western dialects such as MCA clearly work somewhat differently from the dialects we have seen previously, indicates that the vowels may be key to what is going on in MCA. However, the puzzling facts are prefixes where the vowel alternates but the consonants don't.

What we have seen in the data so far is that most stems have at most only one lexically filled vowel.[81] However, since very often the stem vowel is clearly schwa *ə*, positing something like headedness harmony (whereby the prefixal vowel would concord with the stem vowel in terms of headedness) can't be the answer, since schwa is a lexically unfilled nucleus, so there cannot be headedness. Let us look at the facts.

In the case of a consonantal prefix where no following vowel is realised, this seems to assimilate (in a segmental fashion) with the stem-initial consonant. This is seen, for example, with the definite article *l-* (which, as for other dialects, assimilates entirely to coronals except palatal *y*) or the verbal noun of a Form II verb: *ṭ-ṭṛṭiq* 'exploding, bursting', *ḍ-ḍaṛ* 'the house'. However, where there is a prefixal vowel with a consonant, the consonant does not become emphatic, while the vowel shows up as the back variant. This is seen, for instance, with *ta-n-ḍhək* 'I laugh', *ta-n-ḍənn* 'I think', *ta-n-šṛəb* 'I drink', where acoustic measurements[82] show these prefixal *a* vowels as emphatic [ạ], but Heath states: 'Certainly the /t/ of /ta-/ is never pharyngealized in these examples.' Interestingly, this effect is also seen with uvulars, which also lower the prefixal vowel: *ta-n-qyyəl* 'I spend the mid-day' and *ta-n-xrŭž* 'I go out' both had [ạ] for prefixal *a*. However, in stems with no emphatics or uvulars, the prefixal *a* is clearly fronted, as in *ta-n-dir* 'I do' and *ta-n-bus* 'I kiss'. Lastly, in a stem with a uvular preceded by a 'front' consonant, the effect is somewhere between: according to Heath's F_2 measurements of *a*, in *ta-n-tiq* 'I trust' the vowel is not in the range of values of 'emphatic' (and word-final) [ạ], but also clearly lower than the range of F_2 values of 'front' [ä]. Therefore, it appears to be in an 'intermediate' range, almost as if neutral. However, what is interesting is that these variations occur

[81] Looking at the data in Heath (1987), there are some derived forms (such as the diminutive) which have more than one lexical vowel, and also loan words (including what appear to be a couple of borrowings from Standard Arabic).
[82] Heath (1987:314–15).

apparently without any variation in the flanking prefixal consonants *t* and *n*, and that the vowel variation is triggered from a distance.

For this reason, I shall look at vowel representations here, and I propose that the MCA vowels have the following representations:

(28)	'full' vowels:	*i*	[I]	
		>	*e* in emphatic context	[A.I]
		u	[U]	
		>	*o* in emphatic context	[A.U]
		a	[A]	
		>	*ạ* in emphatic context	[A]
		>	*ä* in 'front' context	[A.I]
	'reduced' vowels:	*ə*	[ ]	
		ŭ	[U]	

Before discussing the relevance of this to the prefixal alternations, I should note that I mentioned above that word-final *a* is always 'back', and has the same range of F_2 values as *a* in a fully emphatic environment. I thus proposed its representation as [A]. However, this doesn't seem to spread leftwards (otherwise all stems would be emphatic), so it is likely therefore to be lexically [A], meaning that MCA doesn't allow word-final headless vowels (and note that schwa *ə* and 'reduced' *ŭ*, both of which have headless expressions, never occur word-finally). It is thus headless by virtue of being word-final rather than lexically headed.

Moving on to the prefixal alternations, Heath (1987:314–15) shows (through F_2 measurements) that in the case of stems containing an emphatic, e.g. *ta-n-ḍḥək* 'I laugh', *ta-n-ḍənn* 'I think' and *ta-n-šṛəb* 'I drink', the prefixal vowel is [ạ]. Additionally, in stems containing a uvular in the initial consonant (cluster), the prefixal *a* is also [ạ], as in *ta-n-qyyəl* 'I spend the mid-day' and *ta-n-xrŭž* 'I go out'. This contrasts with stems with no uvular or emphatic, where prefixal *a* is clearly fronted [ä], as in *ta-n-dir* 'I do' and *ta-n-bus* 'I kiss'. The puzzling case, however, is where the stem has a uvular and a preceding 'front' consonant, such as *ta-n-tiq* 'I

trust', where the vowel is not in the range of values of 'emphatic' (and word-final) [ạ], but yet it is clearly lower than the range of F_2 values of 'front' [ä]. In fact, it appears to be in an 'intermediate' range, almost as if neutral.

It is clear that this cannot be (leftward-spreading) vowel harmony (or rather headedness harmony), since many of these stems contain schwa, and since in *ta-n-tiq* the prefixal vowel is neither the 'back' variant, nor the 'front' variant. What therefore does seem likely is that MCA has [I] domains, triggered by [I]-specified consonants (in the data above, this clearly involves non-emphatic coronals, and labials are 'neutral' provided that no emphatic is present). These [I] domains seem rather weak in MCA, though. As noted, unlike other dialects seen, word-final [A] is not targeted by a suprasegmental [I]. Moreover, in *ta-n-tiq*, the presence of the stem-final uvular appears to prevent this [I] domain from spreading leftwards into the prefix, even though the uvular [A] doesn't itself cause backing of the prefixal vowel. In this sense, there is a conflict between [I] and [A], where [I] is 'overpowered' by the leftward effect of an [A] domain, but its presence prevents the effect of the [A] spreading further left.

