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RESEARCH

The phonology and micro-typology of Arabic R

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The R sound exhibits considerable variability both across and within Arabic dialects; one that covers place and manner of articulation, as well as the notorious emphatic-plain distinction. Some R phones are in contrastive distribution, while others are contextually conditioned or free variants. This article aims to establish the underlying R phonemes in the spoken varieties of Arabic, evidence of which is sought in R's dialect-specific phonological behavior: in minimal pair contrasts, distributional phenomena, loanword phonology, and phonological processes that target or are triggered by R. Investigation of such evidence reveals four major patterns based on the nature and number of R phonemes, consequently classifying Arabic dialects into four types: the split-R dialects (primarily Maghrebi and Egyptian dialect groups), the emphatic-R dialects (the Levantine group), the plain-R dialects (the Gulf group together with most peripheral dialects), and the uvular-R dialects (the *qeltu*-dialects of Mesopotamia). The analysis employs a minimalist, contrast-based model of feature geometry to characterize aspects of the attested R's – such as emphatic-ness, coronality, dorsality, and sonority – and shows that the typology is directly mirrored in the representation. This has theoretical implications as well. Diverse rhotic representations within closely related language varieties demonstrate that distinctive features should not be interpreted as rigidly as is often assumed, and call attention to the semi-arbitrary relationship between phonetics and phonology.

Keywords: Arabic dialects; rhotics; emphatic R; uvular R; feature geometry; phonology

1 Introduction

This article is the first thorough and systematic treatment of the phonological behavior of rhotics in the geographically disperse varieties of spoken Arabic. As in many other languages, rhotics constitute a phonetically heterogeneous class in Arabic, which contains taps, trills, fricatives, approximants, emphatics, among other members. Recognized regional variation concerns what comprises the underlying rhotic phonemes, chiefly with reference to the status of emphatic and non-emphatic R, and the uvular R in a few dialects. But although Arabic is a well-researched language, none of the existing literature has surveyed R variation before. (Capital R is used here as a phonological/phonetic cover term for all forms of rhotic sounds).

Our task is to explain the multiplex ties of those R sounds, in order to determine whether the difference between them is contrastive or predictable in each of the major regional dialects. To achieve this, we look for clues in distributional and segmental phenomena, which also help us formalize the feature composition of the various R phonemes. The outcome is a phonologically informed classification of R in Arabic dialects, and a fresh contribution to our understanding of this puzzling sound.

On the theoretical end, the paper makes several strong proposals about the structure of phonological features and the nature of phonological contrast. First, it makes the claim that features are emergent, phonologically grounded, and language-specific; and does so by

articulating representations within the highly abstract Parallel Structures Model. Second, it substantiates the related claim that rhotics can be better defined by their distributional and phonological patternings than by specific phonetic characteristics. And third, it proposes that a strong structuralist position on phonemic contrast is sufficient for describing the representational categories of a language or language variety.

The paper also provides a good case study demonstrating the elusive behavior of R within a language. In particular, it argues that R can have a featural composition in one dialect and a different composition in another – contingent upon phonological behavior. Take, for example, the place of articulation of phonetically alveolar R, where we find three specifications: primary [coronal], primary [coronal] and [dorsal], and primary [coronal] with secondary [dorsal]. Such discrepancies provide support for a weak or semi-arbitrary relationship between phonological entities, in the form of natural classes or features, and their phonetic expression.

The structure of the paper is as follows. Section 2 states some of the notable theoretical challenges in studying rhotics and introduces the representational model used in the analysis. Section 3 presents a literature review of Arabic R, covering its phonetic variation, followed by the research questions I try to answer and the typology that ensues from those answers. Sections 4 through 7 provide a thorough investigation of R behavior in each of the resulting types of Arabic dialects. The goal is to determine the R phoneme(s) in each class and to infer their featural makeup. Section 8 summarizes the R representations and concludes.

2 Theoretical backdrop

Although very common across the world's languages, rhotics pose a serious challenge to both phonologists and phoneticians. Problems start with simple claims like "language L has a phoneme /r/" (Scobbie 2006: 337), combined with the facts that R tends to form a category on its own and to display astonishing phonetic variation. In this section, I explore rhotic variation in general, problematize the concept of an autonomous "rhotic" class, and suggest a solution through abstract representational frameworks. Next, I introduce the specific model of feature geometry utilized in the paper.

2.1 A class of rhotics?

Hyper-variation in R spans virtually every aspect of its articulation (Lindau 1985; Ladefoged & Maddieson 1996). In terms of manner of articulation, all non-stops are possible: from trills and taps/flaps to fricatives, approximants, and even vowels. In terms of place, R can be either coronal, articulated by the front part of the tongue against the dental/alveolar or post-alveolar region, or dorsal, articulated by the tongue dorsum against the velum or uvula. And while most R-sounds are voiced, voiceless allophones are commonplace, and voiceless phonemes are not unknown either. Such variation is present across languages as well as across dialects of the same language. Also within a single variety, it is usual to find free and phonologically-conditioned allophony for the usual single R-phoneme (Wiese 2011), or less usually two or more contrasting R phonemes (Maddieson 1984).

A key question is, then, do these phonetically diverse R-sounds form a class? From the above, it is neither manner nor place of articulation that unifies them (Ladefoged & Maddieson 1996: 215). Nor is there a single acoustic property, either. Lindau (1985), for instance, rejects a lowered third formant as a common denominator. So, with no phonetic similarity among them, rhotics have a merely conventional class membership based on orthography and/or diachrony.

However, despite their large phonetic diversity, rhotics exhibit unmistakable phonological homogeneity, often behaving as a class in terms of distribution and phonological

activity; see Wiese (2001; 2011). Phonotactically rhotics appear in positions reserved for sonorants, even when the actual realization is non-sonorant (Chabot 2019: 8). For instance, they tend to have syllabic variants, and to be closer to the syllable nucleus when part of complex onsets or codas (Proctor 2009) – two properties they share with laterals and nasals. They also tend to merge with contiguous vowels, and to alternate with other rhotics (Ladefoged & Maddieson 1996). On that account, the term "rhotic" is warranted.

But even if rhotics seem to work as a class, a feature like [+rhotic] (Hall 1997) appears circular and *ad hoc*, as it merely offers a label with no phonetic meaning; see Wiese (2001) and Sebregts (2014). Chabot (2019: 5) argues, rightfully, that there is nothing exceptional about the behavior of R that would justify the introduction of a new phonological feature. Rhotics, he continues, "are sonorant phonemes like any other", and they are only special because of their phonetic heterogeneity. After all, if there is no exclusive set of rhotic sounds (Scobbie 2006), then why should there be a feature, or set of features, associated exclusively with rhotics? This appears like a representational conundrum, at least for theories that require universal, phonetically-grounded features; but less so for theories that assume phonologically abstract, non-universal features (see Chabot 2019), such as those used in this study.

2.2 Minimalist feature geometry

To offer a representational analysis of Arabic R, I will adopt a fairly standard version of the Parallel Structures Model (PSM; Morén 2003; 2006; 2007; *inter alia*). The PSM is a modular, minimalist, and contrast-based model of feature geometry in which consonants and vowels exhibit parallel structures and identical features for place, manner, and laryngeal articulations. It incorporates insights from various other proposals, particularly Unified Place Theory (Clements 1991; Clements & Hume 1995), Dependency Phonology (Anderson & Ewen 1987), and Element Theory (Harris & Lindsey 1995).

Features in the PSM are abstract entities in that they are not phonetically determined, and they are specified in the geometry only if there is positive phonological evidence for their existence (cf. Anderson 1981; Clements 2001). In other words, only distinctive features are ever used in the grammar, whereas redundant features that make no difference in phonological patternings are eliminated. It follows that we should not expect identity across languages, or varieties of the same language, with respect to the composition of particular segments, even though we do find overwhelming similarity due to the universal phonetic properties of speech sounds. By parallelism in features we mean that they refer to broadly defined phonetic properties that may describe consonants and vowels alike. All features are supposed to be learned, rather than hard wired, à la Emergent Feature Theory (Mielke 2008). They are treated as cognitive categories, "discovered" on the basis of actual linguistic input.

How a particular terminal feature is interpreted in the PSM depends on its relationship to a superordinate node in the representational hierarchy. As illustrated in Figure 1, each place, manner, or laryngeal feature can be associated with a C-class or a V-class node, and the V-node is dependent on the C-node. The motivation behind this architecture is to create a unified machinery that captures consonant-vowel interactions and acoustic/articulatory parallelisms in natural language. To account for their asymmetries, consonants are allowed to have both C- and V-terminal features, while vowels can only have the latter. Another architectural mechanism of the model is building complex structures from simpler ones which, together with the dependency principle, ensures an effective degree of representational economy.

The three basic node types in the PSM deserve some elaboration here. Under the Place tier, we will use the articulator-based place features [labial], [coronal], and [dorsal] under the C-place node and its daughter V-node (cf. Clements 1991). Simple consonants

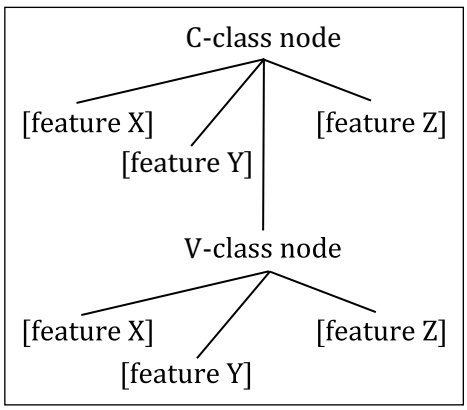

Figure 1: PSM basic geometry.

have one place feature; a plain /r/, for example, could be specified for C-place [coronal]. Complex consonants have multiple features on the same place node (Morén 2003: 233); so a more complex type of /r/ could have C-place [coronal] *and* C-place [dorsal]. Finally, consonants with secondary articulation have features on both C-place and V-place nodes; hence a pharyngealized /r$^{\varsigma}$/ could be specified for V-place [dorsal] in addition to C-place [coronal].

The structure of the Manner tier parallels that of the Place tier: a V-manner node is nested in a C-manner node, and both nodes make use of the loosely defined features [open] and [closed]. This arrangement neatly reflects the relative sonority of segments (Morén 2003: 222–223); so for instance a sonorant R could be represented by a combination of C-manner [open] and V-manner [closed], whereas a fricative R would have only C-manner [open]. Finally, the Laryngeal tier has the same architecture. For present purposes, however, C-laryngeal [lax] will be sufficient to distinguish voiced from voiceless obstruents (see Morén 2003: 230).

When we discuss segmental representations in the PSM, it is crucial to separate underlying from surface levels. Our concern is contrastive phonemes, not predictable allophones and phonetically-driven changes, which can be supplied by rule. The feature composition of these phonemes is based on their phonological distribution and activity, as directly observable in the surface data. As a consequence, the PSM forces us to look carefully at a wide range of phonetic details and (morpho)-phonological alternations in individual languages and to take into account the fine interactions between different processes. And this is what I will attempt to do here.

3 What we know about Arabic R

Arabic rhotics display phonetic and phonological variation that echoes what they do in other languages, although relatively little has been uncovered about it. The first part of this section offers an overview of the phonetic variation as described in the literature. This would help us understand and analyze the phonology of R across Arabic dialects, which is our task in the remainder of this paper. The second part presents the research questions addressed in the study and introduces a map of the typological groups that unfold.

3.1 Phonetic variation

In most Arabic dialects, the rhotic is realized as a voiced dental/alveolar tap or trill (Younes 1994; Watson 2002). The singleton R is often a tap [ɾ], a single short apical closure, whereas the geminated R is a trill [r]. According to Ladefoged & Maddieson (1996: 219), this is generally the case for languages that regularly distinguish between singleton and

geminated consonants, such as Italian and most varieties of Arabic. Arabic trills are found where the templatic pattern dictates a geminate in morphologically and semantically predictable classes. And phonotactically, they arise only where geminates are licensed: in intervocalic and final post-vocalic positions. Taps have no such restrictions. And it is reasonable, therefore, to treat the trills as geminated taps instead of independent phonemes, in parallel with other doubled consonants.[1] For simplicity, I will use [r] for the single tap and [rr] for the geminate.

In addition to the alveolar tap/trill realizations, we find R realized with no contact between the articulators. One type is a posterior fricative [ʁ] or [ɣ] – with close approximation between the back of the tongue and velar/uvular region – which is characteristic of specific speech communities (see Section 7). Another less common type is a frictionless continuant (Shaheen 1979) – either an alveolar approximant [ɹ] or a postalveolar retroflex [ɻ] – which is characteristic of certain sociolects, or of individual speakers where it is often viewed as a deviation from the norm (Younes 1994). Further, any of the rhotic variants can be devoiced, particularly in pre-pausal position, for example in [mitr̥] 'meter'. And all the above variants exist as singleton and geminate.[2]

A major issue related to Arabic R is that of emphasis (also known as pharyngealization). As a matter of fact, each of the variants above can, in turn, occur either as pharyngealized or non-pharyngealized (Shaheen 1979: 145–146), thereby doubling the possible range of variants. For present purposes, however, it is sufficient to consider the voiced alveolar tap/trill realizations. Emphatic consonants are typically coronals characterized by a secondary articulation involving the retraction of the tongue dorsum toward the pharyngeal wall, and they are known to extend their pharyngealization to neighboring vowels and consonants within a certain domain; see Kaye & Rosenhouse (1997) and references therein. Arabic R is typically allied with the emphatic consonants (O'Leary 1923), but it stands out in two respects: (1) its influence on neighboring segments seems to be more restricted, and (2) it is known to alternate with a non-emphatic R cognate. This subtle behavior has compounded difficulties for researchers, so much so that Ghazeli (1977: 151) remarks: "In almost every investigation of pharyngealized consonants in Arabic there is a final section on "unresolved problems", most of which are about the irregular behavior of [r]".

The differentiation between emphatic (*mufaxxama*) and non-emphatic (*muraqqaqa*) R has been documented by Classical Arab grammarians such as Sibawayh, al-Zamaḫšari, and Ibn Yaʿīsh (Cohen 1969; Al-Nassir 1993). As it was never considered a phonemic distinction, they set to carefully determine the predictable conditions under which each variant appears. These conditions persist, more or less, in most eastern Arabic dialects today (Cantineau 1960: 50), and can be summarized as follows. The pharyngealized [rˤ] is found contiguous with back vowels [ɑ/ɑː, oː, u/uː] and in proximity to emphatic obstruents /tˤ, dˤ, sˤ, zˤ, ðˤ/ or uvulars /χ, ʁ, q/. The plain [r] is found adjacent to front vowels [a/aː, eː, i/iː] if no other emphatic is present. In most western dialects, on the other hand, the opposition takes on a distinctive value so clear that we can speak of two, plain versus emphatic, R phonemes. The essence of these generalizations will be elaborated and discussed in Sections 4–7 below.

[1] An anonymous reviewer has pointed out a major articulatory distinction between taps and trills: Taps are ballistic, initiated by muscle activity (Barry 1997), while trills are aerodynamic, initiated by the airstream (Solé 2002). Hence, a geminated tap [ɾɾ] is still phonetically different from a two-contact trill [r]. This distinction may be obscured in Arabic by means of free and/or individual variation, whereby "single /r/'s are sometimes trilled while geminates are produced with single long taps" (Khattab 2002: 155). That said, the R transcriptions in this paper will abstract away from such phonetic differences.

[2] Although somewhat controversial, syllabic [r̩] allophones have also been proposed in some dialects (Obegi 1971; Ghazeli 1977; Khattab 2002). This seems to be a strategy to avoid sonority violations if onset and coda clusters were formed instead, e.g. initially in [r̩biħna] 'we won' and finally in [ʔabr̩] 'grave' or [badr̩] (name).

3.2 A phonological micro-typology of Arabic R

Various Arabic consonants, with recognizably diverse reflexes, have been studied from a typological perspective; for example, the interdentals /θ, ð/, uvular /q/, velar /k/, affricate /ʤ/, but never R (see Holes 1995; Versteegh 1997; Watson 2011). The lack of dialect maps or isoglosses that demarcate variants of Arabic R does not reflect a denial of variation, but rather the fact that R's behavior displays seemingly random variation and rarely conforms to clear-cut divisions. In my attempt to set up the R-typology, therefore, I had to closely examine this behavior in a wide range of Arabic dialects: six based on first-hand research and no less than twenty based on secondary sources. My goal was to answer three sets of questions:

i. How many R sounds exist in a given variety? Which patterns exhibit contrast and which exhibit structurally conditioned allophony?
ii. What is the underlying form for each phoneme? And what evidence exists for assigning it a specific representation in the PSM?
iii. What are the patterning similarities and differences across Arabic dialects? Do the differences give rise to concrete isoglosses?

