

## *The Invisible Node*

*Dr. Balqis I.G. Rashid<sup>(\*)</sup>*

### *Abstract*

Coronals are said to have a special status among other types of consonants. This fact is based on the belief that they lack a Place node underlyingly. In this paper, such factual statements are utilized in a morphophonological analysis to falsify the claims saying that coronals are fully specified in Arabic URs and that homorganic consonants are disallowed in Arabic underlying consonantal roots.

### *1. Introduction:*

This study is based on, what Kenstowicz (1991 xiii) describes as, “an intuition shared by most phonologists: that dental (more generally coronal) is the unmarked consonantal point of articulation. This intuition is tested and corroborated by the study of phonological rules and constraints in an impressive variety of languages...”

Taking the above stated piece of information as the starting point as well as the background of this paper, I will argue for the fundamental claims given in (1) and (2) below:

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(\*) University of Basrah.

- (1). The unmarked coronals lack place features (i.e.[anterior] and [distributed]) because they lack a Place node in Arabic Underlying Representations (henceforth URs).<sup>(\*)</sup>
- (2). Morpheme Structure Conditions" (henceforth MSCs) do not prohibit homorganic consonants in Arabic consonantal roots.

The form of this paper is as follows: section (2), which represents the theoretical background of this study, discusses first the interrelation between matters of frequency and the special status of coronals, and second the different types of under specification theory that specify the form of URs. Section (3) concentrates on uncovering the factual forms of Arabic URs as suggested by MSCs. The final section presents the conclusions of the present study.

Before starting the discussion of the subject matter of this paper, let me make explicit my assumptions about feature geometry and under specification. I assume a model of feature geometry along the lines of Halle (1995). Furthermore, I assume that Arabic URs are not fully specified and argue particularly that unmarked coronals lack both of the Coronal node and the Place node.

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(\*) See the Appendix for the abbreviations used in this paper.

## ***2.Theoretical background:***

### ***2.1 Frequency and the special status of coronals:***

One of the current phonological facts that is beyond any dispute, since it is part of Universal Grammar, is that some segments are more frequent in languages than others. Coronals are usually described as being the most frequent type of segments in all phonological inventories. Evidence for such a description come from Maddieson (1987). He (ibid: 31) affirms that all languages, but Hawaian, have at least one stop of the coronal type, and he (ibid: 40) reports that if a language has /p/ then it has /k/, and if it has /k/ then it has /t/. Moreover, he (ibid: 60) asserts that out of his (UPS ID) sample which comprises 317 language, 316 possess the coronal dental or alveolar nasal /n/. Also Maddieson (ibid: 52) declares that "of the 37 languages with only one fricative, 31 have some kind of /<sup>(\*)</sup>s/. "That is to say, 84% of these languages possess either a dental coronal or an alveolar coronal /s/ which he symbolizes as /<sup>(\*)</sup>s/. Besides, liquids are described as coronals in the majority of the languages of the world

Frequency, according to Paradis and Prunet (1991: 11), is of three distinct types which are quoted at length below:

- a. Inventory Frequency: the number of coronals in the consonant inventory of a given language (In comparison with the number of

other consonants in the same inventory).

- b. Typological Inventory Frequency: the number of coronals attested in a universal phonemic Inventory (In comparison with all other attested consonant in the same inventory).
- c. Occurrence Frequency: the number of times coronals are produced in a representative speech corpus (in comparison with the number of times other consonants are produced in the same corpus).

Paradis and Prunet (ibid) provide us with the following supporting evidence concerning their three frequency types. For their first type of frequency (i.e. (a)), they exemplify from both English and French. English has 13 coronals, 5 labials, and 2 velars (omitting glides) in its phonemic inventory. The French phonemic inventory exhibits almost the same proportions. It contains 9 coronals, 5 labials, and 2 velars. In English, out of the 13 coronals there are 7 alveolars; whereas in French, out of the 9 coronals 7 are dentals.

Regarding their second type of frequency (i.e. (b)), Paradis and Prunet (ibid) consider the International Phonetic Alphabet. They note that "coronal sounds are over three times more numerous than either labial or velar sounds."