The relevance of this to the vowel representations in (28) is as follows. As seen in (28), I assume that a lexical *a* is unheaded [A]. Firstly, an [A] domain (which is triggered by emphatics and uvulars) spreads [A] (at least leftwards) into nuclear positions and causes any lexically present nuclear [A] to be head. In an empty nucleus which is phonetically realised (schwa), [A] therefore has an effect (as seen earlier, in an emphatic context this schwa is realised as [ặ], in Heath's notation, which I take to be an '[A]-coloured' schwa),[83] but since [A] is not lexically present in this nucleus it is not headed. Secondly, in an [I] domain such as *ta-n-bus* (which shows that [I] domains are not affected by the presence of a labial), [I] spreads (at least leftwards) into the prefixal nuclear position, but since lexical [A] is not headed, the expression is

[83] In Chapter 3, I discussed the structure of the phonological representations of vowels. According to Nasukawa & Backley (2005), schwa has two potential realisations (not necessarily utilised in all languages): a nuclear structure (with no elements) with simply a root (FUNDAMENTAL) node is interpreted as a non-high central vowel such as [ʌ] or [ə], while bare RESONANCE is interpreted as a high central vowel [ɨ]. This could be applied to Arabic, in that the 'low' schwa has simply a root (FUNDAMENTAL) node, whereas the 'higher' schwa seen in front contexts terminates in bare RESONANCE. In fact, [ɨ] is the (schwa) vowel given for Moroccan in front contexts (see Kaye, 1990, on *ktib* 'he wrote'). One may prefer to see it as a slight phonetic smearing of [A] vs [I].

then (headless) [A.I]. Lastly, in a 'neutral' domain, such as *ta-n-tiq*, where the prefix is in neither an [I] nor an [A] domain, the vowel remains unheaded [A].

A last point of note here is that it is not clear why the prefixal consonants flanking prefixal *a* don't themselves create an [I] domain which would mean that the vowel would always be [ä]. It may be that *n* is not itself an [I] consonant, indicating that perhaps in MCA not all the coronals are [I]-specified. This would also show a leftward-spread only of [I] domains (triggered by a segmental [I]-specified consonant).

Unfortunately, without more clear data (and since I do not know this dialect myself), analysis in further detail is not possible. Despite this, however, it serves to show that dialects such as MCA, probably due to the rather different vocalic system, may behave rather differently from the other types of dialects seen in this chapter. Having said that, we can draw parallels with the other dialects in terms of the presence of [I] and [A] domains, and also in that these domains have a leftward spreading effect. It also seems that MCA is probably of the 'urban' type in not having the [U] domains seen for example in MB.[84] To conclude, it seems that while consonants trigger these suprasegmental domains, harmonisation of emphatic consonants works somewhat independently of (or at a different level from) the synchronic alternations of vowels and prefixes. This is seen for all dialects discussed here.

6.5 Conclusion

This chapter has looked at what is typically assumed to be 'emphasis' in four different dialects of Arabic. While this cannot be considered entirely representative of all Arabic dialects,[85] there are interesting parallels to be drawn which indicate that the dialects may be, to at least a reasonable degree, predictable in terms of 'backing' (or what is generally called 'emphasis') in relation to the overall sound system.

The first point is the classification of the dialects discussed. Muslim Baghdadi is *gilit* Mesopotamian, but an essentially urban dialect, although apparently

[84] Heath (1987) does notate 'emphatic' labials, and also proposes a set of labialised velars, which would fit with the idea that 'backed' velars are [U] consonants, not [A] consonants. However, the data were not clear (or numerous) enough to be able to see the interaction of this with emphatics and uvulars.

[85] Due to space and time constraints, it has not been possible to do that within the confines of this thesis.

sedentarised at a relatively later time.[86] In many respects the sound system is thus closer to Bedouin-type dialects than to the urban dialects of the Levant. Ḥōrāni Arabic, while rural Levantine, is also very conservative (apparently more so than many of the other rural Levantine dialects), and again seems more toward the Bedouin end of the continuum. By contrast, Damascus Arabic is urban, and its sound system is rather different to that of the previous two dialects. Lastly, the Moroccan Arabic of Fes / Meknes is essentially urban, although North African (western, where the other dialects are eastern).

MB clearly has [I] domains and emphatic domains, but additionally has clear [U] domains. While [I] domains are 'stronger' than [U] domains, it is the interaction of [A] domains with [U] domains which give MB a somewhat 'guttural'-sounding characteristic. Ḥōrāni also seems to have [U] domains, but apparently has less salient [I] domains than MB (or at least fewer [I] contexts, as discussed). This fits with it being non-urban. Damascus Arabic does not seem to have [U] domains, and although *imāla* of *ā* is not particularly salient (unlike other urban dialects of the region, and unlike *qeltu* dialects), the effect of *imāla* contexts ([I] domains) is very clear. Lastly, the urban Moroccan Arabic discussed here, while not conclusive, seems to be more of the urban type in that the sound system lacks the typical more 'Bedouin' characteristics of, e.g. interdental retention, and *q* > *g*, yet the [I] domains don't seem as strong as the eastern urban dialects. This may well correlate with the somewhat different vocalic system noted.

A point arising from the brief investigation presented here is that emphatic spread between coronals within stems appears to be different (noted especially for DA, as discussed) from synchronic spread at lower levels (into suffixes, etc). In this sense, I don't see that there is simply one process of 'emphasis spread', as is typically assumed. Moreover, as I have shown here, I disagree that labials or velars are actually emphatic (or rather, emphaticisable); rather, I see a process of *imāla* (which is usually assumed to be a type of vowel harmony, but which I argue is crucially involved in

[86] As noted in Chapter 5, Blanc (1964) concluded that the *qeltu* dialects were the 'original' sedentary dialects of Iraq, and that the *gilit* dialects reflect much later waves of (Bedouin) immigration. This is generally accepted, and borne out by the behaviour of the sound system. It has not been possible to compare MB with the *qeltu* dialects in this chapter, because the most informative work (Abu-Haidar, 1991) simply did not give enough detail of variation and there were no phonetic transcriptions.

creating [I] domains involving consonants), and this *imāla* creates an environment in which labials (and velars) are 'front'. This means that where labials are not in an *imāla* environment, they are free to assert their full characteristics (which would thus seem somewhat 'back', but which I argue is not 'emphasis').

I also argue that Arabic consonants do not necessarily have the same phonological representations in different dialects. This pertains particularly to velars (whether or not *k* is 'front'), but also, as seen in Chapter 3, to pharyngeal ʕ and, in terms of laryngeal contrasts, to voiceless obstruents (whether or not *t* is aspirated in comparison with *ṭ*). Moreover, for the dialect of Urban Moroccan seen here, it may well be the case that where other dialects of Arabic have *r* which is generally 'back' ([A]-specified), this dialect has not just 'front' vs 'back' *r*, but also an unspecified *r*. This fits with the observation that in this dialect, *n* may not be an [I] consonant, which leads me to assume that in MCA, only the coronal obstruents *t s d z* (precisely those which correspond to 'primary' coronal emphatics *ṭ ṣ ḍ ẓ*) are [I]-specified. Indeed, I commented above that MCA does not have very strong [I] domains, which also fits with such an analysis.