Last question first: Yes, they do. Figure 2 shows four major dialect types based on the quality and number of R phonemes: the split-R in purple (Type I), the emphatic-R in green (Type II), the plain-R in yellow (Type III), and the scattered uvular-R dialects in orange (Type IV). The answer to questions (i) and (ii) will be different among these groups. Types II and III, for instance, have one R phoneme each; but the former is underlyingly emphatic while the latter is plain and dorsal. Types I and IV, on the other hand, each have two contrasting R phonemes: plain-emphatic and plain-uvular respectively. The representations of those R phonemes are clearly non-identical; and as stated in Section 2, they are entirely determined by the distribution and phonological activity of R on a dialect-by-dialect basis. We therefore typologize the rhotics phonologically, *not* phonetically. I argue that adopting this approach allows us to draw sharp distinctions between dialect types as well as between representational primitives, without which it would be impossible to construct the typology.

But before embarking on the details, a few disclaimers are in order. First, the map offers a simplified representation of the groups, which are not meant as highly precise or exhaustive

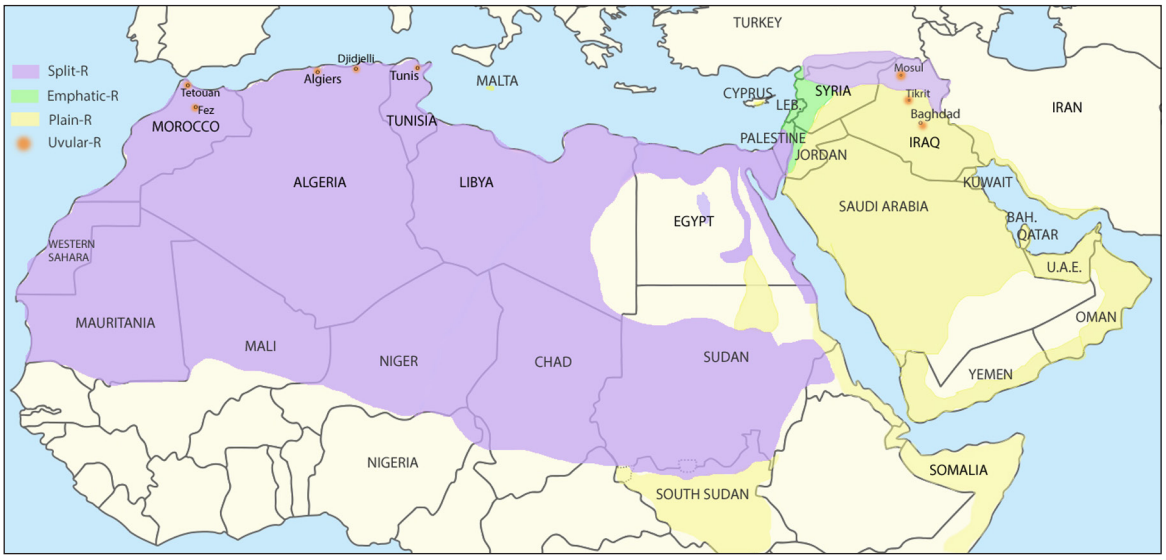

Figure 2: Distribution of R types in spoken Arabic dialects.

isoglosses. Secondly, disregarding any phonetic and sociolinguistic variation, it is possible, and likely, that there is also some phonological variation within these large dialect groups. Finally, all generalizations in this article build on the six dialects studied at first hand. The placement of other dialects in any group is done to the best of my knowledge, on the basis of data and descriptions in secondary literature. Now we move on to examine the groups.

4 Type I: The split-R dialects

The first group is characterized by the existence of two contrastive phonemes: a plain /r/ and an emphatic /rˤ/, and mainly comprises the Arabic dialects spoken in Africa, which fall under three traditional dialect families: (1) the so-called Western or Maghrebi dialects of North Africa; viz. Moroccan, Algerian, Tunisian, Libyan, and the Ḥassānīya dialect of Mauritania; (2) the Egyptian dialects spoken in Egypt and Sudan (excluding Juba Arabic of South Sudan); and (3) a few peripheral dialects spoken in sub-Saharan Africa, e.g. Nigerian and Chadian Arabic, and in Anatolia (southeastern Turkey), e.g. Mardin, Siirt, and Şırnak Arabic. They have been dubbed "the split-R dialects" to imply that historical plain R has split into two distinct phonemes for which there exists abundant evidence. Emphatic /rˤ/ is labeled one of the "new" emphatics in those dialects (Singer 1980: 253), and is typically thought to have gained a phonemic status via processes of lexical and morphological diffusion. We assume that R is phonetically an alveolar tap or trill throughout.

This group will be exemplified by two dialects from families (1) and (2), namely Egyptian Cairene Arabic (ECA) and Moroccan Arabic (MCA). We start with a parallel investigation of R's behavior in ECA and MCA as regards minimal pairs and other distributional patterns, and then relevant phonological processes. We will also highlight facts in other Type-I dialects. Our objective will be to determine R's internal structure based on its behavior.

4.1 The distributional facts of R

The literature shows substantial agreement on a phonemic distinction between a plain /r/ and an emphatic /rˤ/ in Egyptian Cairene (Schulte 1985; Watson 2002; Woidich 2006; Youssef 2014) and Moroccan Arabic (Singer 1980; Heath 1987; 1997; Caubet 1993; Aguadé 2003; Gouma 2013). Despite some partial complementary distribution between plain and emphatic R (see below), the R type is not always predictable from the phonological environment, and two separate phonemes are postulated in order to handle the existing patterns. The most compelling evidence is the minimal pairs contrasting /r/ and /rˤ/, exemplified in (1a–b) for ECA and MCA, where the R's show up in different positions in the word and the syllable.

(1) Contrasts involving emphatic /rˤ/ vs. non-emphatic /r/ in *ECA* (a) and *MCA* (b)

a.	[rˤạfff]	'shelf'	[raff]	'it twitched'
	[rˤạːmịˌ]	(male name)	[raːmi]	'throwing'
	[ʔạrˤḅạʕ]	'a Wednesday'	[ʔarbaʕ]	'he guzzled'
	[ḅạrˤrˤạʔ]	'he acquitted'	[barraʔ]	'he stared'
	[ẉạrˤrˤạːnịˌ]	'rear, back'	[warraː-ni]	'he showed me'
b.	[rˤạːjịḅ]	'curdled, curd'	[raːjib]	'collapsed'
	[ḅrˤạ]	'letter'	[bra]	'needle'
	[ẓrˤạʕ]	'whole wheat'	[zraʕ]	'he sowed'
	[ḥrˤạːm]	'forbidden'	[ħraːm]	'shawl, veil'
	[ḍạːrˤ]	'house'	[daːr]	'he did'

In view of the extension of emphasis over whole words (indicated by dots underneath symbols), one wonders why these are considered contrasts between /r/-/rˤ/ segments,

rather than between prosodic units – both valid ways of analysis. Proponents of the latter approach (e.g. Lehn 1963; Broselow 1976; Tsereteli 1982) recognize no underlying emphatic segments in Arabic, and treat emphasis as a floating prosodic feature that is supplied redundantly in the consonantal and vocalic systems. It has been observed, however, that emphasis (and any plain-emphatic contrasts) is found only in words containing one of the pharyngealized coronal consonants /tˤ, dˤ, sˤ, zˤ, rˤ/ or the marginal "secondary emphatics". Younes (1982: 40) argues that this must be treated as accidental in the suprasegmental account because the actual phonemic content of the word should be irrelevant. More problematically, this approach grants the prosodic structure access to featural information that is assumed to be lower in the hierarchy, i.e. skipping over the segmental level of representation. For these reasons, a segmental approach where the pharyngealized coronals spread their emphatic feature is more widely accepted (see Youssef 2013: 94–96). Section 4.2 looks more into this process.

All other Type-I dialects are claimed to have two separate /r/-/rˤ/ phonemes on the basis of minimal pair evidence, e.g. [ʒra] 'he ran'– [ʒ̣rˤa̰] 'it happened' in Tunisian (Cohen 1970), [naːr] 'it was lit'– [n̰aːrˤ] 'fire' in Libyan (Pereira 2009), [rafraf] 'he quivered'– [rˤa̰frˤa̰f] 'he floated' in Algerian (Georgin 1980), [sədraːja] 'jujube'– [s̰ə̰drˤa̰ːja̰] 'tree' in Mauritanian Ḥassānīya (Cohen 1963), [ʤabar] 'a broken bone'– [ʤa̰ba̰rˤ] 'he forced' in Sudanese (Dickins 2007), [k̰a̰rˤrˤa̰] 'he dragged'– [karra] 'he tore' in Nigerian (Owens 1993), and [k̰a̰rˤa̰] 'he has seen'– [kara] 'he rented' in Mardin (Jastrow 2006).

It is worth mentioning in this connection that MCA has a more established /r/-/rˤ/ opposition than any other dialect in this group. This is due to paradigm regularization, where we find that a radical /rˤ/ or /r/ of a certain root persists in all words of that root: across inflections, ablauts, and play speech transformations (Heath 1987: 298). The paradigms in (2a), for example, have a consistent emphatic [rˤ] throughout, whereas those in (2b) have a plain [r] throughout, regardless of the nature of the neighboring vowels.[3] Heath (1997) compares verbal active participle forms like [ʃrˤə̰b̰] – [ʃ̣a̰rˤə̰b̰] in (2a) with their corresponding forms in Saharan or Tunisian Arabic which alternate between [rˤ] and [r], and maintains that the leveling has gone farther in Morocco than elsewhere in northwest African Arabic. Gouma (2013: 90) concludes that the /r/-/rˤ/ distinction in MCA is a property of the root, just like the uncontroversial plain-emphatic pairs /t/-/tˤ/, /d/-/dˤ/, /s/-/sˤ/, and /z/-/zˤ/.

(2) Paradigm regularization in *MCA*: /rˤ/ or /r/ throughout

a.	[ʃrˤə̰b̰]	'he drank'	>	[ʃ̣a̰rˤə̰b̰]	'having drunk'	>
	[ʃ̣rˤḭb̰]	'drinking'	>	[m̰ʃrˤṵb̰]	'been drunk'	
	[m̰rˤa̰]	'woman'	>	[m̰rˤẹːwa̰]	'small woman'	
	[ḥm̰a̰rˤ]	'red'	>	[ḥm̰a̰rˤ-ẹːt̰]	'I blushed'	
b.	[brəd]	'he became cold'	>	[bar(ə)d]	'cold'	
	[ʃra]	'he bought'	>	[ʃriːt]	'I bought'	

Some distributional facts further corroborate the status of /rˤ/ as a phonemically distinct sound in ECA and MCA. While a rhotic in the neighborhood of an obstruent emphatic /tˤ, dˤ, sˤ, zˤ/ must be [rˤ], never [r], irrespective of adjacent vowels (Shaheen 1979; Heath 1987), [rˤ] is retained in numerous words that do not contain those consonants. And while in MCA a uvular or pharyngeal consonant /q, x, ɣ, ʕ, ħ/ in the same stem tends to favor [rˤ], there are cases of plain [r] as well (Heath 2002: 152). Most importantly, the

[3] Many of these paradigms display differences across Moroccan Arabic dialects with regard to whether /r/ or /rˤ/ won out within the underived stem or word family; see Heath (2002: 149–157).

occurrences of [rˤ] in this group are not restricted to the environment of a low vowel /a/: [rˤ] also appears in the onset or coda of a syllable containing non-low vowels without the presence of other emphatics. The data in (3a–b) give instances of [rˤ] adjacent to [ụ, ụː, ọː], in ECA and MCA respectively.

(3) Emphatic [rˤ] next to non-low vowels in *ECA* (a) and *MCA* (b)

a.	[rˤọːḥ]	‘soul’	[rˤụṃṃạːṇ]	‘pomegranate’
	[rˤụːḥ]	‘go’	[kạṣṭọːrˤ]	‘cotton flannel’
	[x̣ạbụːrˤ]	‘wedge’	[mụrˤrˤ]	‘bitter’
b.	[rˤọːḥ]	‘soul’	[rˤʷṃṃạːṇ]	‘pomegranate’[4]
	[rˤọːṭbạ]	‘rank’	[bx̣ọːrˤ]	‘incense’
	[bạːkụːrˤ]	‘fig’	[ʔạːx̣ụrˤ]	‘other’

The point here is that if [rˤ] and [r] are found in minimal pairs and in parallel phonological environments beyond an accompanying obstruent emphatic or low vowel, then the two sounds exist in parallel distribution. Cohen (1963) makes much the same arguments for Mauritanian Ḥassānīya. In the Tunis or Sahel dialects of Tunisia, Ghazeli (1977: 161) acknowledges the occurrence of [rˤ] in context-free environments (i.e. independently of the presence of a back segment) or even next to a front vowel in the pair [bṛˤẹːṭ] ‘I recovered’– [breːt] ‘I sharpened’.[5]

While the prior facts suggest that emphatic /rˤ/ in this dialect group emulates the obstruent emphatics, there remains one distributional fact that is unique to /rˤ/. In ECA, [rˤ] does not occur with tautosyllabic front vowels [i/iː, eː], in which case it loses the emphatic feature and becomes a plain [r] (Broselow 1976; Watson 2002). A similar, albeit less robust, generalization can be made about MCA, whereby a tautosyllabic [i/iː] prevents the realization of emphatic [rˤ] (Heath 1987; Gouma 2013). This distribution, known as /rˤ/ *de-emphasis*, leads to root-internal allomorphy between emphatic and plain R, if there is no other obstruent emphatic in the word. ECA abounds with alternations like those in (4a), whereas MCA has kept only a few in plural ablauts, some of which are given in (4b). Recall that MCA has leveled out most [rˤ]-[r] alternations within paradigms in favor of one or the other; therefore, some derivatives of a /rˤ/-type stem may have [rˤ] contiguous to a front vowel in the same syllable (i.e. without de-emphasis), as shown in (2a) above. Heath (1997) actually suggests that an originally allophonic distinction in MCA – with [r] next to [i] and [rˤ] next to back vowels – has become phonemic via neutralizations in the conditioning vocalic environments, resulting in the present /r/-/rˤ/ split.

(4) Emphatic/non-emphatic R alternations in *ECA* (a) and *MCA* (b)

a.	[rijaːsa]	‘presidency’	>	[rˤạjjịṣ]	‘president’
	[safiːr]	‘ambassador’	>	[ṣụfạrˤạ]	‘ambassadors’
	[tazaːkir]	‘tickets’	>	[tạzkạrˤạ]	‘ticket’
	[ɣeːr]	‘other’	>	[ɣạjjạrˤ]	‘he changed’
b.	[kbiːr]	‘big’	>	[kʷbạːrˤ]	‘big.PL’
	[ħmiːr]	‘donkeys’	>	[ḥmạːrˤ]	‘donkey’
	[waziːr]	‘minister’	>	[wịzạːrˤạ]	‘ministry’

[4] The labialization in this and similar MCA words is probably the trace of an /u/ vowel; see Gouma (2013: 87–88). Compare with the corresponding ECA word in (3a).

[5] Ghazeli nonetheless argues for a front-back phonemic split in the low vowel, i.e. /a/ vs. /ɑ/, rather than in the R phoneme; see also Laradi (1983) for an analogous proposal in Libyan Arabic. Although a workable diachronic account, I find it difficult to justify synchronically in view of the above evidence.

Other Type-I dialects show a parallel correlation between a plain [r] and front vowels, leading to [rˤ]-[r] alternations within word families, e.g. [rˤaː] 'he saw'– [riːt] 'I saw' in Tunisian (Ghazeli 1977), [ḥrˤaḅ] 'he fled'– [haːrib] 'fleeing' in Mauritanian Ḥassānīya (Cohen 1963), and [ʤaṛˤrˤaːḥ] 'surgeon'– [ʤaːriḥ] 'wound' in Sudanese (Dickins 2007). This de-emphasis pattern has led some researchers (e.g. Ghazeli 1977) to reject the two-phoneme analysis of R advanced here, and led others (e.g. Heath 1987) to declare a conflict between the phonemic analysis and an allophonic one in which [rˤ] and [r] are conditioned realizations of a single phoneme. The two analyses are in fact compatible if we accept de-emphasis as a case of *contextual neutralization* (Kenstowicz & Kisseberth 1979: 211), where the underlying /ɪ/-/rˤ/ contrast is merged in front vowel contexts but is maintained in all other contexts. We simply set up an archiphoneme /r/ in just those contexts where the phonological opposition is suspended.