As for the third type of frequency (i.e. (c)), Paradis and Prunet

(Ibid) state that "Fry (1947) showed that the five most frequent consonants in a (Southern British) English conversational corpus were all coronals (n, t, d, s, and l, in that order." Besides, in an Argentinian-Spanish conversational corpus, Ferreres (forthcoming) notes that the consonantal distribution can be represented by means of percentages as follows:

The importance of the above mentioned frequency information concerning coronals derives from the fact that their frequency is a universal indicator for their being more prone to be involved in any phonological process than any other type of consonants. Consequently, coronals are assumed to have a special status among other consonants. Kean (1975) was the first to relate segmental frequency to markedness theory, He (ibid: 48) proposed a universal markedness theory in which /t/ is found to be the universal unmarked consonant and coronal is the unmarked place of articulation. Therefore, it became quite normal to link the special status of coronals with their special degree of unmarkedness.

## ***2.2 Underspecification theory and URs:***

Current phonological assumptions speak of URs as being partially specified (see Archangeli, 1988; and Mester and Ito, 1989). In other words, certain feature specifications do not show up in URs, but only at a later stage of a derivation. Questions, such as

what feature specification(s) is (are) absent in URs, and when does the filling in, process take place, can be answered, by three divergent types of underspecification theory. These are radical underspecification, contrastive specification, and modified contrastive specification.

Radical underspecification (see Kiparsky, 1982; Grignon, 1984; Pulleyblank, 1986) distinguishes between two kinds of featurevalue: predictable and unpredictable. This distinction is formulated on the basis of a universal markedness theory (cf. Archangeli, 1984). Advocates of radical underspecification maintain that in URs only the unpredictable values of features show up. The predictable feature-values, on the other hand, are later on filled in a later stage of the derivation by means of redundancy rules of the following form:

[OF]  $\longrightarrow$  [aF], where, is either + or –

For instance, it is believed that voiceless stops are the most frequent and unmarked consonants attested in languages all over the world, (see Maddieso, 1987). Accordingly, then the feature-value [-voice] is predictable. <sup>(\*)</sup>Hence, it does not show up in URs. and it is replaced by the feature-value [Ovoice], while the feature-

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(\*) The feature [voice] is used in this study instead of Halle's (1995) laryngeal features [stiff vocal folds] and [slack vocal folds] for reasons of consistency in description.

value [+voice] is unpredictable; therefore, it is present in URs. By the same token, articulators are classified as predictable and unpredictable, and that the coronal, articulator is the most unmarked articulator; therefore, it is predictable (see Paradis and Prunet, 1989, Avery and Rice, 1991; Cho, 1991; Shaw, 1991).

Coronal articulations usually include; the following sub-articulations: dental, alveolar, retroflex, alveopalatal and palatal. These coronal subarticulations are characterized by the binary features [anterior] and [distributed]. So, in a language L which has all the above coronal subarticulations, the unmarked: articulation (usually either dental or alveolar) is said to be underspecified (or absent) in UKs, viz it lacks place features because it lacks its associated Place articulator (i.e. Coronal). Such a justification is reflected by Paradis and Prunet's (1989: 319) principle, which is stated below:

#### Coronal Underspecification Principle (CUP)

Unmarked coronals universally lack a Place node.

For instance, Spoken Iraqi Arabic has the following coronals: 3 interdental /θ, ʔ, ʕ/, 7 denti-alveolars /t, ʈ, d, s, ʈ, z, n/, 2 alveolars /l, r/, and 3 alveo-palatals /ʃ, tʃ, dʒ/. According to the immediately preceding information, the denti-alveolar consonants and the alveolar ones (with the exception of those consonants

articulated with a retracted tongue root /ʈ, ʡ/, lack a Place node. Our justification for this lack of identity is that these consonants can be exhaustively characterized as having the predictable value for each of the coronal features (viz [+ant], [-dist])

(see Rashid, 1997). These predictable coronal features are supposed to be filled in a later stage of the derivation of a certain morpheme. Now, the question is: how can we be sure that underlyingly we have a /n/ not a /r/ or a /l/, or we have a /t/ not a /d/ or a /s/? The answer is illustrated by the following underlying feature-representations:

(fig.1)



As it is shown in these representations, all of the three sonorant coronals are differentiated from the other coronals by the major class features [+cons,+ son] which are dominated by the Root Node. Besides, they are distinguished among themselves by the SP feature [nasal] and the AF features [cont] and [Lat]. On the other hand, the three obstruents /t, d, s/ share the same specification of the major class features that is characteristic of obstruents [+cons, -son]. Moreover, they differ from one another by means of the AF features [cont] and [strid], and the laryngeal feature [voice]. Notice that /t/ and /s/ are specified as [o voice] so as to indicate the unmarkedness of their voicelessness. Notice also all of the six segments have a [o] value for the Place node.