In this sense, MCA is somewhat intermediate, in that where the other dialect types seen have presumably developed an obstruent system where (almost) all its members are specified for a resonance quality (or element), this is not necessarily the case in MCA. Rather, in MCA, it is only the obstruents which directly oppose the emphatics in the sound system which are associated with [I].

A last point to be made here is the triangular relationship between the resonance elements [I], [U] and [A]. To some extent there is an affinity (in terms of backing) between the [A] and [U] elements, and it seems to be that both of these elements may equate with the auditory quality of 'darkness' (which usually contrasts in a sound system with the quality of 'clear' or 'slender'). However, the interaction of these elements with the 'non-dark' [I] is what seems crucial in the behaviour of what is typically assumed to be 'emphasis' (or lack of) in Arabic.

Chapter 7
Conclusion

This thesis is to be seen as the preliminary step towards a comprehensive typology and dialect geography of Semitic emphatics. The aim here has been to identify what exactly is meant by 'emphatic' in the Semitic context and to investigate how this may vary across Semitic languages. Chapter 2 investigated the phonetic correlates of 'emphatic', and showed that in some languages 'emphatic' equates to ejective, which functions purely as a laryngeal contrast within the sound system. In other languages, such as Arabic, the situation is more complex, however. While 'emphatic' may historically have been a laryngeal contrast, its primary function now is part of a more general 'front'–'back' contrast. Nevertheless, in many dialects there appears still to be a laryngeal contrast, in that emphatic voiceless stops are voiceless unaspirated, while the non-emphatic voiceless stops are aspirated; in other dialects, this contrast has neutralised. I showed that this neutralisation is an innovation, and in the dialects detailed here occurs in Eastern urban dialects and Western pre-Hilali; however, the retention of the three-way contrast is a conservative feature which we saw in Bedouin(-type) dialects and rural Levantine.

Since the aim here is to investigate emphatics within overall sound systems, and to be able to understand their phonological role and behaviour, in Chapter 3 I investigated the phonological representation of emphatics (and other relevant segments within the sound system). It transpired that in the standard GP view of segmental representations, the representation of (phonologically contrastive) ejectives was problematic, and I therefore proposed a geometric and contour structure to subsegmental representations, such that the various elements link to different nodes. I also argued that, in parallel with the elements [H] and [L], the element [?] functions not only as a 'manner' element, but also as a 'laryngeal' element, thus having a dual function in phonological representations. Lastly, I argued that emphatics and uvulars are characterised by 'secondary' [A], while pharyngeals have 'primary' [A].

Again, with the aim of understanding the role of emphatics across Semitic, in Chapter 4 I investigated the historical development of emphatics, arguing for the Proto-Semitic 'ejective' hypothesis. I looked at the trajectory proposed by Dolgopolsky (1977) and discussed the emergence of the pharyngeal character in Semitic. I then contextualised this by showing the changing phonological representations.

Since it is widely supposed that emphatics across the various dialects of Arabic behave differently, and since there have been widely varying theoretical analyses applied to the phenomenon of emphatics, in Chapter 5 I discussed Arabic dialect classification. I also discussed the issue of sound systems and noted a set of key phonological variables that could be evaluated for the various dialects. I then detailed the variables for representatives of each major dialect group.

Lastly, in Chapter 6, I looked more closely at data from four different types of dialects. I argued that while analyses of Arabic emphatics typically look at domains of 'emphasis spread', this is not the whole story. I investigated data that showed that there is not necessarily one process of spreading of an emphatic property, and argued that the Arabic consonantal system is characterised by resonance qualities, and it is this that varies cross-dialectally. Some dialects have salient [U] domains which are typically called 'emphatic', although I suggest that 'back' is a more appropriate term. In Arabic, the emphatics characterise [A] domains which typically oppose [I] domains. Therefore, what is often argued to be an 'emphatic' domain may actually be more accurately thought of as a non-[I] domain. For this reason, the phenomenon of *imāla* merits much closer attention.

Overall, then, in looking at the role of emphatics within sound systems such as (the various dialects of) Arabic, it is not only the emphatics that need looking at, but other aspects of the sound system, and especially 'fronting' contexts (*imāla*).

In this way, the thesis has highlighted areas in which further research would lead to the setting up of a comprehensive comparative typology and dialect geography of emphatics (and their role in sound systems), and also pointed out the directions in which further research could be taken. That is, that a comprehensive and consistent corpus of cross-dialectal data needs to be gathered, which could then be evaluated in

the same terms and with the same working assumptions and hypotheses across the dialects. The data should take into account factors such as laryngeal contrasts, but also evaluate factors such as vowel realisations not just in overtly emphatic contexts, but also in the various non-emphatic contexts discussed in Chapter 6.

The thesis has also shown that the investigation into emphatics is not confined to only one area of research, and thus makes a contribution to several sub-disciplines. Firstly, I have aimed to contribute to theoretical phonology, at least in the area of (consonantal) segmental representation as viewed in an element framework, but also in showing how a given phenomenon must be viewed in the context of its role in an overall sound system. Secondly, the thesis has related this to historical linguistics, and comparative Semitic studies. Thirdly, and perhaps most importantly, the thesis has aimed to contribute to Arabic dialectology. The approach here has therefore been firmly and intentionally cross-disciplinary, and I hope serves to show how disciplines not only overlap but benefit from one another.