The last pattern comes from loanword phonology, and is exclusive to MCA. In French loanwords borrowed into MCA, the French rhotic /ʁ/ is systematically interpreted as an alveolar tap /r, rˤ/ (5a), despite the fact that MCA has a phonetically equivalent velar-uvular fricative phoneme /ʁ/ (Paradis & LaCharité 2001; Lahrouchi 2018). Meanwhile, when Arabic words containing /ʁ/ are borrowed into French, they do not appear with the French rhotic /ʁ/, but more willingly with a velar stop /g/, as exemplified in (5b).

(5) French loans into *MCA* (a) and Arabic loans into *French* (b)

a.	Fr. [byʁo]	>	[biru]	'office'	Fr. [ʁazwaʁ]	>	[razwar]	'shaver'
	Fr. [tʁɛ̃]	>	[træn]	'train'	Fr. [sɛʁʒɑ̃]	>	[ʃɑrˤʒɑṇ]	'sergeant'
	Fr. [sɛʁtifika]	>	[sərtafika]	'certificate'	Fr. [kaʁtɔ̃]	>	[ḳɑrˤtˤoṇ]	'cardboard'
b.	Ar. [maʁrib]	>	[magʁɛb]	'Maghreb'	Ar. [ʁazaːl]	>	[gazɛl]	'gazelle'

Both studies concur that the choice is based on the rhotic's phonological identity – in this case distinctive features and phonotactic role – rather than its surface phonetic form. More specifically, MCA speakers identify the French rhotic as a sonorant, which for example occupies the nucleus-adjacent position in onset and coda clusters, a description that maps into their native /r, rˤ/, but not their /ʁ/ phoneme. The Arabic /ʁ/, on the other hand, is maintained as an obstruent with a similar place of articulation, /g/, when borrowed into French. The idea is that one and the same phonetic form, say [ʁ], may sometimes be classified as a rhotic (as in French) and sometimes as a fricative (as in MCA): a fact that is hardly puzzling if rhotics are defined in terms of their phonological behavior alone (Wiese 2011; Chabot 2019). This will be the assumption of the featural analysis below.

The distributional facts in this section have confirmed that the presence or absence of emphasis is contrastive for R in Type-I dialects. Minimal pairs, paradigm uniformity, and variety of contexts provided the clues. Moreover, we have seen that /r/ and /rˤ/ can lead lives as autonomous phonemes even though they do not contrast in all vocalic environments. In the next section, we review some phonological processes in which /r/-/rˤ/ participate actively, as a way to understanding their featural representations.

4.2 Phonological processes involving R

In Type-I dialects, not only does /rˤ/ bear an emphatic feature contrastively, but it also extends this feature over adjacent strings of segments in a process known as *emphasis spread* (ES for short). ES can be defined as a bidirectional, long-range pharyngealization effect. Target vowels often become retracted or more centralized than their non-emphatic counterparts, and are marked acoustically by F_2 lowering (Card 1983; Shahin 2002), while target consonants can be verified by the formant onsets and/or offsets of their neighboring vowels (El-Dalee 1984; Norlin 1987). As a widespread phenomenon across Arabic dialects,

ES displays considerable variation with regard to its domain of application, its directionality, as well as the identity of the contrastive emphatic triggers and, if any, opaque segments.

In ECA /rˤ/ has frequently been designated a "secondary emphatic" (e.g. in Schulte 1985; Watson 2002), citing its unique de-emphaticizing behavior and a limited spreading effect. However, Youssef (2014) has shown that /rˤ/ has the same ES domain as /tˤ, dˤ, sˤ, zˤ/, and must therefore be classified as a "true" emphatic. Examples (6a–b) illustrate that /rˤ/ triggers rightward and leftward ES within the prosodic word (including affixes), and that non-tautosyllabic /i, iː/ do not block ES from /rˤ/, as in [rˤaḥiːbaˤ] and [ħiraˤṣaˤ].

(6) Emphasis spread into stems (a) and affixed forms (b) in *ECA*

a.	[rˤaḥiːbaˤ]	'terrific-F.SG'	[ʃaḥrˤ]	'month'
	[ħiraˤṣaˤ]	'guarding'	[kurˤamaˤ]	'generous.PL'
b.	[faraˤaʃ-aːtˤ]	'butterflies'	[ʕarˤabijj-aːtˤ-ak]	'your cars'
	[baˤ-krˤaˤh-haˤ]	'I hate her'	[maˤ-garˤrˤaˤb-naˤːʃ]	'we didn't try'

In MCA, there is consensus that /rˤ/ belongs with the true (obstruent) emphatics in that it has the same long-range influence they have. The ES domain here is the uninflected word; spreading continues further to prefixes, but not to inflectional suffixes unless they are vowel-initial and surface as tautosyllabic with a stem-final [rˤ] (Benhallam 1980; Heath 1987), as shown in (7). Segments like the front vowel /i/ and the postalveolar consonants /ʃ, ʒ, j/ do not systematically block ES, although they are reported to have limited blocking effects in the left-to-right direction (Heath 1987: 324). This, together with the noted discrepancy between prefix and suffix targets, suggests that ES in MCA is more regressive than it is progressive.

(7) Emphasis spread into stems (a) and prefixed forms (b) in *MCA*

a.	[rˤʷxaːm]	'marble'	[brˤam]	'he rolled'
	[garˤrˤu]	'cigarette'	[nʃarˤ]	'he planed (wood)'
b.	[m-ħrˤrˤarˤ]	'liberated'	[n-ʒarˤrˤb-uhum]	'we try them'
	[ta-n-ʒbarˤ-u]	'I find him'	[ta-n-ʃrˤab-ha]	'I drink it'

Emphasis spread from /rˤ/ obtains in all dialects of this group; however, some variation in its scope has been noted. For example, Owens (1993) does not differentiate between /rˤ/ and /sˤ, dˤ/ in Nigerian Arabic, and states that ES from those segments extends throughout the word domain, e.g. in [farˤwa] 'animal skin'. Abumdas (1985), on the other hand, states that /rˤ/'s influence in Libyan is "almost as strong as" the obstruent emphatics, while Ghazeli (1977) proclaims that /rˤ/ in Tunisian has only a limited, local spreading effect.

Aside from these differences, what does ES tell us about the feature makeup of /rˤ/? Emphatic consonants are distinguished from their plain counterparts by an additional non-primary back articulation (Davis 1995: 472). And since consonants with secondary articulations in the PSM have both C-place and V-place terminal features (Morén 2003: 199), we can posit V-place [dorsal] to indicate pharyngealization in the class of emphatics /tˤ, dˤ, sˤ, zˤ, rˤ/.[6] The advantage of a V-place feature is that it can spread to consonant and vowel targets of ES, whereas a C-place feature can only spread to consonants (see Section 2.2). Moreover, the V-place [dorsal] on /rˤ/ will be delinked next to a front vowel and no ES takes place. This last ban can be formulated in autosegmental theory as an

[6] Arabic emphatics admittedly involve constriction in the upper pharynx (Ali & Daniloff 1972), and so a feature like [pharyngeal] may be more phonetically accurate. However, given that features in the PSM are not decided by the phonetics and that V-place [dorsal] is not otherwise active, using it can only enhance the parsimony aspect of the model. After all, dorsum lowering is still present, even as a reflex of the pharyngeal constriction.

adjacency restriction on certain feature combinations, e.g. V-place [dorsal] and V-place [coronal], within the syllable.

Another phonological process involving R is the assimilation of the definite article /l/, attested in nearly all Arabic dialects. The definite /l/ assimilates totally to a following word-initial coronal (alveolar/palato-alveolar) – /t, tˤ, d, dˤ, s, sˤ, z, zˤ, ʃ, ʒ, l, n, R/ – and the outcome is a geminate copy of the trigger. Thus in both ECA and MCA (8a–b), plain /r/ and emphatic /rˤ/ triggers produce [rr] and [rˤrˤ] respectively (preceded by epenthesis in pausal position). This is in contrast to words with initial non-coronals which preserve [l] in their definite form, as in [ʔil-bard] 'the cold' and [ʔil-ɣasiːl] 'the laundry' (ECA). The assimilation is obligatory; and although heavily morphologized, it is synchronically active, as evident from assimilations to initial R's in recent loanwords (see Watson 2002: 219).

(8) Assimilation of the definite article /l/ to /r, rˤ/ in *ECA* (a) and *MCA* (b)

a.	/l-rˤubʕ/	→	[ʔi̯irˤ-rˤu̯bʕ]	'the quarter'
	/l-rˤadju/	→	[ʔi̯irˤ-rˤa̯di̯u]	'the radio'
	/l-rasma/	→	[ʔir-rasma]	'the painting'
	/l-ruti:n/	→	[ʔir-ruti:n]	'the routine'
b.	/l-rˤɑ:ʒəl/	→	[ə̯rˤ-rˤɑ:ʒə̯l]	'the man'
	/l-rəkba/	→	[ər-rəkba]	'the knee'
	/l-razwar/	→	[ər-razwar]	'the shaver'

The inference here is that /r, rˤ/, along with the other triggers of /l/-assimilation, are coronal. Since the triggers form a mixture of plain and emphatic consonants, this must be their primary place of articulation. The appropriate feature for this natural class is, therefore, C-place [coronal]. Watson (2002: 220–221) suggests that the main motivation behind this process is an OCP violation on the coronal tier, rejecting representations in which /l/ and the trigger are each linked to its own copy of the feature. The resulting structure with merged C-place [coronal] prompts other features to spread to the /l/, creating a fake geminate.

The third R-related process is *coronal sonorant assimilation*, by which /n/ and /l/ undergo total regressive assimilation to a following /r, rˤ/ across words and morpheme boundaries, again producing a geminate copy of the trigger. The nasal /n/ may also assimilate to /l/. Assimilations of this type prevail in both ECA and MCA (9) except in very careful speech (Harrell 1957; Heath 1987; Youssef 2013). The underlying forms for phrase-initial words or morphemes in (9) are the same as the surface forms in isolation, i.e. [miːn] 'who', [waːkil] 'eating', etc. Note that the converse process, assimilation of /r, rˤ/ to /n, l/, is not attested.

(9) Regressive assimilation of /n/ and /l/ to /r, rˤ/ in *ECA* (a) and *MCA* (b)

a.	/min rigl-u/	→	[mir rigl-u]	'from his leg'
	/miːn rˤaːħ/	→	[miːrˤ rˤa̯ːḥ]	'who went'
	/waːkil riɣiːf/	→	[waːkir riɣiːf]	'eating a loaf (of bread)'
	/ji-ʕmil rˤaːgil/	→	[ji-ʕmirˤ rˤa̯ːgi̯l]	'he pretends to be a man'
b.	/n-rˤmi/	→	[rˤ-rˤm̥i]	'I throw'
	/l-rusija/	→	[r-rusija]	'to Russia'

These assimilations are common across Arabic dialects. They are described both briefly in grammars and extensively in some studies of segmental assimilation, e.g. Abumdas (1985) and Elramli (2012) on Libyan Arabic. The process verifies that trigger /r, rˤ/ and target /l, n/ are all coronal sonorant segments. (Another indication of the sonorancy of

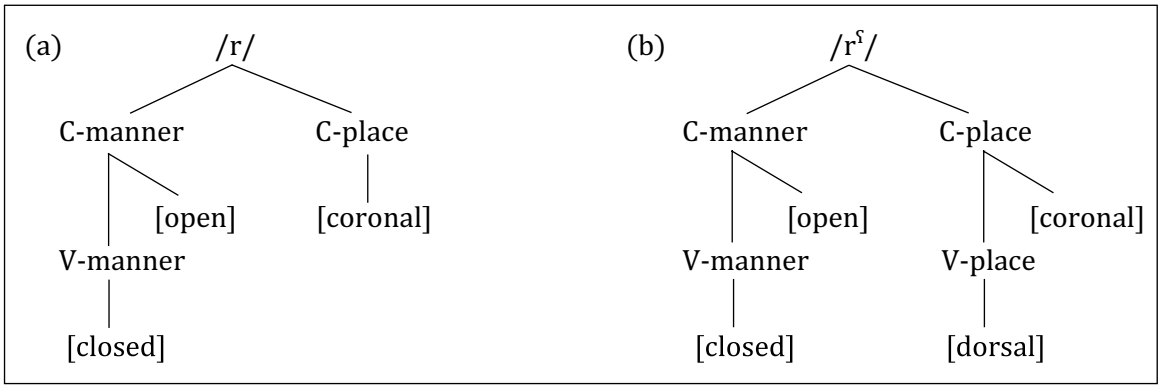

Figure 3: Representation of /r/ and /rˤ/ in Type-I dialects.

/r, rˤ/ in MCA is the loanword pattern in Section 4.1). Let us assign a combination of C-manner [open] and V-manner [closed] for the natural class of sonorants in the PSM (see Morén 2006: 1210). These features correspond to liquids and nasals being continuants (open) and vowel-like (sonorous). Thus, coronal sonorant assimilation takes place when the trigger and target merge their C-place [coronal] and their manner features to avoid multiple OCP violations.

To summarize, Type-I dialects established a two-way contrast for their R's: a plain /r/ vs. an emphatic /rˤ/. Despite an apparent hazy region, the two phonemes emerge as independent in minimal pairs and in multiple phonetic environments. Their phonological activity offers support for the feature representations in Figure 3. In terms of place of articulation, /r, rˤ/ have "primary" C-place [coronal] while /rˤ/ has an extra "secondary" V-place [dorsal] to mark emphasis. In terms of manner of articulation, they are both sonorants, with C-manner [open] and V-manner [closed] features. Voicing is redundant and therefore excluded. The following section presents a group of dialects with only a /rˤ/ phoneme.

5 Type II: The emphatic-R dialects

Type-II dialects have a single, emphatic R phoneme, /rˤ/, and comprise the Levantine (or Syro-Lebanese) dialects spoken in Syria, Lebanon, Palestine, and Jordan. The /rˤ/ phoneme has emphatic [rˤ] and plain [r] allophones, both of the alveolar tap-trill type, which exist in complementary distribution. In other words, there is no signal of a phonemic R-split as in Type-I dialects.

This group will be exemplified by Rural Palestinian Arabic (henceforth RPA), the best described variety to date. The descriptions are indeed based on three subdialects of RPA: two of which are spoken in the Northern West Bank, namely Dar Younes (Younes 1982; 1993; 1994) and Yaʿbad (Herzallah 1990), and the third in the pre-1948 Palestine village of Abu Shusha (Shahin 2002). In all respects relating to emphasis, the three are essentially the same; however, for consistency's sake, data is taken only from the nearly identical varieties of Dar Younes and Yaʿbad. As in the previous section, we start with the distributional facts followed by phonological processes involving R in RPA, with reference to other Type-II dialects where appropriate.

5.1 The distributional facts of R

There are no true minimal pairs contrasting emphatic and plain R in RPA (Younes 1982: 55; Herzallah 1990: 107). All three subdialects consider /rˤ/ to be an underlying emphatic on a par with /sˤ, ðˤ, tˤ/, but with no non-emphatic counterpart. Younes (1982; 1994) provides explicit distributional evidence, both phonological and morphological, of the R phoneme behaving as a "primary" emphatic. The first fact is that /rˤ/ generally co-occurs with a

backed [ạ], rather than a front [a], variant of the low vowel /a/. A comparison of the pairs in (10) reveals that /rˤ/ patterns with emphatic /sˤ, tˤ/ but not with the plain consonants in the right-hand column. Remember that these emphatic consonants also occur adjacent to other vowels, as in Type I, so it is unacceptable to assume that they are underlyingly plain, with emphatic surface forms in [ạ] contexts.

(10) Emphatic /rˤ, sˤ, tˤ/ accompanied by a backed [ạ] in *RPA*

[bạrˤạd]	‘he got cold’	[balad]	‘country’
[nạːrˤ]	‘fire’	[naːm]	‘he slept’
[bạːsˤ]	‘bus’	[baːs]	‘he kissed’
[tˤạll]	‘he appeared’	[tall]	‘hill’

The second fact is that /rˤ/ behaves like the “primary” emphatics and the velar obstruents /k, x, ɣ/ in a morphological rule of ablaut. Only when a verb has one of these as the second or third root consonant does the imperfect (roughly the present tense) surface with [u]; otherwise the vowel is [i]. Consider the perfect-imperfect alternations in (11a) vs. (11b).