The second type of underspecification theory is contrastive specification (see Steriade, 1987; Clements, 1988), which assumes that what the URs contain is suggested by whatever phonemic contrasts that are existent in the language in question. In other words, if there is a pair of coronals the members of which contrast. In terms of a certain feature, both of them should be specified the contrastive value of that feature. In case there is no such a contrast, the UR would exhibit neither value of the related feature. For example, Modern Standard Arabic has four plain stops /b, t, d, k/, but no /p/ or /g/. /t/ is [voice] and /d/ is [+voice] but neither /b/ nor /k/ is specified for this feature since their counterparts do not exist

in the phonemic inventory. Unlike radical underspecification, contrastive specification necessitates the presence of an articulator underlyingly whenever there is an articulator contrast existent in the inventory. For instance, both of Standard English and Spoken Iraqi Arabic have the stops /p, t, k/ where /p/ contrasts with /t/, and these two contrast with /k/ in terms of the articulators producing them. Therefore, each one of them should be specified for the responsible articulator underlyingly. Thus, contrastive specification sounds incapable of justifying the current assumption that the unmarked coronals have no Place node in URs.

In (1988, and, 1989) Avery and Rice proposed a modified version of the theory of contrastive specification that reflects a compromise between the assumptions of radical underspecification and those of contrastive specification. Avery and Rice (1988:103) believe that universal markedness theory allows certain features to be underspecified (i.e. absent) in URs with the exception of cases that represent a minimal phonemic contrast. That is to say, some features which do not show up in URs will lack a Place node, whereas contrastive features will always have a dominating Place node. For example, if a certain language exhibits contrasts by means of the laryngeal feature [voice] in its stop-system, then the voiced stops will be specified as [+voice] while the voiceless ones will be specified as [Ovoice], because voicelessness is said to be unmarked.

One point which is worthy of mentioning about this modified version of the theory is that it is similar to radical underspecification in crediting the unmarkedness of the coronal articulator but with the condition that if there exists a contrast between coronal consonants then the contrasting coronal, members should have a coronal articulator dominated by the Place node.

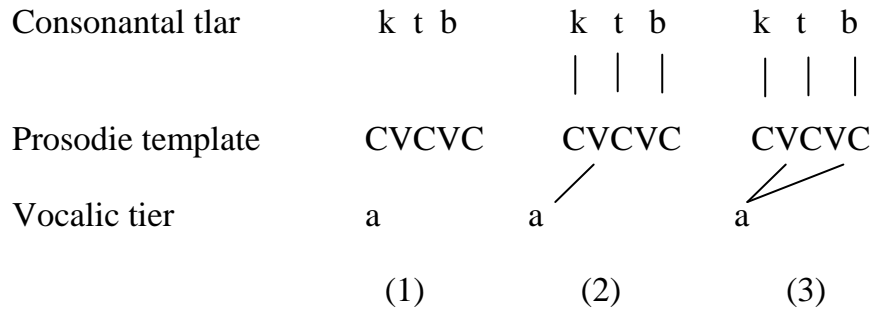
### ***3. URs and MSCs in Arabic:***

Greenberg (1950:162) and McCarthy (1989) claim that there are certain MSCs in Arabic that disallow the occurrence of homorganic consonants in consonantal roots underlyingly. McCarthy (1981: 396) contends that only the second and third positions of such consonantal roots can be filled by 'identical homorganic consonants, thus such roots are supposed to be biliteral not trilateral. Moreover, Greenberg (1950: 177) claims that such MSCs do not designate coronals as being unmarked, and different from other consonants in URs. In addition to that, Mester and Ito (1989: 265) state that these MSCs which are also typical of Javanese show that the different articulators should be present underlyingly.

Contra to Mester and Ito (1989 and references cited there in), I propose that in Arabic URs the unmarked coronals lack place features (i.e. there is no Place node). Besides, contra to Greenberg (1950) and (1981,1989), I suggest that the MSCs 'in Arabic do not

prohibit the occurrence of homorganic consonants (i.e. coronals) in consonantal roots.