For future research, the immediate aim is building on this thesis to set up a typology of emphatics. However, research undertaken during the course of this project (but too large in scope to be included here) indicated that other comparative studies could also arise from this. Firstly, one could look at the perceptual–auditory notion of 'darkness'. Generally, when we talk about languages which have 'dark' segments, we contrast them with 'light' or 'clear' segments, as for instance investigations into English 'dark' vs 'clear' *l*, or 'dark' vs 'light' consonants in Russian or Irish Gaelic. Since my investigation led me to conclude that Arabic emphatics had an *a*-quality (i.e. the [A] element), I wondered whether [A] could be effectively the 'dark' element. However, on looking at Russian[1] and Irish Gaelic,[2] it seemed that here 'darkness' patterns with *u*-quality. Moreover, a long (and ultimately distracting) investigation into pharyngealisation in the various North-East and North-West Caucasian languages[3] showed that pharyngealisation here is very different from Arabic. In Caucasian, pharyngealisation patterns phonologically with palatalisation, is

[1] See in particular Padgett (2001, 2003).
[2] See the classic work by Thurneysen (1946).
[3] See Bellem (2005a, 2005b).

phonetically very tense and somewhat rhoticised,[4] and induces both *a*- and *i*-quality in vowels; there is no sense of 'darkness', either. By contrast, Arabic does have this 'darkness', yet this seems to equate to non-*i*-quality, since while the emphatics are generally 'dark', so are the *u*-domains that we saw, for instance, in Muslim Baghdadi Arabic. The notion of 'darkness' therefore seems to be a phonological opposition to *i*-quality, and thus can equate to *a*- and / or *u*-quality, depending on the sound system of the language in question.

I close, therefore, by noting that this project has raised just as many questions as it has answered, if not more, and that this really does comprise just the starting steps towards setting up a phonological typology of Arabic dialects (or indeed Semitic languages generally).

En güzel deniz :
henüz gidilmemiş olanıdır.
En güzel çocuk :
henüz büyümedi.
En güzel günlerimiz :
henüz yaşamadıklarımız.
Ve sana söylemek istediğim en güzel söz :
henüz söylememiş olduğum sözdür...

25 Eylül 1945 - Nazım Hikmet

[4] The issue of retroflexion is also very interesting. Retroflexion may be another instance of where languages have 'front' ([I]-specified) coronals, which contrast with retroflexed ([A] and [I]-specified) coronals. Cross-linguistically, retroflexes tend to pattern with back (or non-front) vowels. The seminal works on this are Bhat (1973, 1974) and Hamann (2003). Flemming (2003) also discusses 'front' vs 'back' coronals.

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VOT Measurements (Chapter 2)

I Tigrinya

Table A1 *Tigrinya – VOT values (ms) of the 6 Tigrinya stops t, k, t', k', d, g; measurements of soundfiles from the archive of SOAS Phonetics Laboratory, spoken by an adult male*

(Chapter 2, Figure 2.6)

	token	VOT (ms)	mean	range
t	kətri	26	43	26 – 65
	läyti	65		
	tak'li	31		
	tak'li	27		
	tebgi	51		
	təlmi	62		
	təlmi	37		
	watäg	54		
	taħti	30		
	bərk'ətät	46		
k	kətri	49	65	49 – 79
	kəbri	68		
	kətri	65		
	kəbdi	66		
	kəbri	65		
	kəsel	74		
	kərammid	57		
	kərmed	62		
	kəbdi	69		
	kərete	79		
t'	gət'mi	66	53	34 – 69
	k'ət'mi	42		
	t'ak'mi	34		
	t'ərfi	46		
	t'esmi	69		
	t'efer	59		
	t'əzez	59		
	t'ubot	59		
	t'af	60		
	t'ub	35		

k’	berk’i	46	52	41 – 64
	dərk’i	47		
	k’asri	53		
	k’ərbi	54		
	k’ət’mi	41		
	k’ətri	55		
	wark’i	51		
	berk’i	46		
	k’arni	64		
	k’ərs’i	64		
d	därbi	-110	-99	-138 – -47
	dums’i	-109		
	dəbes	-118		
	därbi	-110		
	dərk’i	-47		
	dowel	-138		
	dəmbe	-78		
	dənget	-113		
	dugri	-108		
	daħri	-61		
g	gət’mi	-118	-110	-152 – -82
	nəfgi	-114		
	gəreb	-127		
	nəfgi	-92		
	goybi	-96		
	gobez	-131		
	gundi	-82		
	gohri	-92		
	gəmed	-152		
	gərħi	-95		

II Syrian Arabic

Table A2 *Syrian Arabic – mean VOT values (ms) of voiceless stops preceding [i], [a], [u] (n = 30); data from Jesry (1996); the results are his analysis of 10 tokens from 3 adult subjects for each of the 12 target CV sequences*

(Chapter 2, Figure 2.9)

	VOT (ms)		VOT (ms)		VOT (ms)	mean
ti	29	ta	24	tu	23	25
ṭi	24	ṭa	24	ṭu	23	24
ki	30	ka	32	ku	33	32
qi	31	qa	33	qu	22	29
mean	**29**		**28**		**25**	

Table A3 *Syrian Arabic – mean VOT values (ms) of voiced stops preceding [i], [a], [u] (n = 30); data from Jesry (1996); the results are his analysis of 10 tokens from 3 adult subjects for each of the 9 target CV sequences*

(Chapter 2, Figure 2.10)

	VOT (ms)		VOT (ms)		VOT (ms)	mean
bi	-67	ba	-67	bu	-75	-70
di	-67	da	-65	du	-68	-67
ḍi	-62	ḍa	-69	ḍu	-74	-68
mean	**-65**		**-67**		**-72**	

III Lebanese Arabic

Table A4 *Lebanese Arabic – mean VOT values (ms) of voiceless stops preceding [i], [a], [u] (n = 64); data from Yeni-Komshian et al. (1977); the results are their analysis of 8 tokens from 8 adult subjects for each of the 12 target CV sequences*

(Chapter 2, Figure 2.12)

	VOT (ms)		VOT (ms)		VOT (ms)	**mean**
ti	30	ta	20	tu	25	**25**
ṭi	35	ṭa	15	ṭu	20	**23**
ki	30	ka	25	ku	30	**28**
qi	35	qa	30	qu	25	**30**
mean	**33**		**23**		**25**	

Table A5 *Lebanese Arabic – mean VOT values (ms) of voiced stops preceding [i], [a], [u] (n = 64); data from Yeni-Komshian et al. (1977); the results are their analysis of 8 tokens from 8 adult subjects for each of the 9 target CV sequences*

(Chapter 2, Figure 2.13)

	VOT (ms)		VOT (ms)		VOT (ms)	**mean**
bi	-40	ba	-80	bu	-75	**-65**
di	-40	da	-60	du	-70	**-57**
ḍi	-50	ḍa	-65	ḍu	-65	**-60**
mean	**-43**		**-68**		**-70**	