(11) Perfect-imperfect ablaut alternations in *RPA*

a.	[ḥạrˤạθ]	- [ji-ḥrˤuθ]	‘to plough’	[ʕạbạrˤ]	- [ji-ʕbụrˤ]	‘to cross’
	[nạsˤạb]	- [jị-nsˤụb]	‘to set up’	[ʃạfạtˤ]	- [jị-ʃfụtˤ]	‘to suck’
	[nakal]	- [ji-nkul]	‘to transport’	[naɣaz]	- [ji-nɣuz]	‘to prick’
b.	[ħamal]	- [ji-ħmil]	‘to carry’	[katab]	- [ji-ktib]	‘to write’

The final evidence concerns the distribution of the feminine suffix allomorphs. As in many Levantine Arabic dialects, this suffix turns up as [a/ạ] if preceded by an emphatic, velar, pharyngeal, or laryngeal consonant (12a), or as [i] (i.e. with *imāla*) if preceded by a front consonant (12b). Again, /rˤ/ behaves like the former group in selecting the /a/-type allomorph.

(12) Feminine suffix allomorphy in *RPA*

a.	[mịḥṭạːrˤ-ạ]	‘bewildered-F.SG’	[ʤọːrˤạ]	‘hole, pit’
	[bạsị:tˤ-ạ]	‘simple-F.SG’	[ʕạrị:ðˤ-ạ]	‘wide-F.SG’
	[mankuːʕ-a]	‘soaked-F.SG’	[fallaːħ-a]	‘peasant-F.SG’
b.	[ʃriːtʃ-i]	‘partner-F.SG’	[mạḍrˤạsi]	‘school’
	[tˤạwiːl-i]	‘tall-F.SG’	[maʤnuːn-i]	‘crazy-F.SG’

Central to Type-II dialects is the full predictability of the R type from the phonological context. If we can predict all instances of R in which emphasis does not appear, and if the emphatic [rˤ] is the elsewhere variant, then it is reasonable to argue for a single emphatic /rˤ/ phoneme that is de-emphaticized to [r] in those specific contexts. This is the line maintained by Younes, Herzallah, and Shahin for their respective subdialects. All three agree that a non-emphatic [r] is a de-emphaticized /rˤ/ because it is predictable in precisely three well-defined phonological environments.

The first is before a velar /k, x, ɣ/ in the same consonantal root, where we only find the plain [r] variant. Besides /rˤ/, the emphatic fricatives /sˤ, ðˤ/ are also de-emphaticized in this context. Boldface consonants in (13a) are arguably underlyingly emphatic, which means that emphatic [rˤ, sˤ, ðˤ] do not occur to the left of the velars, but occur freely to their right (13b); hence the distribution is “directionally conditioned” (Herzallah 1990: 122–123).

(13) Plain [r, s, ð] before velars (a) vs. emphatic [rˤ, sˤ, ðˤ] after velars (b)

a.	[tˤaraak]	‘he knocked’	[ðajjak]	‘he made narrow’
	[barɣaʃ]	‘mosquitoes’	[sabaɣ]	‘he dyed’
	[tarrax]	‘he dated’	[sarax]	‘he screamed’
b.	[χaḅaṛˤ]	‘news item’	[χaḅaṣˤ]	‘he mixed randomly’
	[ɣaḅaṛˤaˤ]	‘dust’	[ɣaðˤaˤb]	‘anger’

Another context that conditions a plain [r] in RPA is the strict adjacency to one of the non-emphatic coronals /θ, t, d, s, z, n, ʃ, ʧ, ʤ, j/ in the same non-affixed stem (14a). (This has also been reported by Bani-Yasin & Owens (1987) in a Northern Jordanian Arabic dialect).[7] Unlike the previous context, however, /rˤ/ is not de-emphaticized if it is separated from the coronal trigger by an intervening vowel. Thanks to this, we get [r]~[rˤ] alternations between nominals and their morphologically related verb forms, as in (14b). Similar forms in Type-I dialects, such as ECA, display paradigm uniformity with a plain [r] throughout.

(14) Plain [r] immediately before non-emphatic coronals

a.	[bardaːn]	‘cold’	[ʔarnab]	‘rabbit’
	[kart]	‘card’	[farz]	‘classifying’
	[marʤ]	‘meadow’	[farji]	‘a stomach disorder’
b.	[mars]	‘smashing’	[mˤarˤaˤs]	‘he mashed’
	[farʃ]	‘furnishings’	[fˤarˤaˤʃ]	‘he furnished’

According to Herzallah (1990), the consonants that never cause /rˤ/ de-emphasis are the labials, pharyngeals, and laryngeals; that is, peripheral consonants whose articulation does not involve the tongue blade nor dorsum. The dorsal and coronal contexts above are not absolute either: if the triggers do not fulfil the adjacency and directionality requirements, they still co-occur with [rˤ]. Together these facts imply that the emphatic [rˤ] is the default allophone, a conclusion reinforced by the following, last environment that conditions [r].

In RPA, only a non-emphatic [r] appears “in the neighborhood of a non-inflectional, non-epenthetic, non-low front vowel” (Younes 1994: 220); that is to say, /rˤ/ is de-emphaticized in words containing a stem-internal /i, iː, eː/. R and the vowel may be immediately adjacent in either direction (15a), or they may be separated from each other by no more than one consonant (15b). The observation is that tautosyllabicity is not required here, in contrast to Type-I dialects.

(15) Plain [r] next to front non-low vowels

a.	[mbaːriħ]	‘yesterday’	[bariːd]	‘mail’
	[xirfaːn]	‘lambs’	[ɣeːrak]	‘other than you’
	[kbiːr]	‘big’	[barri]	‘wild, of the wilderness’
b.	[xibra]	‘experience’	[kiʃr-aːt]	‘peels’
	[barmiːl]	‘barrel’	[ji-darwiʃ]	‘he becomes pious’

Adjacent epenthetic [i] and inflectional (suffixal or prefixal) [i/iː], on the other hand, have no effect on /rˤ/. The examples in (16a–b) show an emphatic [rˤ] in these two respective contexts. Inflectional morpheme boundaries in (b) are shown with a dash.

[7] Shaaban (1977), cited in Ghazeli (1977), mentions a comparable distribution in Omani Arabic. Nevertheless, upon lack of full proof that Omani has an emphatic /rˤ/ that is de-emphaticized in specific environments, I opt not to include it in this group.

(16) Emphatic [rˤ] adjacent to epenthetic [i] (a) and to inflectional [i/iː] (b)

a.	[ħaṛˤib]	‘war’	[faṛˤiʕ]	‘branch’
b.	[ʤaːrˤ-itʃ]	‘your.F.SG neighbor’	[ɣaḍḍaːrˤ-iːn]	‘traitors’
	[bi-rˤaːhin]	‘he bets’	[bi-rˤabbi]	‘by God’

An often-discussed detail in this frame is the discrepancy between two homophonous derivational and inflectional /i/ suffixes: the former gives rise to [r], while the latter retains the preceding [rˤ]. As (17) illustrates, this has produced apparent contrasts between words ending in the adjectival (relational) suffix *–i* and the identical first singular possessive suffix *–i* ‘my’.[8] Notice that some of these pairs may or may not be semantically related, as the glosses in (17b) reveal, in which case they are derived from different roots.

(17) R distribution before derivational /i/ (left column) vs. inflectional /i/ (right column)

a.	[ħarbi]	‘military’	[ħaṛˤb-i]	‘my war’
	[naːri]	‘fiery, pertaining to fire’	[naṛˤ-i]	‘my fire’
b.	[ʤaːri]	‘flowing, running’	[ʤaːrˤ-i]	‘my neighbor’
	[faːri]	‘nauseating’	[faṛˤ-i]	‘my mouse’

This discrepancy can be easily understood in a rule ordering account. Drawing on the work of Younes (1982) and Watson (2002), I assume that /rˤ/ de-emphasis takes place prior to inflectional affixation and [i]-epenthesis; and once de-emphasis fails to materialize at this stage, emphatic [rˤ] survives on the surface. Consider, for example, the apparent minimal pair [ʃaʤari] ‘arboreal’– [ʃaʤaṛˤ-i] ‘my trees’, which can be disambiguated via the derivation in Table 1. Rule ordering here is used for illustrative purposes, rather than for any theoretical preference.

As a restatement of the derivation in Table 1, Younes (1993) proposes that morpheme boundaries block de-emphasis, but inflectional affixes alone create no such boundaries. Younes thus treats the derivational suffix as part of the stem. A competing view, advanced by Herzallah (1990), is to propose two underlying /i/ phonemes: one specified (for roots and derivational suffixes) and one underspecified (for epenthesis and inflectional suffixes). The former de-emphaticizes /rˤ/ whereas the latter does not. These two proposals have their merits and drawbacks, but assessing them is outside the scope of the article.

The most noteworthy reference to R in other Type-II dialects is made in Syrian Arabic. Cowell (1964) states that in Damascus and some parts of Greater Syria there is no contrast between plain [r] and emphatic [rˤ] in the same contexts, such that words like ‘flowing’ and ‘my neighbor’ are pronounced identically as [ʒaːri]; compare with (17b). He adds that “in other regions the r/rˤ distinction – though not obliterated – is often subject to local and

Table 1: /rˤ/ de-emphasis in a rule ordering derivation.

Underlying form	/ʃaʤarˤ/ ‘trees’	/ʃaʤarˤ/ ‘trees’
Derivational affixation	ʃaʤarˤ₊i	—
/rˤ/ de-emphasis	ʃaʤar₊i	—
Inflectional affixation	—	ʃaʤarˤ-i
Emphasis Spread	—	ʃaʤaṛˤ-i
Output form	[ʃaʤari] ‘arboreal’	[ʃaʤaṛˤ-i] ‘my trees’

[8] Matching pairs in other Arabic dialects have been discussed by Ghazeli (1977), also in Type-I dialects. See, for example, Harrell (1957: 72) for ECA and Aguadé (2003: 78) for MCA.

individual variations to such an extent that its importance is very slight" (Cowell 1964: 8). In Lebanese, Obegi (1971: 17–18) lists a single R phoneme with plain and emphatic allophones, and refers to "the severe distributional restrictions" on emphatic [rˤ]. Conversely, Obrecht (1968) and Al Mashaqba (2015) propose two phonemes, /r/ and /rˤ/, in Lebanese and Southern Bedouin Jordanian respectively, based on pairs like [ʒaːri] – [ʒ̣aːrˤ-i], but we have already seen that these are not genuine minimal pairs.

So far, we have shown that R acts like the "primary" emphatics in three distributional patterns, and that it surfaces as non-emphatic in exactly three contexts. From these findings, we conclude that there is only one R phoneme in Type-II dialects, which is fundamentally emphatic, ergo /rˤ/, and which has a phonologically predictable plain allophone [r]. Emphatic [rˤ] as an allophone of /r/ is not predictable in the same way, and we infer that the inventory lacks a non-emphatic /r/ phoneme. Let us now examine evidence from phonological activity that supports these conclusions.

5.2 Phonological processes involving R

In most Levantine Arabic dialects, bidirectional emphasis spread is triggered by /rˤ/, among other emphatics (Grotzfeld 1980: 180). We have established in Section 4.2 that ES targets consonants and vowels within a certain domain, and is characterized articulatorily by pharyngealization and acoustically by F_2 lowering. Younes (1993) and Davis (1995) discussed a peculiar directionality effect in RPA, where rightward ES is more restricted than leftward ES. Right-to-left spreading has no blockers, and the minimum domain is the uninflected word (18a). Left-to-right spreading, on the other hand, continues up to the first low vowel, including any intervening consonants (18b), and is blocked by an immediately following /ʃ, j, w/ or a non-low vowel (18c).[9] While the domain applies to all emphatics, note that some of the opaque contexts, namely /ʃ, j/ and the front vowels /i, iː, eː/, already cause /rˤ/ to lose its emphatic character (see Section 5.1).

(18) Leftward and rightward emphasis spread from /rˤ/

a.	[sˤaːfˤarˤ]	'he traveled'	[mˤaʃˤuːrˤ]	'famous'
	[ɣˤajjˤarˤ]	'he changed'	[tˤamˤirˤ]	'dates (fruit)'
b.	[rˤˤasuːl]	'prophet'	[rˤˤaːmi]	(male name)
	[ħˤarˤˤaːm]	'shame'	[xˤarˤbˤaːn]	'broken down'
c.	[sˤjaːm]	'fasting'	[ʔˤatˤʃaːn]	'thirsty'
	[tˤwaːl]	'tall.PL'	[ʔˤarˤwaːħ]	'souls'

Furthermore, ES from /rˤ/ in both directions is more limited than ES from the other emphatics. More specifically, morpheme boundaries block ES from a /rˤ/ source (to suffixes and prefixes), but not from /sˤ, ðˤ, tˤ/, unless /rˤ/ is contiguous to a low vowel or /h/ (Younes 1993: 127). By comparing the effect of the triggers in (19a) versus (19b), one can see that the uninflected word (minimum) domain mentioned above applies to /rˤ/.

(19) ES from /rˤ/ (b) and non-/rˤ/ triggers (a) across morpheme boundaries

a.	[xˤaɫɫasˤ-tˤak]	'I rid you'	[xˤaɓatˤ-nˤa]	'he knocked us'
	[xˤaɫɫasˤ-ˤak]	'he rid you'	[mˤa-xˤaɓatˤ-ħˤaːʃ]	'he didn't knock her'
b.	[ħˤaʃˤarˤ-tak]	'I cornered you'	[ħˤaʃˤarˤ-na]	'he cornered us'
	[ħˤaʃˤarˤ-ˤak]	'he cornered you'	[ma-ħˤaʃˤarˤ-ħˤaːʃ]	'he didn't corner her'

[9] While the directionality effect is observed in all Levantine dialects, the set of blockers is known to vary. In Abu Shusha dialect (Shahin 2002) the set is /ʃ, ʧ, ʤ/, and non-low vowels are transparent; and in Southern Rural Palestinian (Davis 1995) the set is /ʃ, ʤ, j/ and /i/. Some dialects, e.g. Urban (Amman) Jordanian (Zawaydeh 1999), are argued by have no blockers at all.

Card (1983) examined emphasis in the Palestinian Arabic of Jerusalem, and argued that the R is not emphatic based on three facts: (1) the F_2-lowering influence of R on other segments is weaker than that of the so-called true emphatics; (2) the more restricted domain of ES from R just named; and (3) the distributional restrictions of R next to front vowels (Section 5.1). Without entirely ruling out the phonetic distinction in (1), Younes (1993) asserts that R must be treated phonologically as an emphatic in Palestinian even if it does not measure up to the more established emphatic phonemes. Other Type-II dialects where /rˤ/ is reported to cause bidirectional ES include Syrian (Cowell 1964), Southern Bedouin Jordanian (Al Mashaqba 2015), and Northern Rural Jordanian (Bani-Yasin & Owens 1987); with examples like [bˤarˤrˤaˤ] 'outside', [fˤarˤwˤa] 'hide' (noun), and [xˤanʤˤarˤ] 'dagger'.

Moving on to the featural composition of emphatic /rˤ/ in RPA, I will largely reconstruct Herzallah's (1990) analysis in the PSM. As a member of the natural class of ES triggers, /rˤ/ will be assigned a "secondary" V-place [dorsal] feature. As a blocker to ES from /rˤ/, the /w/ is assigned V-place [labial], which is incompatible with a tier-adjacent V-place [dorsal]. Non-emphatic coronal consonants and front vowels are also opaque in that they cause an adjacent /rˤ/ to de-emphaticize. These can be split into a V-place [coronal] class containing /ʃ, ʧ, ʤ, j/ as well as /i, iː, eː/, and a C-place [coronal] class containing /θ, t, d, s, z, n/. Again, we can assume an incompatibility condition between [coronal] and /rˤ/'s V-place [dorsal]. Velar /k, x, ɣ/, too, are opaque in that they de-emphaticize a preceding /rˤ, sˤ, ðˤ/. If the former are assigned C-place [dorsal] and the latter V-place [dorsal], then de-emphasis can be explained as an OCP [dorsal] effect across nodes that will delink the emphasis feature.

Beyond emphasis spread, the /rˤ/ phoneme triggers complete assimilation of the definite article /l/, a process known to be initiated by coronals. Similar to (8) in Type-I dialects, both emphatic [rˤ] and non-emphatic [r] realizations are active in the process, suggesting that the rhotic belongs to the natural class of coronals, and hence is specified for C-place [coronal]. Herzallah (1990: 115–116) takes the fact that de-emphaticized [r] still triggers /l/-assimilation – just as any other coronal – as an indication that /rˤ/ does not lose its [coronal] feature upon de-emphasis, or else it would not trigger this phrase-level process.