Evidence supporting the immediately preceding suggestions can be presented as follows, McCarthy (1981:387) proposes an autosegmental approach for Arabic morphology. He (ibid: 380) provides a 'prosodic template' for each verb stem (cf. Yushmanov, 1961: 48). This 'prosodic template' represents the C-V skeleton of the stem. McCarthy (ibid) autosegmentalizes the morphemes of both the consonantal root and the grammatical vocalics, together with the consonant-affix characteristics of the forms as separate tiers, called 'melodies'. The elements comprising the 'prosodic template' are characterized as either [-syllabic] (i.e. consonants), r[+syllabic] (i.e. vowels). By means of three universal conventions and some language specific rules, McCarthy (ibid: 382) draws association lines between the C-V skeleton and the consonantal as well as the grammatical vocalic tiers. For instance, the triliteral perfective verb stem, which is considered as the basic Arabic form, represented by/ katab/ (he wrote) has the following 'prosodic template' and association-forms:



(fig. 2)

The first form in (fig.2) exhibits the setting of the ‘prosodic template1’ and the consonantal and vocalic tiers of the verb stem /katab/ before performing any association process. The second, form shows the association lines linking between melodic elements (i.e. consonants and vowels) and melody-bearing elements i.e. C-V skeleton). The last form in (fig.2) represents the association process of a floating melody-bearing element (V) with the same melodic element (a) that is linked previously with a preceding melody-bearing element in the second form.

Now, if one takes the consonantal root of the verb stem /katab/ and specify its elements by means of feature-representations, one can get the following sketches:

**(fig. 3)**

As it can be seen, all of the three feature-representations of the three consonants /k/, /t/, and /b/ have a Root Node immediately dominating the major class features [+cons, -son]. Besides, all of them are specified by the AF feature [-cont]. Two of them, namely, /k/ and /b/ have opposite values for the laryngeal feature [voice]. /t/, on the other hand, has a predictable value of the feature [voice], therefore it is specified as [Ovoice] (i.e. unmarked for voicelessness). Again, on the basis of universal markedness theory, unlike /k/ and /b/ which have place features characteristic of their -related articulators (viz Dorsal and Labial), /t/ lacks the Place node altogether. The immediate question that can be raised is: how can we know the identity of the consonant in question? The answer is: there are three feature-types in the feature-representation of /t/ that can aid us in discovering the identity of this segment. These features are: the major class features [+cons, -son], the AF feature [-cont], and the laryngeal feature [Ovoice]. The major class features assure us that we have an obstruent, the AF feature declares that

this obstruent is a stop, and finally the specification of the laryngeal feature [Ovoice] implies that this stop is unmarked. Consequently, the unmarkedness of this stop suggests that we have a /t/. Testing this outcome by the CUP, we can conclude that the unmarked coronals such as /t/ do lack a Place node in Arabic URs. Still, the invisibility of this node can be handled by a redundancy rule which specifies, the coronal articulator at a later stage of the derivation (see Paradis and Prune 1989, and 1991). This rule has the following shape:

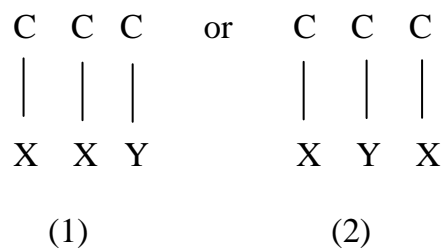
$$[\emptyset \text{Place}] \longrightarrow \text{Coronal}$$

After the application of the above stated rule, the Place node becomes visible and is specified as Coronal.

Upon proving that in Arabic unmarked coronals lack a Place node underlyingly, I now turn to justifying my second fundamental claim: that MSCs do not prohibit the occurrence of homorganic consonants in Arabic consonantal roots. My concern is, again, with coronal segments.

First of all, homorganic consonants can either be identical or non-identical. Identical homorganic consonants reflect a replication of one and the same consonant, such as: /b -b/, /t-t/, /n-n/, /s-s/, etc. Non-identical homorganic consonants, on the other hand, mean that two or more consonants are produced by the same articulator, such

as : /drs/, /nzl/, /sd<sub>3</sub>n/, etc. McCarthy's (1981: 396) presentation and discussion of the possibility of occurrence of identical homorganic consonants only in second and third positions of Arabic consonantal roots (i.e. biliteral stems, e.g./sam/ (he poisoned)) leaves us with two other forms of roots having identical homorganic consonants. These can be illustrated as in below:



(fig. 4)