IV Muslim Baghdadi vs Cairene Arabic

Table A6 *Muslim Baghdadi and Cairene Arabic – means and ranges of VOT values (ms) of [ṭ] and [t] (n = 4); data from Heselwood (1996); the results show the means of 4 tokens for each of 4 speakers, labelled B1–B4 for Baghdadi and C1–C4 for Cairene; the ranges are across the total 16 tokens per target*

(Chapter 2, Figures 2.15–17)

t / ṭ	(Cairene) subject	mean VOT (ms)	group mean	range (ms)	group range	Baghdadi (subject)	mean VOT (ms)	group mean	range (ms)	group range
t	C1	41.3	33.3	36–46	16–50	B1	29.3	31.4	19–48	19–51
	C2	26.5		16–31		B2	29.3		27–31	
	C3	41.3		33–50		B3	21.5		19–25	
	C4	24		21–29		B4	45.8		32–59	
ṭ	C1	51	35.4	41–63	15–63	B1	14.3	15.5	13–15	9–31
	C2	26.5		15–44		B2	14.8		12–19	
	C3	35.8		20–51		B3	11		9–15	
	C4	28.3		18–36		B4	22		15–31	

V Muslim Baghdadi Arabic

Table A7 *Baghdadi Arabic analysis 1 – VOT values (ms) of 4 voiceless stops in word-initial position (per token), means (n=6) and ranges shown; data from the soundfiles accompanying Alkalesi (2001, Lessons 9–16), of one adult male subject*

(Chapter 2, Figures 2.18–19)

token	VOT (ms)	mean	range
tara	37	31	28 – 37
tara	37		
tara	28		
tara	28		
tara	29		
tara	28		
ṭabʕan	10	11	9 – 14
ṭabʕan	14		
ṭabʕan	9		
ṭabʕan	10		
ṭawābiʕ	9		
ṭawābiʕ	12		
kam	38	39	31 – 45
kam	40		
kabīr	31		
kabīr	45		
kabīra	39		
kabīra	43		
qadīm	7	15	7 – 24
qadīm	23		
qadīm	15		
qadīm	9		
qadīma	14		
qadīma	24		

Table A8 *Baghdadi Arabic analysis 1 – VOT values (ms) of 4 voiced stops in word-initial position (per token), means (n=6) and ranges shown; data from the soundfiles accompanying Alkalesi (2001, Lessons 9–16), of one adult male subject*

(Chapter 2, Figures 2.18–19)

token	VOT (ms)	mean	range
basma	-21	-41	-65 – -21
basma	-37		
basma	-27		
basma	-48		
basma	-65		
basma	-49		
darras	-48	-47	-62 – -22
darras	-56		
daqīqa	-22		
daqīqa	-44		
dalīl	-49		
dalīl	-62		
ḍābuṭ (</ðābuṭ/)	-85	-76	-92 – -56
ḍābuṭ (</ðābuṭ/)	-92		
ḍaxma	-66		
ḍaxma	-72		
ḍaxum	-56		
ḍaxum	-84		
gabul	-55	-47	-61 – -30
gabul	-51		
gabul	-30		
gabul	-36		
gaṣṣ	-61		
gaṣṣ	-46		

Table A9 *Baghdadi Arabic analysis 2 – VOT values (ms) of 4 voiced stops in word-initial position (per token), means (n=6) and ranges shown; data from the soundfiles accompanying Alkalesi (2001, Lesson 1), of one adult male subject*

(not shown in Chapter 2, Figures A1–2, below)

token	VOT (ms)	mean	range
bana	-106	-105	-68 – -124
bana	-107		
banna	-110		
banna	-68		
beet	-124		
beet	-116		
darb	-102	-87	-45 – -122
darb	-122		
daar	-88		
daar	-78		
daras	-45		
daras	-89		
ḍarb	-125	-122	-72 – -178
ḍarb	-178		
ḍaar	-100		
ḍaar	-72		
ḍaaf	-107		
ḍaaf	-151		
gash	-68	-73	-61 – -94
gash	-78		
garram	-74		
garram	-94		
gaal	-61		
gaal	-63		

Figure A1 *Baghdadi Arabic analysis 2 – mean VOT values (ms) of voiced stops (n=6); data from the soundfiles accompanying Alkalesi (2001, Lesson 1), of one adult male subject*

(actual results in Table A9, above)

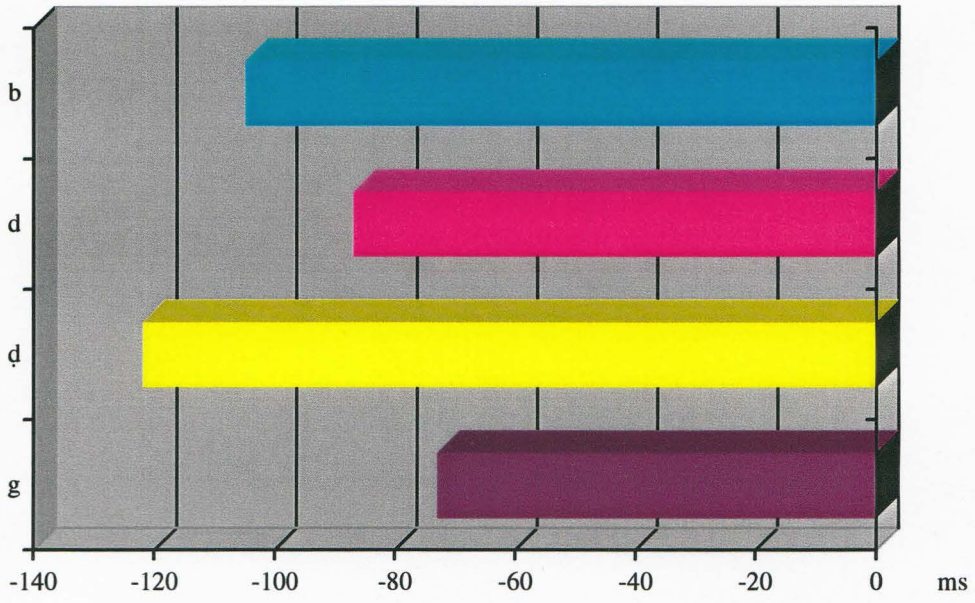


Figure A2 *Baghdadi Arabic analysis 2 – ranges of VOT values (ms) of voiced stops (n=6); data from the soundfiles accompanying Alkalesi (2001, Lesson 1), of one adult male subject*