Finally, /rˤ/ in RPA partakes in coronal sonorant assimilation, by which /l/ fully assimilates to /rˤ/ and /n/ to /rˤ, l/; see (9). The process is also reported in Syrian (Cowell 1964), Urban Jordanian (Zuraiq & Zhang 2006), Northern Rural Jordanian (Bani-Yasin & Owens 1987), and Southern Rural Jordanian (Al Huneety 2015), among other dialects in this group. A related observation by McCarthy (1986), cited in Herzallah (1990), is that the consonants /n, l, rˤ/ do not co-occur in the same root. What this all entails is that /n, l, rˤ/ form a class of coronal sonorants, and are consequently specified for C-manner [open] and V-manner [closed]. The existence of a V-manner feature is, then, what differentiates /rˤ/ from the emphatic obstruents, and is responsible for its discrete performance.

In summary, it has been shown that [r] and [rˤ] are realizations of one phoneme in this group, and that this phoneme is underlyingly emphatic, despite two types of patterning. On the one hand, /rˤ/ patterns with other emphatic coronals in its distribution and in inducing leftward and rightward ES. On the other, it partially differs from those emphatics due to its vulnerability to be de-emphaticized and to its more limited ES domain. I proposed that /rˤ/ has the representation in Figure 4, with C-place [coronal] and V-place [dorsal] plus C-manner [open] and V-manner [closed]. This is the same as emphatic /rˤ/ for Type-I dialects (Figure 3). When de-emphaticized under various conditions, the V-place node is delinked. After the emphatic-R dialects, we examine dialects with a single, plain /r/ phoneme.

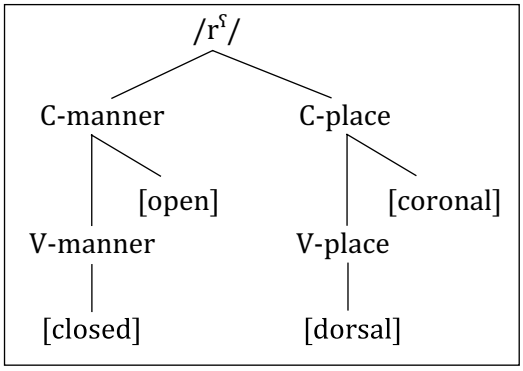

Figure 4: Representation of /rˤ/ in Type-II dialects.

6 Type III: The plain-R dialects

This group has one R phoneme, which is underlyingly non-emphatic, yet argued to be both coronal and dorsal. The plain-R dialects belong to three traditional dialect families: (1) the Mesopotamian *gilit*-dialects of Iraq, which also extend into Kuwait, northeastern Syria, and Iran; (2) the Peninsular Arabic dialects comprising Yemeni, Hijazi, Najdi, Omani, and other dialects of the Persian Gulf; and (3) most peripheral Arabic dialects, such as Maltese, Cypriot, Uzbekistani, Juba, and Ki-Nubi. In the first two subgroups, the /r/ phoneme has plain [r] and emphatic [rˤ] realizations – phonetically alveolar taps or trills – which are more or less predictable from the phonological context. The peripheral subgroup, on the other hand, represents dialects that have lost all emphatic versus non-emphatic contrasts in their consonant inventory.

Our example dialect will be Muslim Baghdadi Arabic (MBA) from subgroup (1). One reason for selecting MBA is the abundant descriptive and linguistic work in existence. Besides that, MBA is defined as an urban variety with stark Bedouin features, and is therefore an exemplar for both subgroups (1) and (2). From subgroup (3), Maltese will be mentioned where relevant. We keep to the structure of the two previous sections.

6.1 The distributional facts of R

The literature on MBA lists one plain /r/ phoneme (see e.g. Erwin 1963; Blanc 1964; Altoma 1969); and no minimal pairs that suggest a phonemic split of R are ever given. There are nonetheless two R allophones in complementary distribution: one emphatic and one plain (Shamdin Agha 1969: 54). According to Rahim (1980: 245–246), the non-emphatic [r] is found before a high front vowel [i/iː] or glide [j] in the same syllable (20).

(20) Plain [r] before [i/iː] and [j] in *MBA*

[riːʃ]	‘feathers’	[bariːd]	‘post office’
[ʤwaːriːb]	‘stockings’	[ʔariːd]	‘I want’
[risam]	‘he drew’	[daris]	‘lesson’
[baːrid]	‘cold’	[loːri]	‘lorry’
[rjaːʤiːl]	‘men’	[ʕaːrj-a]	‘naked-F.SG’

Otherwise, the R phoneme is realized as an emphatic or pharyngealized [rˤ]. The emphatic gesture is most audible in the vicinity of obstruent emphatics /sˤ, ðˤ, tˤ/ (21a) and low back vowels [a/aː] (21b), but also occurs next to other vowels (21c). Notice that in (21b) only the adjoining low vowel is backed; in (21a) more vowels and consonants are backed due to the influence of ES from /sˤ, ðˤ, tˤ/; while in (21c) no other segment is audibly backed.

(21) Emphatic [rˤ] in various environments

a.	[mụsˤrˤạːn]	‘intestine’	[rˤsˤạːsˤị]	‘grey’
	[xụðˤrˤạw-aːt]	‘vegetables’	[ʕạrˤðˤ]	‘honor’
	[mụtˤrˤạːn]	‘archbishop’	[wạrˤtˤạ]	‘plight’
b.	[rˤạnnaːn]	‘resounding’	[rˤạːfaʤ]	‘he befriended’
	[ħanʤarˤạ]	‘larynx’	[zawrˤạːʔ]	‘an epithet for Baghdad’
	[ʃakạrˤ]	‘sugar’	[minʃạːrˤ]	‘a saw’
c.	[rˤubuʕ]	‘quarter’	[baːsburˤt]	‘passport’
	[zambuːrˤ]	‘wasp’	[ʕarˤuːs]	‘bride’
	[θoːrˤ]	‘bull’	[trˤeːla]	‘trailer’

Based on these facts alone, it appears that R is an emphatic phoneme that undergoes de-emphasis to [r] in limited environments – seeing that [rˤ] is the elsewhere allophone. Youssef (2015), however, describes a distributional pattern in MBA that invalidates the underlying emphatic nature of R. In this pattern, [i] and [u] exist in complementary distribution in specific morphological classes, e.g. in epenthetic vowels of derived nouns and in initial stem vowels of perfect/imperfect Measure-I verbs, among others. Although /i/ and /u/ are otherwise contrastive, the appearance of [u] in those classes is determined by two neighboring labial and dorsal consonants, and R is a participant. Let us take the synchronic distribution of [i]~[u] in epenthetic vowels as an example.

Like many Arabic dialects, MBA has a tendency to break up a final consonant cluster with an epenthetic vowel (EV). As a result, derived nouns of the morphological pattern CaCC – wherein the stem vowel is always /a/ – will surface as CaCvC via epenthesis, and the EV may be [i] or [u] depending on the consonantal environment.[10] If the cluster consists of a labial /b, p, f, m/ plus a velar /k, g, x, ɣ/, uvular /q/, emphatic /tˤ, sˤ, ðˤ, lˤ/, or an R (collectively, *back consonants*) in either order, then the EV is always [u] (Blanc 1964: 55–56), as exemplified in (22a). The same is observed when the cluster consists of a labial and some other consonant provided the initial consonant is an emphatic (22b). Apart from these [u]-domains, the EV is [i]. And as a rule, [i] surfaces if only one of the cluster consonants (C_2/C_3) is a labial or a back consonant, or if the cluster consists of two back consonants (22c).

(22) Epenthetic vowel distribution in *MBA*: [u]-contexts (a–b) vs. [i] contexts (c)

a.	[nafux]	‘inflating’	[dabuɣ]	‘tanning’
	[sagum]	‘boredom’	[waquf]	‘religious endowment’
	[ʔamurˤ]	‘order’	[ħafurˤ]	‘digging’
	[ʕạtˤụf]	‘compassion’	[ḥạbụtˤ]	‘dropping’
	[bạsˤụm]	‘stamping’	[qạbụðˤ]	‘getting paid’
b.	[sˤạfụn]	‘meditating’	[tˤạʕụm]	‘taste’
	[tˤạbụl]	‘drumming’	[tˤạfụħ]	‘overflowing’
c.	[rˤạmiz]	‘symbolizing’	[rˤạʔif]	‘showing pity’
	[ʔaxið]	‘taking’	[lạtˤiʕ]	‘licking’
	[fạðˤil]	‘favor’	[ðˤạɣịtˤ]	‘pressure’

The distribution shows that the EV splitting final clusters of derived nouns is predictable in MBA, and that epenthetic [u] can be construed as a contextual variant of /i/ in those cases (described as *labialization*). Here, some comments are in order concerning the behavior of

[10] Word-final clusters in this pattern have a synchronic status; they are preserved in sandhi when a subsequent word or morpheme begins with a vowel. Compare, for instance, [wạsˤịtˤ] ‘middle’ – [wạsˤtˤ in-nahạrˤ] ‘mid-stream’ or [nạbụðˤ] ‘pulse’ – [nạbðˤ-ạk] ‘your pulse’. Words with consistent complex codas also survive in MBA, although mostly limited to foreign and Literary Arabic borrowings.

R. First of all, R functions as a trigger of labialization in (22a), in [ʔamurˤ] and [ħafurˤ], where [u] must be flanked between a labial and a back, emphatic or non-emphatic, consonant. R is not, however, found in (22b), where [u] must be adjacent to the labial but not to the back (emphatic) trigger, which can extend its backness from a distance via ES. Indeed, what we see in (22c) is that an initial R and a C_2/C_3 labial do not cause labialization, i.e. they produce epenthetic [i], as in [rˤạmiz] and [rˤạʔif]. This suggests the characterization of R as underlyingly non-emphatic in MBA, or else it would perform like the emphatics in (22b). We return to this issue in Section 6.2, where emphasis spread provides more definitive clues. Now we turn briefly to the treatment of R in other Type-III dialects.

According to Watson (2002: 16), R cannot be described as pharyngealized in several varieties of Arabic. Yemeni (Sanʿāni) /r/, for instance, has the allophone [rˤ] only next to, or no more than one vowel from an emphatic obstruent, as in [mạḥḍˤạrˤ] 'official report' and [gụrˤtˤ] 'earring'; elsewhere it is realized as a plain [r], even in words where other Peninsular dialects have an emphatic realization, such as [raːs] 'head', [ħarr] 'hot', and [saːra] 'Sarah' (Qafisheh 1990: 173). Another dialect where the distribution of emphatic [rˤ] is severely restricted is Bedouin Hijazi (Al-Mozainy 1981), in which /r/ appears as [rˤ] only when the adjacent vowel is [u/uː], and plain [r] when it is [i/iː] or [a/aː]. Lastly, in their investigation of a wide range of Peninsular dialects, Johnstone (1967), Prochazka (1988), and Holes (1990) list only non-emphatic /r/ as a distinctive phoneme.[11]

Peripheral Arabic dialects that have lost the emphatic consonants obviously belong to the plain-R type. Consider the forms in (23a), where emphatic /sˤ, tˤ, dˤ, rˤ/ in ECA correspond to their non-emphatic cognates /s, t, d, r/ in Maltese. What is interesting in many such dialects is that the historical emphatics have left traces in vocalism. The distribution of the diachronic low vowels /a, aː/ in Maltese is a case in point (Cowan 1966; Mifsud 2008). Low vowels are retained when contiguous to pharyngeal consonants [ħ, ʕ] or an earlier emphatic, or else realized with raising as [e] or [ie] (23b). Cowan (1966) maintains that an originally allophonic variation of vowels based on emphatic-plain contexts was followed by phonemicization of these variants when the emphatics were no longer present as a conditioning factor. Or, put differently, the emphasis component has remained in the vowels after disappearing from the consonantal system; see also Walter (2002).

(23) *ECA* (left) vs. *Maltese* (right): comparing emphatics and low vowels (Cowan 1966: 28–29)

a.	[sˤụːf]	vs.	[suːf]	'wool'	[tˤạẉịːl]	vs.	[twiːl]	'long'
	[dˤụfr]	vs.	[difer]	'fingernail'	[nạːrˤ]	vs.	[naːr]	'fire'
b.	[sˤạːfi]	vs.	[saːfi]	'pure'	[ʔạrdˤ]	vs.	[ʔart]	'earth'
	[kalb]	vs.	[kelp]	'dog'	[kaːn]	vs.	[kien]	'he was'

Overall, then, this section has given distributional evidence of a single R phoneme in Type-III dialects, mainly by showing that its [r] and [rˤ] realizations are phonologically predictable. The labialization pattern has additionally shown that R behaves more like velar-uvular than emphatic triggers. The next section explores a different type of evidence.

6.2 Phonological processes involving R

The triggers of emphasis spread in MBA are limited to /sˤ, ðˤ, tˤ, lˤ/, in which case we observe a bidirectional long-distance pharyngealization effect within the uninflected word domain (24a); see Youssef (2013: 126–139) for details. Where none of these emphatics

[11] The single work that refers to two R phonemes in this region is Kabrah (2004) in her study of Meccan Arabic. However, the patterns displayed for R are analogous to those given here, and there are no contrasts, which calls her two-phoneme proposal into question.

exists, three other consonants, /r, q, ɣ/, seem to have a local backing influence on subsequent low vowels (24b); see also (21b) for more examples on R.

(24) ES from the emphatics /sˤ, ðˤ, tˤ, lˤ/ (a) compared with /r, q, ɣ/ (b)

a.	[sˤụbạɣ]	‘he painted’	[gạsˤsˤạːbˌ]	‘butcher’
	[ðˤạxxạm]	‘he enlarged’	[ḥạðˤạm]	‘he digested’
	[tˤạːbụːg]	‘brick’	[nạʃạːtˤ]	‘activity’
	[ʔạlˤmạːn]	‘Germans’	[mxạbˌbạlˤ]	‘crazy’
b.	[qạːnuːn]	‘law’	[qạss]	‘priest’
	[ʁạːz]	‘gas’	[biːrˤạ]	‘beer’

Central to the current discussion is why these segments cause backing, and whether this effect is ES or something else. On the one hand, Al-Ani (1970: 32–35) has pointed out an F_2 lowering effect of /q, ɣ/ on following [a/aː] and [i/iː] vowels, which does not extend farther. Influence on preceding vowels is insignificant. What we also notice is that these consonants have some posterior (or dorsal) articulation: the stop /q/ is uvular, while the fricative /ɣ/ is realized as uvular [ʁ] in most contexts (Rahim 1980: 242–243; Giannini & Pettorino 1982: 24). We infer that the backing is no more than low-level coarticulation, not ES, which is a long-distance effect by definition. Now the same may be said about R in MBA. The rhotic is described as a pharyngealized tap/trill – unless adjacent to [i/iː] – that results in lowering F_2 of a following [a/aː] (Al-Ani 1970: 33). Again, this impact is rarely attained in distant vowels, which points toward phonetic conditioning, rather than phonological ES. The conclusion is that /r, q, ɣ/ are not emphatics, even though they have a dorsal articulation.

Three important facts about R have so far been presented. First, there is one R phoneme; given that the distinction between [r] and [rˤ] is allophonic. Second, this phoneme is a non-emphatic /r/; it does not behave like the emphatic triggers of labialization and long-range ES. And third, it is dorsal; it does pattern (phonologically) with the velar-uvular /q, k, g, x, ɣ/ in triggering labialization and (phonetically) with /q, ɣ/ in having a coarticulatory backing effect. Having established this, R must be specified for a “primary” C-place [dorsal] feature together with the velar-uvular consonants, but lacks V-place [dorsal] which is reserved for emphatics. So as long as a Type-III dialect exhibits the labialization pattern, its plain /r/ phoneme will be featurally different from the /r/’s in Type I (above) and Type IV (discussed below).

The specification of a C-place [dorsal] feature on the phonetically alveolar rhotic calls to mind the case of velar laterals in the Papuan languages Yagaria and Kanite, discussed in Blevins (1994). Blevins argues for a coronal (featural) component in these articulatorily dorsal laterals, citing only phonological evidence – from alternations, distribution, and loanword phonology. What this suggests is that the loose relationship between phonetics and phonology holds not only for rhotics, but potentially for the larger class of liquids.[12] That said, the /r/ in Type-III dialects is specified for other straightforward place and manner features, phonological support for which is by now familiar.

First, just as in the previous dialect types, /r/ is among the coronal consonants that trigger assimilation of the definite article /l/ in MBA, as in /l-rizma/ → [r-rizma] ‘the parcel’ (Erwin 1963); see also (8). The process is attested in all dialects of this group, counting peripheral ones like Maltese (Borg 1997). And it follows that /r/ is a member of the natural class of C-place [coronal] segments.