(actual results in Table A9, above)

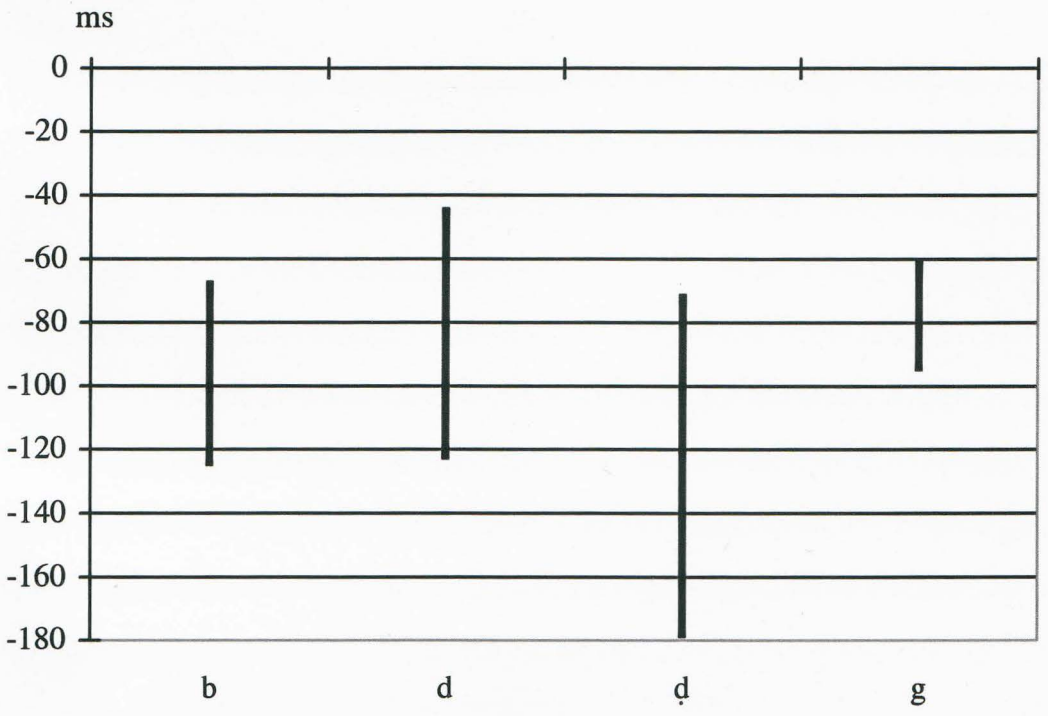


Table A10 *Baghdadi Arabic analysis 3 – VOT values (ms) of 4 voiced stops in word-initial position (per token), means (n=10) and ranges shown; data from the soundfiles accompanying Alkalesi (2001, all lessons), of one adult male subject*

(not shown in Chapter 2, Figures A3–4, below)

token	VOT (ms)	mean	range
batt	-99	-86	-143 – -30
batt	-136		
baṭṭ	-127		
baṭṭ	-143		
biʕīd	-85		
biʕīd	-59		
bāqi	-30		
bāqi	-71		
biʕīd	-58		
biʕīd	-54		
dār	-90	-74	-90 – -46
dār	-77		
dār	-62		
dār	-66		
daras	-64		
daras	-77		
daras	-46		
daras	-87		
darras	-79		
darras	-89		
ḍāf	-105	-100	-179 – -56
ḍāf	-143		
ḍār	-99		
ḍār	-72		
ḍarb	-123		
ḍarb	-179		
ḍaxma	-69		
ḍaxma	-72		
ḍaxum	-56		
ḍaxum	-82		

gāl	-61	-44	-84 – 12
gāl	-63		
gul-li	-52		
gul-li	-44		
gidar	-84		
gidar	-66		
girīb	-40		
girīb	-30		
giddām	-9		
giddām	+12		

Figure A3 *Baghdadi Arabic analysis 3 – mean VOT values (ms) of voiced stops (n=10); data from the soundfiles accompanying Alkalesi (2001, all lessons), of one adult male subject*

(actual results in Table A10, above)

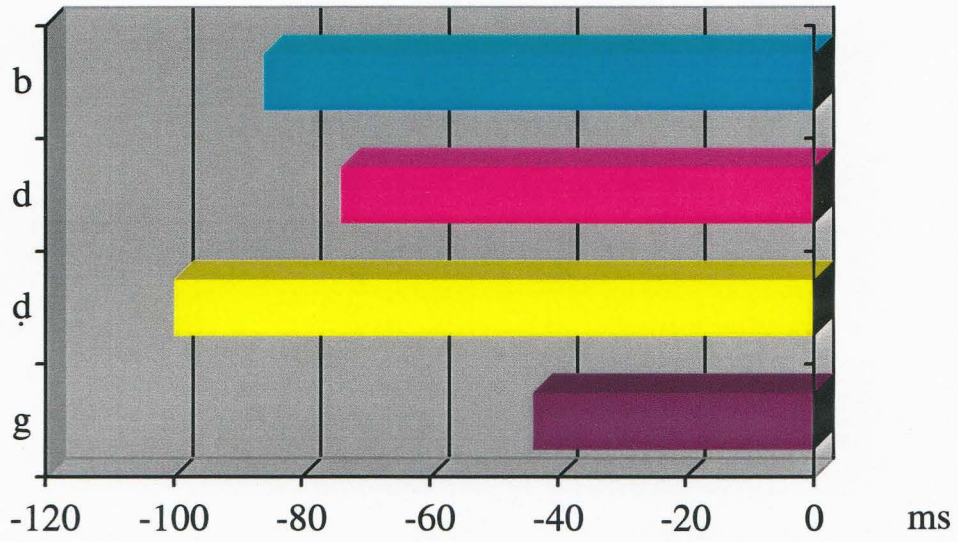
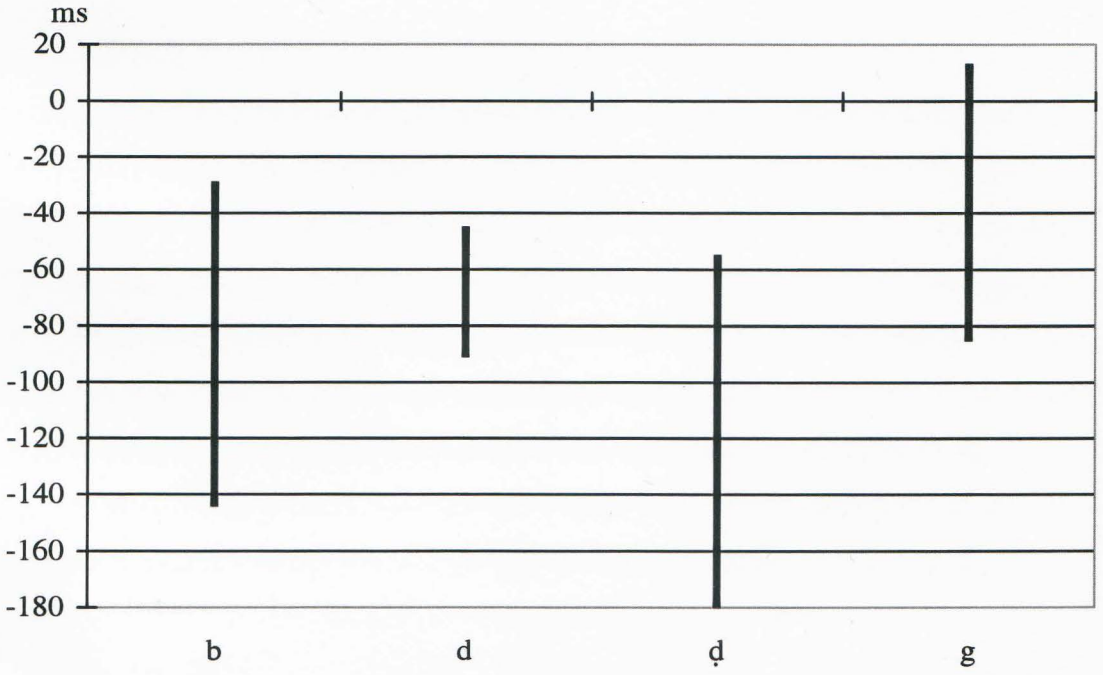


Figure A4 *Baghdadi Arabic analysis 3 – ranges of VOT values (ms) of voiced stops (n=10); data from the soundfiles accompanying Alkalesi (2001, all lessons), of one adult male subject*

(actual results in Table A10, above)



VI Saudi Arabian Arabic

Table A11 *Saudi Arabic – VOT values (ms) of the voiceless coronal stops [t] [ṭ] (per token), showing means (n=9) per subject (total 7 subjects – group mean also shown); data from the soundfiles of the KACST database*

(Chapter 2, Figures 2.20–7)

	Subject A	A mean	Subject B	B mean	Subject F	F mean	Subject G	G mean	Subject H	H mean	Subject M	M mean	Subject Y	Y mean	Group mean
taz	20		50		46		26		33		34		30		
tuz	22		28		40		36		35		42		44		
tiz	24		34		42		27		27		46		47		
zataz	30		30		43		22		24		50		?*		
zutuz	24	26	39	33	56	44	32	30	27	25	56	47	47	41	35
zitiz	40		39		51		44		22		64		55		
zattaz	17		15		55		24		10		52		37		
zuttuz	30		28		28		29		29		40		33		
zittiz	23		31		34		28		19		43		34		
ṭaz	16		7		12		16		**		21		19		
ṭuz	16		13		9		13		11		30		19		
ṭiz	17		7		8		13		13		42		14		
zaṭaz	17		17		12		9		15		18		12		
zuṭuz	18	18	13	11	16	12	14	12	19	12	31	30	9***	14	16
ziṭiz	16		14		16		13		11		46		22		
zaṭṭaz	19		10		7		9		10		27		14		
zuṭṭuz	18		10		11		9		10		23		7		
ziṭṭiz	27		7		15		8		9		30		12		

* It was not possible to measure this token as the release was not distinct.

** This soundfile is blank.

*** 9ms between release and appearance of F_2; however, this segment is actually fully voiced.

Table A12 *Saudi Arabic – VOT values (ms) of voiceless dorsal stops [k] [q] (per token), showing means (n=9) per subject (total 7 subjects – group mean also shown); data from the soundfiles of the KACST database*
(Chapter 2, Figures 2.20–7)

	Subject A	A mean	Subject B	B mean	Subject F	F mean	Subject G	G mean	Subject H	H mean	Subject M	M mean	Subject Y	Y mean	Group mean
kaz	48		44		36		32		38		55		58		
kuz	36		69		55		35		38		49		63		
kiz	27		52		65		42		62		70		100		
zakaz	40		34		42		34		36		42		38		
zukuz	28	33	45	46	35	52	25	32	40	41	55	48	48	54	44
zikiz	39		52		63		45		45		50		48		
zakkaz	25		35		37		27		34		38		43		
zukkuz	28		36		55		27		33		35		42		
zikkiz	30		48		83		24		40		39		49		
qaz	36*		27		25		17		30**		15		15		
quz	14		19		20		16		22		18		11		
qiz	16		35		26		11		14		17		15		
zaqaz	24		14		15		19		18		21		?***		
zuquz	22	23	17	19	33	23	11	13	13	18	25	17	11	11	18
ziqiz	21		13		28		10		30		16		11		
zaqqaz	30		14		16		10		22		15		8		
zuqquz	31		15		19		11		10		15		8		
ziqqiz	15		13		21		13		6		12		10		

* This segment is clearly not aspirated, as apparent from the spectrogram, but appears to be released in three phases (i.e. the release is sloppy).
** This segment is clearly not aspirated, as apparent from the spectrogram, but appears to be released in two phases (i.e. the release is sloppy).
*** It was not possible to measure this token as the release was not distinct.

Table A13 *Saudi Arabic – VOT values (ms) of voiced stops [b] [d] [ḍ] (per token), showing means (n=3) per subject (total 7 subjects – group mean also shown); data from the soundfiles of the KACST database*

(Chapter 2, Figures 2.20–7)

	Subject A	A mean	Subject B	B mean	Subject F	F mean	Subject G	G mean	Subject H	H mean	Subject M	M mean	Subject Y	Y mean	Group mean
baz	-89		-137		-139		-98		-24		-51		-78		
buz	-77	-83	-70	-107	-71	-109	-62	-70	0	-14	28	-23	-37	-34	-63
biz	-84		-113		-117		-50		-17		-47		14		
daz	-97		-125		-124		-59		9		28		-46		
duz	-82	-88	-97	-112	-100	-111	-70	-59	-45	-38	20	23	-100	-74	-66
diz	-86		-113		-108		-49		-77		22		-77		
ḍaz	-92		-94		-96		-62				***		-133		
ḍuz	-90	-89	-98	-104	-99	-105	-63	-56*		**	-41****	-43	-60	-94	-84
ḍiz	-86		-119		-119		-43				-45		-88		

* These were a little harder to measure as they were produced as dentals and slightly fricated.