The next process is coronal sonorant assimilation, by which /n, l, lˤ/ regressively assimilate to /r/ across morpheme and word boundaries in MBA, and also in Southern Najdi

[12] Many thanks to an anonymous reviewer for raising this point, and for suggesting the Blevins reference.

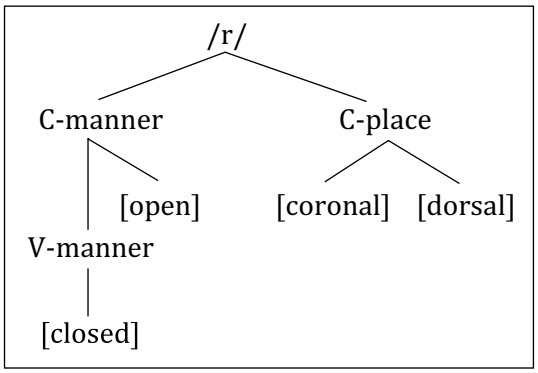

Figure 5: Representation of /r/ in Type-III dialects.

(Al-Qahtani 2004) and Sanʿāni Arabic (Watson 2002), among others. See similar examples in (9) above. Akin to this process are the alternations between /r/ and /n, l/ in a number of Type-III dialects. In Najdi Arabic (Al-Qahtani 2004), for example, some loanwords exhibit metathesis between /r/ and /n, l/ (25a). And in Maltese, Borg (1997: 256–257) notes a "widespread synchronic trend […] towards reshuffling of liquids" in words of Italian origin, such that /l/ arises in syllable-initial and /r/ in syllable-final position, with some free variation at syllable codas (25b). On the cross-linguistic tendency of liquids to undergo metathesis, see Ultan (1978).

(25) Alternations between /r/ and /n, l/ in *Najdi Arabic* (a) and *Maltese* (b) (target words in boldface)

a.	[mihrˤa̤h]	<	**mihnah**	'profession'
	[barˤziːn]	<	**benzine**	'gasoline'
	[kartajr]	<	**curtail**	—
	[bluʤiktar]	<	**projector**	—
	[rˤa̤bal]	<	**rubber**	—
	[krˤuːzal]	<	**cruiser**	(car brand)
b.	[gamblu]	<	**gambaru**	'crayfish'
	[arblu]	<	**albero**	'mast'
	[porvli]	<	**polvere**	'gunpowder'
	[garigoːr]	<	**caragolu**	'spiral staircase'
	[ʤorf] ~ [ʤolf]			'giant'
	[galbu] ~ [garbu]	<	**garbo**	'good manners'

Together the last two facts point to a natural class of coronal sonorants comprising /r, n, l, lˤ/. This means that /r/ has additional C-manner [open] and V-manner [closed] to account for its sonorancy. See Youssef (2013: 77–78) for a detailed autosegmental analysis.

To sum up, there is one non-emphatic /r/ phoneme in this group, with two allophones. This phoneme patterns with both coronals and non-emphatic dorsals; hence it is characterized by a double place of articulation, C-place [coronal] and C-place [dorsal], but no secondary articulation. In addition, it patterns with the coronal sonorants; and so it also gets C-manner [open] and V-manner [closed] features. Compare the representation of Type-III /r/ in Figure 5 with that of Type-I /r/ in Figure 3, where there is only [coronal] under the C-place node.

7 Type IV: The uvular-R dialects

The fourth group is admittedly the most exotic. Here, not only does the historical R correspond to a uvular fricative phoneme /ʁ/, but there is an alveolar tap-trill /r/ phoneme as well. Type IV comprises primarily the Mesopotamian *qeltu*-dialects of the Tigris and

Southern Kurdistan groups, spoken in the Iraqi cities of Mosul, Tikrit, and Kirkuk (and their surroundings), and by Christians and formerly Jews in Baghdad and Southern Iraq. In those dialects, the uvular R coincides and merges with the etymological /ʁ/ phoneme, *ġayn* (Jastrow 1978: 39). Moreover, the uvular R is found sporadically in some urban dialects of Maghrebi Arabic,[13] but without becoming phonemically identical to *ġayn* (Fischer & Jastrow 1980: 51).

Two representative *qeltu*-dialects will be used in the discussion: Mosul Arabic (MLA) and Christian Baghdadi Arabic (CBA). Data from MLA are based on my work with three native consultants (two females and one male, age range 25–50), while data from CBA are based on the speech of one male consultant in his sixties, in addition to the detailed study of Abu-Haidar (1991). Some reference to the Jewish Baghdadi and Djidjelli Algerian dialects will also be made where appropriate. The exposition follows the same order as before.

7.1 The distributional facts of R

Both MLA and CBA belong to the Tigris branch of *qeltu*-dialects. Besides the characteristic "perseveration" of /q/ (where we find /g/ in the *gilit*-dialects), uvular R is one of the most notable features of this branch which, according to Jastrow (1978), serves as a distinguishing criterion to separate it from the other two, Euphrates and Anatolian, *qeltu*-dialects. There is little doubt that uvular R originates from Old Arabic alveolar /r/, possibly first as a substrate influence from Aramaic. Jastrow (2007) states that it dates back to the medieval Abbasid period; ever since it has become a frequent sound as it also fell into harmony with inherited /ʁ/. The merged phoneme has been described as a voiced post-velar fricative (Watson 2002: 16); and although I prefer to use the uvular [ʁ] symbol, a velar [ɣ] is an equally plausible choice. (According to Paradis & LaCharité 2001: 278, uvular and velar fricatives do not contrast in any Arabic dialect).

A uvular [ʁ] occurs in the majority of MLA and CBA words with etymological R, though not necessarily in identical words in the two dialects. Example set (26) illustrates that these are well established, everyday words. But note that, contrary to Jastrow (1979), lexical forms with original geminate (trilled) [rr] retain the gemination in [ʁʁ], e.g. in [bạʁʁạ] 'outside' and [ħạʁʁ] 'heat'.

(26) Uvular [ʁ] in various word positions (identical forms in *MLA* and *CBA*)

[ʁiʤʤaːl]	'men'	[ʁạːħ]	'he went'
[fʁeːʃ]	'bed'	[sˁụ̣ʁsˁụ̣ʁ]	'cockroach'
[tˁạːʁ-it]	'it flew'	[ji-ʃtaʁi]	'he buys'
[nahạːʁ]	'daytime'	[ʔạðˁẹːfiʁ]	'fingernails'
[kafkiːʁ]	'colander'	[kθiːʁ]	'many'

On the other hand, several studies have remarked a tendency to re-establish alveolar [r] in the two dialects (e.g. Blanc 1964; Jastrow 1979; Abu-Haidar 1991). This is especially true for loanwords from foreign languages like Turkish, Persian, and English (27a), and from Literary Arabic or one of the Arabic dialects (27b). The Arabic words with [r] incorporate religious vocabulary, proper names, or terms for abstract ideas, although some are not even manifestly loanwords, such as the verbs in (27c). The disposition toward [r] in loanwords was also observed in Jewish Baghdadi (Mansour 1957), and the dialects of Tikrit (Johnstone 1975) and Djidjelli (city in northeastern Algeria) (Marçais 1956).

[13] More specifically, it appears in the old pre-Hilalian dialects of North Africa, e.g. in the cities of Tunis in Tunisia; Algiers, Constantine, Cherchell, Tlemcen, Nedroma, and Djidjelli in Algeria (Cohen 1912; Marçais 1956); and Fez, Meknes, Tetouan, Chefchaouen, Taza, as well as in some Jewish dialects in Morocco (Heath 2002; Aguadé 2003) – but note that in Fez R is arguably an approximant, not a fricative (Hachimi 2005).

(27) Alveolar [r] in foreign loans (a) and Arabic loans and non-loans (b–c)

a.	[ʤiːgaːraˌ]	‘cigarette’	[taːjir]	‘tire (car)’
	[praˌstiːʤ]	‘prestige’	[nafar]	‘person’ (Persian)
	[ʃarbat]	‘sherbet’ (Turkish)	[qoːndaraˌ]	‘shoe’ (Turkish)
b.	[raˌbb-i]	‘my God’	[gaˌraˌːjib]	‘relatives’ (MBA)
	[ʔibraˌːhiːm]	(male name)	[ʃariːf]	‘honorable, (name)’
	[taʔaθθur]	‘influence’	[mustaʃaːr]	‘consultant’
c.	[qaˌraˌ]	‘he read’	[rubuħ]	‘he won’
	[riˌkaˌðˁ]	‘he ran’	[nikar]	‘he denied’

At the same time, there are a few minimal pairs contrasting /r/ with /ʁ/, both inherited and new (28a–b), which are sufficient to establish them as separate phonemes in Type-IV dialects; and “once a phoneme, always a phoneme”.[14] Mansour (1957), by the same reasoning, advocates the two-phoneme hypothesis in Jewish Baghdadi. He lists more contrasts than those found in MLA and CBA (28c), and suggests that the forms with /r/ are recent Literary Arabic loans whereas those with /ʁ/ have already existed with a different, more basic meaning in the dialect. However, he carefully delineates this as a by-product of borrowing rather than a semantic restriction, since there is no independent support for the latter; see Note 14.

(28) Contrasts involving /r/ vs. /ʁ/ in Type-IV dialects

a.	[raˌsuːl]	‘prophet’	[ʁaˌsuːl]	‘laundry’
	[jiˌ-sˁbˌuˌr]	‘he forbears’	[jiˌ-sˁbˌuˌʁ]	‘he paints’
b.	[rˌaˌmˌaˌðˁaːnˌ]	(male name)	[ʁˌaˌmˌaˌðˁaːnˌ]	(lunar month)
	[raˌkkib]	‘he let climb’	[ʁaˌkkib]	‘he assembled’
	[qaˌddir]	‘he estimated’	[qaˌddiʁ]	‘he measured’
c.	[farraˌq]	‘he distinguished’	[faʁʁaˌq]	‘he separated’
	[farr]	‘he threw’	[faʁʁ]	‘he served (food)’
	[ʁaˌjjar]	‘he changed’	[ʁaˌjjaʁ]	‘he dressed up’

From the Maghrebi subgroup, the Arabic spoken in Djidjelli was reported to have a weakened version of R, which is non-trilled and articulated by the back of the tongue against the uvula, ergo [ʁ̞] (Marçais 1956: 17). This [ʁ̞] sound is described as phonetically similar but not identical to the uvular fricative [ʁ], i.e. with less friction noise and a further back point of articulation. And it is asserted that speakers do not confuse them. Hence in this subclass we have a /r/ phoneme that can potentially be realized as [ʁ̞], and a separate /ʁ/ phoneme.

One last relevant pattern is vowel raising (*imāla*) of the feminine suffix *-a* (cf. (12) above). The suffix surfaces as [i] after a final “front” consonant (29a) and as [a/aˌ] after an emphatic or back consonant, [ʁ] and [r] included (29b). There are two exceptions to *imāla*, known in both MLA (Jastrow 1979: 40) and CBA (Abu-Haidar 1991: 30). First, a raised [i] appears after a [ʁ] reflex of old *r* where the preceding stressed vowel is front (29c). Also, no *imāla* is attested in loanwords ending in /a/ regardless of which consonant comes before, e.g. in [sˁoːdˌaˌ] ‘soda’ and [doːndirma] ‘ice cream’. The implications of *imāla* will be dealt with in Section 7.2.

[14] Tawfiq (2010) attributes the pairs in (28a) to a semantic restriction against lexical duplicates in MLA; that is, [r] is realized to avoid confusion with words that have inherited [ʁ] – with the exception of [sˁaˌːʁ], in which the [ʁ] may be a variant of /r/ to mean ‘became’ or of /ʁ/ to mean ‘devised’. He therefore maintains that underlying /r/ has [ʁ] and [r] variants, while underlying /ʁ/ (*ġayn*) has just [ʁ], and that the two phonemes do not merge.

(29) Feminine suffix allomorphy (identical forms in *MLA* and *CBA*)

a.	[ʤeːʤi]	‘chicken’	[madrasi]	‘school’
	[sani]	‘year’	[bˌaṭˤtˤaˌːnijji]	‘blanket’
b.	[maʁaqaˌ]	‘sauce’	[ʁaˌxiːsˤ-aˌ]	‘cheap-F.SG’
	[bˌaṭˤtˤeːxaˌ]	‘melon’	[luʁaˌ]	‘language’
	[xaˌmiːraˌ]	‘yeast’	[maʁa]	‘woman’
c.	[ʔibʁi]	‘needle’	[xaˌbiːʁ-i]	‘expert-F.SG’
	[gbiːʁ-i]	‘big-F.SG’	[faqiːʁ-i]	‘poor-F.SG’

In this section we have examined distributional evidence, including from minimal pairs, for two R phonemes in these dialects: /ʁ/ which is a reflex of old *r* merged with inherited /ʁ/, and /r/ found principally in loans. While /r/ is exclusively rhotic, /ʁ/ cannot be claimed so, given that it stands equally for historical *r* and *ʁ*. So do we expect, along with various researchers, that the diachronic change will not lead to changing the phonological behavior of the rhotic? To answer this, we need to examine phonological processes that show whether /ʁ/ behaves as a coronal sonorant or as a dorsal fricative. This is the purpose of the next section.

7.2 Phonological processes involving R

Blanc (1964: 21) points out that the diachronic shift from [r] to [ʁ] has resulted in the latter sound appearing in “positions strange to it in Old Arabic […] notably in contact with /q, x/”. These abnormal contacts have led to further phonetic change in this group, for instance in the form of total assimilation. As noted by Abu-Haidar (1991: 10), expected sequences like /qʁ/ and /xʁ/, where /ʁ/ is a reflex of etymological *r*, will surface as [qq] and [xx] respectively (30). And although this is a clear pattern in the two dialects under scrutiny, Blanc (1964: 22) gives some unassimilated forms in CBA, such as [ʔaqʁab] ‘nearer’ or the optional [ʕaqʁabi] ~ [ʕaqqabi] ‘scorpion’, adding that assimilated forms are generally more common in Jewish Baghdadi. In Djidjelli Arabic, [ʁ] and [ʁ] are “difficult to differentiate when they appear adjacent to each other” (Marçais 1956: 17), which can also be interpreted as assimilation.

(30) Regressive assimilation of /ʁ/ to /q, x/ in *CBA*

[ʔaxxaˌs]	‘dumb’	[l-ixxi]	‘the other’
[ʕaˌqqoːqaˌ]	‘frog’	[ʔaqqaˌʕ]	‘bald’

In some contexts, again following Blanc, there is a tendency toward vocalization, whereby a [w]-like articulation of /ʁ/ is identified. For instance, the [ʁ] in [quʁuːn] ‘horns’, [fuʁħaːn] ‘happy’, and [ʔakbaʁ kaððaːb] ‘biggest liar’ is perceived with little or no audible velar constriction due to the influence of the adjacent /uː/, /ħ/, and /k/ sounds. There are occasions on which full vocalization takes place, too. As demonstrated in (31a), a long back rounded vowel [oː] or [uː] appears in MLA instead of /u/ followed by a uvular /ʁ/, but only if the preceding consonant is a back /q, x, ʁ/ (Jastrow 1979; Tawfiq 2010). These changes seem to be connected to speech rate, and so in careful speech no assimilation occurs, hence the alternate forms in (31a). An outdated feature of MLA is the vocalization to [oː] in words that have the digit 4 built in (e.g. 14, 40, 400), where the modern pronunciations have re-established the [ar] sequence, as indicated in (31b). (Blanc remarked back in 1964 that one of his informants considers the [oː] forms old fashioned, which was echoed by my informants).

(31) Vocalization of /ʁ/ in $C_{(q/x/ʁ)}$ u_ C contexts in *MLA*

a.	/quʁsˁa/	→	[qo̯ːsˁa̯]	~	[qu̯ʁsˁa̯]	‘bread loaf’
	/xuʁfeːn/	→	[xuːfeːn]	~	[xuʁfeːn]	‘sheep’
	/ʁuʁbeːl/	→	[ʁuːbeːl]	~	[ʁuʁbeːl]	‘sieve’
b.	/ʔarbaʕa/	→	[ʔoːbʕa]	→	[ʔarbaʕa̯]	‘four’
	/ʔarbʕiːn/	→	[ʔoːbʕiːn]	→	[ʔarbaʕiːn]	‘forty’
	/ʔarbʕaː/	→	[ʔoːbʕaː]	→	[ʔarbiʕaːʔ]	‘Wednesday’

Marçais (1956) mentions a comparable tendency in Djidjelli Arabic, whereby a final uvular R is not pronounced, and the preceding consonant or vowel seems to be prolonged with an [a]-like element, e.g. [biːᵃ] ‘a well’, [tuːᵃ] ‘bull’, [sˁa̯bˁᵃ] ‘patience’.