** This subject produced all three tokens of *ḍ* as a strongly fricated *ð̣*. VOT measurements are therefore unobtainable.

*** This token was produced as a fricative and therefore VOT was not obtainable.

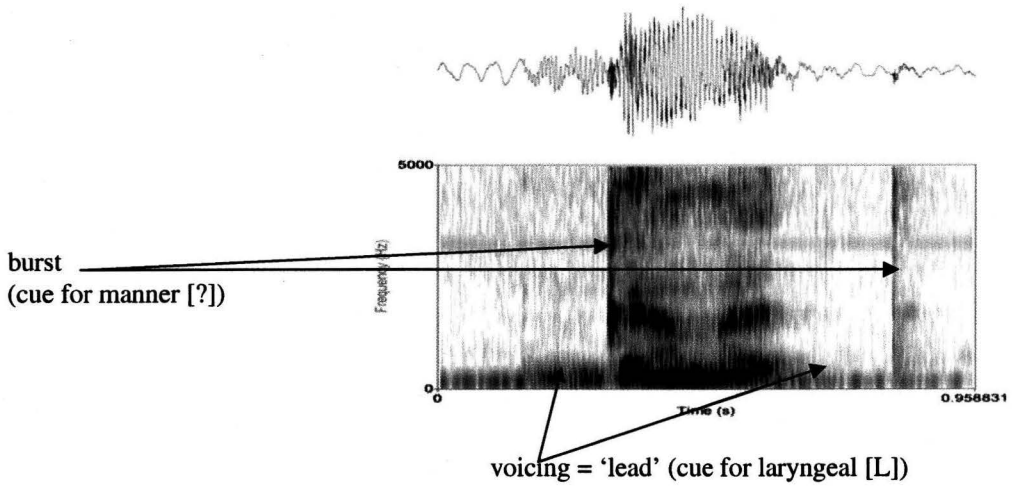
**** Both this token and the following (*ḍuz* and *ḍiz*) were produced as interdentals, somewhat fricated, but there were clear releases and clear periods of pre-voicing.

Table A14 *Saudi Arabic – means and ranges (n=9 for voiceless stops, n=3 for voiced stops) of VOT values (ms) for each of the 7 stops, per subject (group mean also shown); data from the soundfiles of the KACST database*

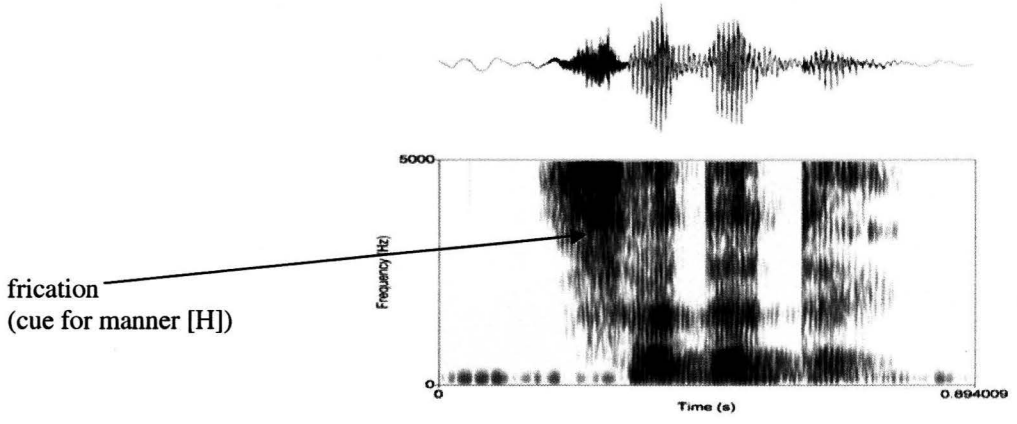
(Chapter 2, Figures 2.20–7)

	A mean	A range	B mean	B range	F mean	F range	G mean	G range	H mean	H range	M mean	M range	Y mean	Y range	Group mean
t	26	17–40	33	15–50	44	28–56	30	22–44	25	10–35	47	34–64	41	30–55	35
ṭ	18	16–27	11	7–17	12	7–16	12	8–16	12	9–19	30	18–46	14	7–22	16
k	33	25–48	46	34–69	52	35–83	32	24–45	41	33–62	48	35–70	54	38–100	44
q	23	14–36	19	13–35	23	15–33	13	10–19	18	6–30	17	12–25	11	8–15	18
b	-83	-89 – -77	-107	-137 – -70	-109	-139 – -71	-70	-98 – -50	-14	-24 – 0	-23	-51 – 28	-34	-78 – 14	-63
d	-88	-97 – -82	-112	-125 – -97	-111	-124 – -100	-59	-70 – 49	-38	-77 – 9	23	20 – 28	-74	-100 – -46	-66
ḍ	-89	-92 – -86	-104	-119 – -94	-105	-119 – -96	-56	-63 – -43	?		-43	-45 – -41	-94	-133 – -60	-84

(iv) [gəmed]



(v) [sedede]



The spectrograms above show the acoustic cues that typically correlate with (or map onto) the three elements [H], [L] and [?] in their roles as manner elements and laryngeal elements.[4] Note that where the cue for the 'edge' element [?] in its manner role (i.e. in a segment interpreted as a stop) is labelled as 'burst' in Figure 3.1 above, the cue is more strictly defined, as earlier, as an 'abrupt and sustained drop in overall amplitude', the abruptness of which is seen in the 'burst', as labelled.

It will be noted here that since plosives are represented by expressions containing the 'edge' element [?], we need to investigate further to deduce what differentiates 'plain' plosives from ejectives. That is, for example, if a 'plain'

[4] With the exception that the acoustic cue for [L] as manner (contributing nasality) hasn't been specifically shown.