In contrast with assimilation, there is also dissimilation: a tendency to realize the old *r* as [r], rather than [ʁ], in close proximity to an inherited /ʁ/ and a back or pharyngealized vowel (32a). But where the two root consonants are separated by a front vowel or palatal /j/, the co-occurrence restriction does not apply, and so two instances of [ʁ] occur (32b). This curious arrangement is found in MLA (Tawfiq 2010) and CBA (Abu-Haidar 1991), as well as in Jewish Baghdadi Arabic (Blanc 1964).

(32) Avoidance (a) vs. tolerance (b) of two [ʁ]’s in the same word (identical forms in *MLA* and *CBA*)

a.	[barʁuːθ]	‘flea’	[farra̯ʁ]	‘he emptied’
	[ʁa̯rb]	‘west’	[ʁa̯ːra̯]	‘raid’
	[ʁura̯ːb]	‘crow’	[roːʁa̯ːn]	‘patent leather’
b.	[ʁiʁi]	‘glue’	[ʁeːʁ]	‘other’
	[zʁa̯jjaʁ]	‘small’	[ʁa̯jjaʁ]	‘he changed’

Assimilation, vocalization, and dissimilation can thus be viewed as ways to resolve the newly created, unusual contacts between the uvular R and the back consonants /q, x, ʁ/. Assuming these are active phonological processes, they are apparently motivated by an OCP violation, and we can propose that /q, x, ʁ/ are all specified for C-place [dorsal]. In the case of total assimilation, the OCP violation on this tier will lead to merger of other consonantal features. In vocalization, the [dorsal] feature on /ʁ/ will merge with the vocalic [dorsal] on an adjacent /u/. And in dissimilation, where the only trigger is the inherited fricative /ʁ/, we need to propose two additional features that exclude other dorsal triggers. These are C-manner [open], designating friction, and C-laryngeal [lax], designating voice (see Morén 2003: 222–233). The feature [lax], in the sense of “lenis”, is distinctive as it differentiates /ʁ/ from /x/.

To work out the feature composition of /r/, let us examine assimilation of the definite /l/. It comes as no surprise that triggers are the coronal consonants (see (8) above); hence /r/ is included but not /ʁ/ (irrespective of its origin), as exemplified in (33). My data exhibit no discrepancy between the two dialects in this respect: in accordance with Jastrow (1979) for MLA, but in conflict with Abu-Haidar (1991) who states that the triggers in CBA are not limited to coronals, and so include both /r/ and /ʁ/. It is possible that this is a fast-speech-only phenomenon which I was not able to elicit in my pilot study, so I will not rule it out.

(33) Assimilation of the definite article /l/ to /r/ (a), but not to /ʁ/ (b) (identical forms in *MLA* and *CBA*)

a.	[ʔir-ra̯ːbiʕ]	‘the fourth’	[ʔir-risaːla]	‘the message’
	[ʔi̯ːr-ra̯qi̯sˁ]	‘the dancing’	[ʔir-ra̯ʔi]	‘the opinion’

b. [ʔil-ʁạbiːʕ] ‘the spring’ [ʔil-ʁiʤʤaːl] ‘the man’
[ʔil-ʁạχiːsˁ] ‘the cheap’ [ʔil-ʁạqạbi] ‘the neck’

What /l/-assimilation tells us about /ʁ/ is that it is a non-coronal. The /r/ phoneme *is* one of the coronal triggers and so must be specified for C-place [coronal]. But should it be specified for [dorsal] too? For one thing, the *imāla* data in (29) suggest that /ʁ/ and /r/ behave like emphatic or back consonants. This matches the behavior of /ʁ/ in other patterns, and thus suits its characterization as C-place [dorsal]. /r/ does not display similar signs of dorsality. It does, however, cause backing of a following low vowel along with the non-emphatic consonants /ʁ, x, q, ɡ, h, ħ, ʕ/, as many of the transcriptions indicate. Because the effect is apparently gradient and very local, in contrast with the categorical long-range emphasis spread from /sˁ, ðˁ, tˁ/, I argue that backing from /r/ and those consonants is phonetic coarticulation rather than ES (see Section 6 for a full discussion on MBA /r/). The same goes for *imāla*. And on that account /r/ is a non-emphatic segment, and has no [dorsal] feature.

Lastly, we should substantiate sonorancy. For /ʁ/ there is none. /r/, however, triggers coronal sonorant assimilation at normal speech rate – see (9) – although it was limited to /l/ targets in my data, as in /ji-ʃtiɣal rassaːm/ → [ji-ʃtiɣar rạssaːm] ‘he works as a painter’. Further, Jastrow (1979: 41) refers to an interesting pattern in the dialect of Baḥzāni (a town near Mosul) by which nominal forms of the $C_1VC_2C_3$ shape break up the final coda cluster only if C_3 is a sonorant /m, n, r, l/. I will take these as indications that /r/ is generally sonorant in this group, and assign it the usual C-manner [open] and V-manner [closed] features.

In short, based on the evidence presented here, there is a coronal sonorant /r/ and a dorsal fricative /ʁ/ in Type-IV dialects, and they are distinct phonemes. It is both the rarity of languages with more than one R-phoneme and those with uvular R (Maddieson 1984) that make the dialects in this group particularly remarkable. The suggested representation of a non-emphatic /r/ in Figure 6 (a) is by now standard: C-place [coronal], C-manner [open], and V-manner [closed]. The uvular /ʁ/, on the other hand, was assigned C-place [dorsal], C-manner [open], and C-laryngeal [lax] (b). This distinction is in line with Maddieson’s (1984: 88) generalization that a language with two R phonemes is “unlikely to restrict their contrast to place of articulation”.

Turning back to the question at the end of Section 7.1: Can we contend that the uvular R remained a rhotic in this group? Our phonological evidence implies otherwise. The new /ʁ/ sound has wholeheartedly melted with the fricative /ʁ/ phoneme, and no longer behaves as a sonorant. Wiese (2001), Scobbie (2006), and Chabot (2019) may be correct about the diachronic stability of R across many languages, but what we saw here poses a challenge to their hypothesis.

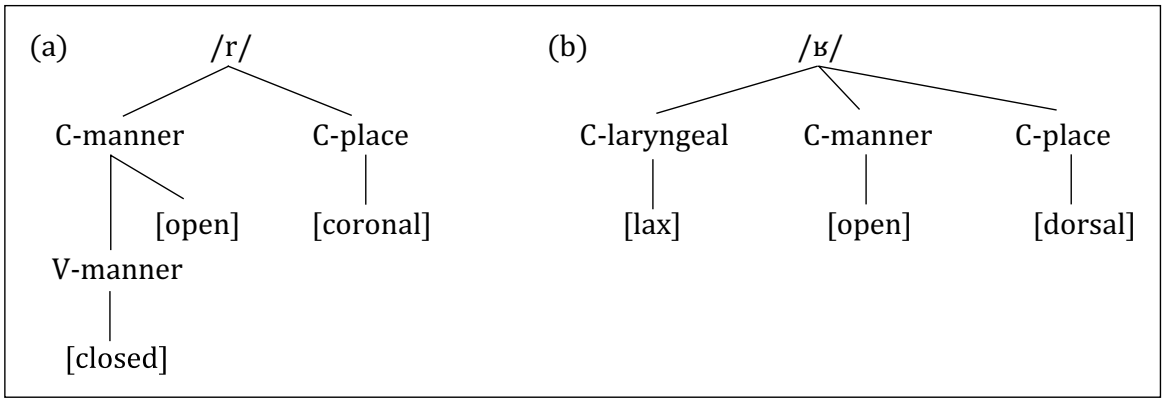

Figure 6: Representation of /ʁ/ and /r/ in Type-IV dialects.

8 Conclusion

This paper has confirmed that there is extensive variability in Arabic R, both contrastive and phonetically conditioned, observed across and within dialects. To answer the *phonological* questions – on underlying R phonemes and their representations – we sought evidence in the *phonological* behavior of R; i.e. in its distribution and the processes it actively participates in. Investigation of such behavior in a wide range of Arabic dialects reveals four dialect types based on the nature and number of R phonemes. We found that the R allophones in the first three types are the same, a plain [r] and an emphatic [rˤ], but the contrastive phonemes are different. There are two phonemes in Type-I dialects, viz. /r/ and /rˤ/, while in II and III there is a sole phoneme that is underlyingly emphatic and plain, respectively. In Type IV there are two phonemes again, this time a uvular fricative /ʁ/ and a plain /r/.

We also discovered that the unique patterning of R in each class is reflected in the feature representations, as summarized in Table 2. Looking down the feature columns, we can make a few observations. First, all R phonemes except uvular /ʁ/ have C-place [coronal], as well as the sonorant feature V-manner [closed]. Emphatic /rˤ/'s in I and II are characterized by an additional, secondary V-place [dorsal]; the plain /r/ in III and the uvular /ʁ/ in IV by primary C-place [dorsal]. The uvular /ʁ/ has only a C-manner [open] feature but no V-manner, and is therefore a non-sonorant. It is also the only R where voicing, C-laryngeal [lax], is distinctive.

While each of those specifications was phonologically and independently motivated, none of them is articulatorily implausible. The explanation lies, on the one hand, in R's phonetically heterogeneous existence, and, on the other, in the unreasonableness of positing an exclusive feature or set of features to unify all types of R (see Section 2.1). In fact, the final feature groupings are in line with Barry's (1997) solution of relating the various lingual R's to one another, and the uvular R's to one another. They are also compatible with the *family resemblance* model (Lindau 1985), whereby each member of the rhotic class shares some property with another, which in turn shares a different property with the next member, in a chain-like fashion. Here it is the sheer mechanism of the PSM – building structures from less to more complex – that creates those links. Further, the PSM assumes that a given grammar has as few features as possible, i.e. minimal feature specification, so there is evidently no need for a phonological feature of R-sounds that may be labeled "rhotic".

At a more general level, we conclude that R's elusive behavior provides support for a semi-arbitrary phonetics-phonology relationship, in line with Chabot (2019). This is the

Table 2: Summary of feature specifications of the R phonemes in Arabic dialects.

Type	Phonetic forms	Phonemes	Features					
			C-place [coronal]	C-place [dorsal]	V-place [dorsal]	C-manner [open]	V-manner [closed]	C-laryngeal [lax]
I. Split-R dialects	[r]	/r/	✓			✓	✓	
	[rˤ]	/rˤ/	✓		✓	✓	✓	
II. Emphatic-R dialects	[r]	/rˤ/	✓		✓	✓	✓	
	[rˤ]							
III. Plain-R dialects	[r]	/r/	✓	✓		✓	✓	
	[rˤ]							
IV. Uvular-R dialects	[ʁ]	/ʁ/		✓		✓		✓
	[r]	/r/	✓			✓	✓	

case, for instance, when the underlying representation of a rhotic is not entirely predictable from its phonetic realization. The main implication is that distinctive features are not as rigid as most models of feature geometry propose. And it is therefore useful to embrace a model that is both economical and substance free; otherwise many generalizations would be poorly expressed or missed altogether. I hope to have shown that the PSM is a model that fulfils these standards, and that it has a direct bearing on the study of cross-linguistic variation.

Finally, as this paper attempts to fill a (huge) gap in Arabic phonology and micro-typology, the answers and proposals given here should open the door for other researchers to approach this long-avoided topic, both to investigate specific dialects or phonological aspects, or to revisit any of the phenomena discussed here.

Abbreviations

C = consonant, CBA = Christian Baghdadi Arabic, ECA = Egyptian Cairene Arabic, ES = emphasis spread, EV = epenthetic vowel, F_2 = second formant, F.SG = feminine singular, MBA = Muslim Baghdadi Arabic, MCA = Moroccan Arabic, MLA = Mosul Arabic, OCP = Obligatory Contour Principle, PL = plural, PSM = Parallel Structures Model, RPA = Rural Palestinian Arabic, V = vowel.

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Competing Interests

The author has no competing interests to declare.

References

Abu-Haidar, Farida. 1991. *Christian Arabic of Baghdad* (Semitica Viva 7). Wiesbaden: Harrassowitz.

Abumdas, Abdul Hamid A. 1985. *Libyan Arabic phonology*. Ann Arbor, MI: University of Michigan dissertation.

Aguadé, Jordi. 2003. Estudio descriptivo y comparative de los fonemas del árabe dialectal marroquí. *Estudios de Dialectología Norteafricana y Andalusí* 7. 59–109.

Al-Ani, Salman H. 1970. *Arabic phonology*. The Hague: Mouton De Gruyter. DOI: https://doi.org/10.1515/9783110878769

Al Huneety, Anas Ibraheem. 2015. *The phonology and morphology of Wadi Mousa Arabic*. Salford: University of Salford dissertation.

Al Mashaqba, Bassil Muhammad. 2015. *The phonology and morphology of Wadi Ramm Arabic*. Salford: University of Salford dissertation.

Al-Mozainy, Hamza. 1981. *Vowel alternations in a Bedouin Hijazi Arabic dialect: Abstractness and stress*. Austin, TX: University of Texas at Austin dissertation.

Al-Nassir, A. A. 1993. *Sibawayh the phonologist: A critical study of the phonetic and phonological theory of Sibawayh as presented in his treatise Al-Kitab*. London: Kegan Paul International.

Al-Qahtani, Duleim Masoud. 2004. *Sound changes in Arabic sonorant consonants*. Beirut: Librairie de Liban.

Ali, Latif Hassan & R. G. Daniloff. 1972. A contrastive cinefluorographic investigation of the articulation of emphatic – non emphatic cognate consonants. *Studia Linguistica* 26(2). 81–105. DOI: https://doi.org/10.1111/j.1467-9582.1972.tb00589.x

Altoma, Salih J. 1969. *The problem of diglossia in Arabic: A comparative study of Classical and Iraqi Arabic* (Harvard Middle Eastern Monographs 11). Cambridge, MA: Harvard University Press.

Anderson, John & Colin J. Ewen. 1987. *Principles of dependency phonology*. Cambridge, MA: Cambridge University Press. DOI: https://doi.org/10.1017/CBO9780511753442

Anderson, Stephan R. 1981. Why phonology isn't "natural". *Linguistic Inquiry* 12(4). 493–539. https://www.jstor.org/stable/4178242.

Bani-Yasin, Raslan & Jonathan Owens. 1987. The phonology of a northern Jordanian Arabic dialect. *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 137(2). 297–331. https://www.jstor.org/stable/43379559.

Barry, William J. 1997. Another R-tickle. *Journal of the International Phonetic Association* 27. 35–45. DOI: https://doi.org/10.1017/S0025100300005405

Benhallam, Abderrafi. 1980. *Syllable structure and rule types in Arabic*. Gainesville, FL: University of Florida dissertation.

Blanc, Haim. 1964. *Communal dialects in Baghdad* (Harvard Middle Eastern Monographs 10). Cambridge, MA: Harvard University Press.

Blevins, Juliette. 1994. A place for lateral in the feature geometry. *Journal of Linguistics* 30(2). 301–348. DOI: https://doi.org/10.1017/S0022226700016686

Borg, Alexander. 1997. Maltese phonology. In Alan S. Kaye (ed.), *Phonologies of Asia and Africa* 1. 245–285. Winona Lake, IN: Eisenbrauns.

Broselow, Ellen. 1976. *The phonology of Egyptian Arabic*. Amherst, MA: University of Massachusetts dissertation.

Cantineau, Jean. 1960. *Cours de phonétique arabe*. Paris: Libraire C. Klincksieck.

Card, Elizabeth A. 1983. *A phonetic and phonological study of Arabic emphasis*. Ithaca, NY: Cornell University dissertation.

Caubet, Dominique. 1993. *L'arabe marocain* 1. Paris and Louvain: Peeters.

Chabot, Alex. 2019. What's wrong with being a rhotic? *Glossa: A Journal of General Linguistics* 4(1): 38. 1–24. DOI: https://doi.org/10.5334/gjgl.618

Clements, George N. 1991. Place of articulation in consonants and vowels: A unified theory. *Working Papers of the Cornell Phonetics Laboratory* 5. 77–123.

Clements, George N. 2001. Representational economy in constraint-based phonology. In Tracy A. Hall (ed.), *Distinctive Feature Theory*, 71–146. Berlin: Mouton De Gruyter. DOI: https://doi.org/10.1515/9783110886672.71

Clements, George N. & Elizabeth Hume. 1995. The internal organization of segments. In John A. Goldsmith (ed.), *The handbook of phonological theory*, 245–306. Cambridge, MA: Blackwell.

Cohen, David. 1963. *Le dialecte arabe Ḥassānīya de Mauritanie (parler de la Gəbla)* (Études Arabes et Islamiques: Études et Documents). Paris: Librairie C. Klincksieck.

Cohen, David. 1969. Sur le statut phonologique de l'emphase en arabe. *Word* 25. 59–69. DOI: https://doi.org/10.1080/00437956.1969.11435557

Cohen, David. 1970. Les deux parlers arabes de Tunis. In David Cohen (ed.), *Études de linguistique sémitique et arabe*, 150–171. The Hague: Mouton De Gruyter.

Cohen, Marcel. 1912. *Le parler arabe des juifs d'Alger*. Paris: Librairie Ancienne.

Cowan, William. 1966. Loss of emphasis in Maltese. *Journal of Maltese Studies* 3. 27–32. https://www.um.edu.mt/library/oar//handle/123456789/26027.

Cowell, Mark W. 1964. *A reference grammar of Syrian Arabic (based on the dialect of Damascus)*. Washington, D.C.: Georgetown University Press.
Davis, Stuart. 1995. Emphasis spread and grounded phonology. *Linguistic Inquiry* 26(3). 465–498. https://www.jstor.org/stable/4178907.
Dickins, James. 2007. Khartoum Arabic. In Kees Versteegh, Mushira Eid, Alaa Elgibali, Manfred Woidich & Andrzej Zaborski (eds.), *Encyclopedia of Arabic language and linguistics* 2. 559–571. Amsterdam: Brill.
El-Dalee, Mohamed Saleh. 1984. *The feature of retraction in Arabic*. Bloomington, IN: University of Indiana, Bloomington dissertation.
Elramli, Yousef Mokhtar. 2012. *Assimilation in the phonology of a Libyan Arabic dialect: A constraint-based approach*. Newcastle: University of Newcastle Upon Tyne dissertation.
Erwin, Wallace M. 1963. *A short reference grammar of Iraqi Arabic*. Washington, D.C.: Georgetown University Press.
Fischer, Wolfdietrich & Otto Jastrow. 1980. Phonologie und Morphologie des Neuarabischen. In Wolfdietrich Fischer & Otto Jastrow (eds.), *Handbuch der arabischen Dialekte*, 49–101. Wiesbaden: Harrassowitz.
Georgin, Pierre. 1980. *Esquisse phonologique et détermination nominale du parler arabe d'Alger*. Paris: René Descartes University-Paris 5 dissertation.
Ghazeli, Salem. 1977. *Back consonants and backing coarticulation in Arabic*. Austin, TX: University of Texas at Austin dissertation.
Giannini, Antonella & Massimo Pettorino. 1982. *The emphatic consonants in Arabic* (Speech Laboratory Report IV). Naples: Oriental Institute of Naples.
Gouma, Taoufik. 2013. *L'emphase arabe marocain: Vers une analyse autosegmentale*. Paris: University of Vincennes Saint-Denis-Paris 8 dissertation.
Grotzfeld, Heinz. 1980. Das syrisch-palästinensische Arabisch. In Wolfdietrich Fischer & Otto Jastrow (eds.), *Handbuch der arabischen Dialekte*, 174–206. Wiesbaden: Harrassowitz.
Hachimi, Atiqa. 2005. *Dialect leveling, maintenance and urban identity in Morocco: Fessi immigrants in Casablanca*. Honolulu, HI: University of Hawaii at Manoa dissertation.
Hall, Tracy Alan. 1997. *The phonology of coronals*. Amsterdam: John Benjamins. DOI: https://doi.org/10.1075/cilt.149
Harrell, Richard S. 1957. *The phonology of colloquial Egyptian Arabic*. New York: American Council of Learned Societies.
Harris, John & Geoff Lindsey. 1995. The elements of phonological representation. In Jacques Durand & Francis Katamba (eds.), *Frontiers of phonology: Atoms, structures, derivations*, 34–79. Harlow: Longman.
Heath, Jeffrey. 1987. *Ablaut and ambiguity: Phonology of a Moroccan Arabic dialect*. Albany, NY: State University of New York Press.
Heath, Jeffrey. 1997. Moroccan Arabic phonology. In Alan S. Kaye (ed.), *Phonologies of Asia and Africa* 1. 205–219. Winona Lake, IN: Eisenbrauns.
Heath, Jeffrey. 2002. *Jewish and Muslim dialects of Moroccan Arabic*. London: Routledge. DOI: https://doi.org/10.4324/9780203037362
Herzallah, Rukayyah. 1990. *Aspects of Palestinian Arabic phonology: A non-linear approach*. Ithaca, NY: Cornell University dissertation.
Holes, Clive. 1990. *Gulf Arabic*. London: Routledge.
Holes, Clive. 1995. *Modern Arabic: Structures, functions and varieties*. London: Longman.
Jastrow, Otto. 1978. *Die mesopotamisch-arabischen qēltu-Dialekte* (Band I: Phonologie und Morphologie). Wiesbaden: Steiner.
Jastrow, Otto. 1979. Zur arabischen Mundart von Mossul. *Zeitschrift für Arabische Linguistik* 2. 36–75. https://www.jstor.org/stable/43530334.

Jastrow, Otto. 2006. Anatolian Arabic. In Kees Versteegh, Mushira Eid, Alaa Elgibali, Manfred Woidich & Andrzej Zaborski (eds.), *Encyclopedia of Arabic language and linguistics* 1. 87–96. Amsterdam: Brill.

Jastrow, Otto. 2007. Iraq. In Kees Versteegh, Mushira Eid, Alaa Elgibali, Manfred Woidich & Andrzej Zaborski (eds.), *Encyclopedia of Arabic language and linguistics* 2. 414–424. Amsterdam: Brill.

Johnstone, T. M. 1967. *Eastern Arabian dialect studies*. London: Oxford University Press.

Johnstone, T. M. 1975. The spoken Arabic of Tikrīt. *Annual of Leeds University Oriental Society VII*, 89–109.

Kabrah, Rawiah. 2004. *Opacity and transparency in the phonology of Makkan Arabic: A stratal optimality-theoretic approach*. Boston, MA: Boston University dissertation.

Kaye, Alan S. & Judith Rosenhouse. 1997. Arabic dialects and Maltese. In Robert Hetzron (ed.), *The Semitic languages*, 263–311. London: Routledge.

Kenstowicz, Michael & Charles Kisseberth. 1979. *Generative phonology: Description and theory*. San Diego, CA: Academic Press. DOI: https://doi.org/10.1016/C2013-0-10970-1

Khattab, Ghada. 2002. *Sociolinguistic competence and the bilingual's adoption of phonetic variants: Auditory and instrumental data from English-Arabic bilinguals*. Leeds: University of Leeds dissertation.

Ladefoged, Peter & Ian Maddieson. 1996. *The sounds of the world's languages*. Oxford: Blackwell.

Lahrouchi, Mohamed. 2018. Not as you R: Adapting the French r into Arabic and Berber. *Paper presented at the Journée d'études: Rhotiques: l'invariant et ses avatars*. March 23, in Paris.

Laradi, Walid Juma. 1983. *Pharyngealization in Libyan (Tripoli): An instrumental study*. Edinburgh: University of Edinburgh dissertation.

Lehn, Walter. 1963. Emphasis in Cairo Arabic. *Language* 39(1). 29–39. DOI: https://doi.org/10.2307/410760

Lindau, Mora. 1985. The story of /r/. In Victoria Fromkin (ed.), *Phonetic linguistics: Essays in honour of Peter Ladefoged*, 157–168. Orlando, FL: Academic Press.

Maddieson, Ian. 1984. *Patterns of sounds*. Cambridge: Cambridge University Press. DOI: https://doi.org/10.1017/CBO9780511753459

Mansour, Jacob. 1957. The Arabic dialect of the Jews of Baghdad and the pronunciation of Hebrew. *Journal of Jewish studies* 8. 187–198. DOI: https://doi.org/10.18647/320/JJS-1957

Marçais, Philippe. 1956. *Le parler arabe de Djidjelli (nord Constantinois, Algérie)*. Paris: Librairie d'Amérique et d'Orient.

McCarthy, John J. 1986. Features and tiers: The structure of Semitic roots. Ms. University of Massachusetts and AT & T Laboratories.

Mielke, Jeff. 2008. *The emergence of distinctive features*. Oxford: Oxford University Press.

Mifsud, Manwel. 2008. Maltese. In Kees Versteegh, Mushira Eid, Alaa Elgibali, Manfred Woidich & Andrzej Zaborski (eds.), *Encyclopedia of Arabic language and linguistics* 3. 146–159. Amsterdam: Brill.

Morén, Bruce. 2003. The Parallel Structures Model of feature geometry. *Working Papers of the Cornell Phonetics Laboratory* 15. 194–270.

Morén, Bruce. 2006. Consonant-vowel interactions in Serbian: Features, representation and constraint interaction. *Lingua* 116. 1198–1244. DOI: https://doi.org/10.1016/j.lingua.2005.04.003

Morén, Bruce. 2007. The division of labor between segment-internal structure and violable constraints. In Sylvia Blaho, Patrick Bye & Martin Krämer (eds.), *Freedom of analysis?*, 313–344. Berlin: Mouton de Gruyter. DOI: https://doi.org/10.1515/9783110198591.313

Norlin, Kjell. 1987. *A phonetic study of emphasis and vowels in Egyptian Arabic*. Lund: Department of Linguistics, Lund University.
Obegi, Michel. 1971. *The phonemic system of Lebanese Arabic*. Burnaby: Simon Fraser University dissertation.
Obrecht, Dean H. 1968. *Effects of the second formant on the perception of velarization consonants in Arabic*. The Hague: Mouton De Gruyter. DOI: https://doi.org/10.1515/9783111357393
O'Leary, De Lacy. 1923. *Comparative grammar of the Semitic languages*. London: Kegan Paul.
Owens, Jonathan. 1993. *A grammar of Nigerian Arabic* (Semitica Viva 10). Wiesbaden: Harrassowitz.
Paradis, Carole & Darlene LaCharité. 2001. Guttural deletion in loanwords. *Phonology* 18(2). 255–300. DOI: https://doi.org/10.1017/S0952675701004079
Pereira, Christophe. 2009. Tripoli Arabic. In Kees Versteegh, Mushira Eid, Alaa Elgibali, Manfred Woidich & Andrzej Zaborski (eds.), *Encyclopedia of Arabic language and linguistics* 4. 548–556. Amsterdam: Brill.
Prochazka, Theodore, Jr. 1988. *Saudi Arabian dialects*. London: Kegan Paul International.
Proctor, Michael Ian. 2009. *Gestural characterization of a phonological class: The liquids*. New Haven, CT: Yale University dissertation.
Qafisheh, Hamdi A. 1990. The phonology of Sanʿāni Arabic. *Journal of King Saud University: Arts* 2. 167–182.
Rahim, Abbas Jawdat. 1980. *The phonology of spoken Iraqi Arabic from the functional point of view*. Leeds: University of Leeds dissertation.
Schulte, Martha. 1985. *The word and the syllable in the spread of emphasis in Cairene Arabic*. Tucson, AZ: University of Arizona MA thesis.
Scobbie, James M. 2006. (R) as a variable. In Keith Brown (ed.), *Encyclopedia of language & linguistics*, second edition 10. 337–344. Oxford: Elsevier. DOI: https://doi.org/10.1016/B0-08-044854-2/04711-8
Sebregts, Koen. 2014. *The sociophonetics and phonology of Dutch r*. Utrecht: Utrecht University dissertation.
Shaaban, Kassim Ali. 1977. *The phonology of Omani Arabic*. Austin, TX: University of Texas at Austin dissertation.
Shaheen, K. S. K. 1979. *The acoustic analysis of Arabic speech*. Bangor: University of Wales dissertation.
Shahin, Kimary N. 2002. *Postvelar harmony*. Amsterdam: John Benjamins. DOI: https://doi.org/10.1075/cilt.225
Shamdin Agha, Hadar Hazim. 1969. *A synchronic description of the phonology of Muslim Baghdadi Arabic*. Beirut: American University of Beirut MA thesis.
Singer, Hans-Rudolf. 1980. Das Westarabische oder Maghribinische. In Wolfdietrich Fischer & Otto Jastrow (eds.), *Handbuch der arabischen Dialekte*, 249–291. Wiesbaden: Harrassowitz.
Solé, Maria-Josep. 2002. Aerodynamic characteristics of trills and phonological patterning. *Journal of Phonetics* 30(4). 655–688. DOI: https://doi.org/10.1006/jpho.2002.0179
Tawfiq, Marwan Najib. 2010. The /r/ phoneme in Mosuli Arabic: A phono-pragmatic study. *Adab Al-Rafidayn* 57. 31–45. https://radab.mosuljournals.com/article_30053.html.
Tsereteli, Konstantin. 1982. On one suprasegmental phoneme in Modern Semitic. *Journal of the American Oriental Society* 102(2). 343–346. DOI: https://doi.org/10.2307/602533

Ultan, Russel. 1978. A typological view of metathesis. In Joseph Greenberg (ed.), *Universals of human language*, 368–402. Stanford, CA: Stanford University Press.
Versteegh, Kees. 1997. *The Arabic linguistic tradition* (Landmarks in Linguistic Thought III). London: Routledge. DOI: https://doi.org/10.4324/9780203444153
Walter, Mary Ann. 2002. Pharyngealization effects in Maltese Arabic. In Sami Boudelaa (ed.), *Perspectives on Arabic Linguistics XVI*, 161–178. Amsterdam: John Benjamins. DOI: https://doi.org/10.1075/cilt.266.10wal
Watson, Janet C. E. 2002. *The phonology and morphology of Arabic*. Oxford: Oxford University Press.
Watson, Janet C. E. 2011. Arabic dialects (general article). In Stephan Weninger, Geoffrey Khan, Michael Streck & Janet Watson (eds.), *The Semitic languages: An international handbook*, 851–896. Berlin: De Gruyter Mouton. DOI: https://doi.org/10.1515/9783110251586.851
Wiese, Richard. 2001. The phonology of /r/. In Tracy Alan Hall (ed.), *Distinctive feature theory*, 335–368. Berlin: Mouton de Gruyter. DOI: https://doi.org/10.1515/9783110886672.335
Wiese, Richard. 2011. The representation of rhotics. In Marc van Oostendorp, Elizabeth Ewen, Colin J. Hume & Keren Rice (eds.), *The Blackwell companion to phonology*, 711–729. Oxford: Blackwell. DOI: https://doi.org/10.1002/9781444335262.wbctp0030
Woidich, Manfred. 2006. *Das Kairenisch-Arabische: Eine Grammatik*. Wiesbaden: Harrassowitz.
Younes, Munther 1982. *Problems in the segmental phonology of Palestinian Arabic*. Austin, TX: University of Texas at Austin dissertation.
Younes, Munther. 1993. Emphasis spread in two Arabic dialects. In Mushira Eid & Clive Holes (eds.), *Perspectives on Arabic linguistics V*, 119–145. Amsterdam: John Benjamins. DOI: https://doi.org/10.1075/cilt.101.08you
Younes, Munther. 1994. On emphasis and /r/ in Arabic. In Mushira Eid, Vicente Cantarino & Keith Walters (eds.), *Perspectives on Arabic Linguistics VI*, 215–235. Amsterdam: John Benjamins. DOI: https://doi.org/10.1075/cilt.115.16you
Youssef, Islam. 2013. *Place assimilation in Arabic: Contrasts, features, and constraints*. Tromsø: University of Tromsø dissertation. https://munin.uit.no/handle/10037/5347.
Youssef, Islam. 2014. Emphasis spread in Cairene Arabic: A reassessment. In Olivier Durand, Angela D. Langone & Giuliano Mion (eds.), *Alf lahğa wa lahğa (Proceedings of the 9th AIDA Conference)*, 455–464. Münster: LIT Verlag.
Youssef, Islam. 2015. Vocalic labialization in Baghdadi Arabic: Representation and computation. *Lingua* 160. 74–90. DOI: https://doi.org/10.1016/j.lingua.2015.04.001
Zawaydeh, Bushra. 1999. *The phonetics and phonology of gutturals in Arabic*. Bloomington, IN: University of Indiana, Bloomington dissertation.
Zuraiq, Wael & Jie Zhang. 2006. Phonological assimilation in urban Jordanian Arabic. *Kansas Working Papers in Linguistics* 28. 33–46. DOI: https://doi.org/10.17161/KWPL.1808.1229

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