In (fig. 4), the first form has the consonantal root in which the first and second positions are occupied by identical homorganic consonants, (i.e. a replication of the same consonant). This type of verb stems is not found in Arabic. Thus , Greenberg (1950: 396), in an attempt to justify this finding, discusses the derivation of 'doubled verbs'. Such verbs usually have the biliteral root-tier /CC/. He (ibid) contends that his aim is to explain” the absence of verbs or nouns like <sup>(\*)</sup>sasam versus the existence of samam. “Nevertheless, the second form in (fig.4), (i.e. XYX), can be attested in Arabic contra to what Greenberg, (1950), Lightner (1973) and McCarthy (1981: 396) maintain. The above scholars propose that due to



grammaticized exclusion (viz MSCs) in Arabic, this kind of verbs is absent. Generally speaking, MSCs are formulated to block the derivation of an ill-formed form. However, such a form of Arabic verb stems can neither be described as ill-formed nor as absent. The evidence I present is reflected by the existence of verb stems having this type of forms in the Arabic lexicon. Consider the morphological structure of the following Arabic verb stems:

1. /θalaθ/ (ha became the third of a group of people; he took one third of something):
2. /natan/ (he stinked).
3. /darid/ (he lost his teeth).
4. /sadas/ (he became the sixth of a group of people; he took one sixth of something).
5. /salas/ (it ran smoothly).
6. /sulis/ (he lost his mind).

The above six example-words exhibit the fact that in their consonantal roots the first position and the third one are occupied by the same consonant. In other words, there is a replication of the first consonant across the second consonant. So, these verb stems actually have the following consonantal roots:

1. /θlθ/, 2. /ntn/, 3. /drd/, 4. /sds/, 5. /sls/, 6. /sls/

stems no. 5 and no. 6 have the same consonantal root- Accordingly, we have five examples of consonantal roots which the first and third consonants are identical homorganic consonants. Since such examples represent well-formed meaningful Arabic verbs existing in lexicon, then the claim that identical homorganic consonants are prohibited by MSCs in Arabic URs is falsified.

Let us examine the feature-representation of these five Arabic consonantal roots so as to check once more the invisibility of the Coronal as well as the Place nodes:

1.

2.

3.

4.

5.

**(fig. 5)**

One general note about these five consonantal roots is that they are composed entirely of coronal consonants. We can see clearly that all of these coronal consonants lack a Place node. Thus, this node is specified as having the null value. That is to say, the coronal articulator together with its dominating Place node are invisible reflecting the unmarkedness of these coronal consonants. Yet, what spells out the identity of these coronals in the URs is the

presence of: the major class features [+cons, +son]; the AF features [cont], [strid], and [Lat]; the SF feature [nasal]; and the laryngeal feature [voice].

Once again, such examples, though they represent a rare form of verb stems, pose a genuine challenge to Greenberg's (1950), McCarthy's (1981, 1989), and Mester and Ito's (1989) claims.

So far, I have discussed the possibility of having the first type of homorganic consonants (i.e. identical consonants) as constituents of Arabic consonantal roots in URs, and the inability of MSCs to prohibit their existence. The other possibility of having nonidentical homorganic consonants as the building blocks of Arabic consonantal roots in URs is easier to prove than the first possibility. The reason is: there is a large number of Arabic verb stems whose (some or all) constituents are unmarked coronals, such as:

- A. 1. /natadg<sub>3</sub>/ (it resulted)
- 2. /naθar/ (he spread)
- 3. /daras/ (he studied)
- 4. d<sub>3</sub>alas/ (he sat)
- 5. /nasad<sub>3</sub>/ (he knitted)
- 6. /fatal/ (he uprooted a plant to plant it somewhere else).
- B. 1. /rasam/ (he drew)

- 2. /tarak/ (he left some thing)
- 3. /nasab/ (he assigned to)
- 4. /salab/ (he took something from somebody by force)
- 5. /θalam/ (he cut)
- 6. /d<sub>3</sub>araH/ (he injured)

## C. 1. /fatal/ (he twisted)

- 2. /kanas/ (he swept)
- 3. /kaθar/ (it increased)
- 4. /had<sub>3</sub>ar/ (he forsook)
- 5. /walad<sub>3</sub>/ (it entered)
- 6. /kafar/ (he forced something inbetween)

## D. 1. /famal/ (it covered)

- 2. /nahar/ (he slaughtered)
- 3. /θabat/ (he stood still)
- 4. /d<sub>3</sub>afal/ (he escaped quickly)
- 5. /sakat/ (he stopped talking)
- 6. /labas/ (he wore)

The above four groups of examples are classified according to the position of the homorganic coronals. So, group (A) contains

verb stems composed of three adjacent homorganic coronals. Group (B) includes stems in which the first and second consonantal positions are occupied by two (adjacent) homorganic coronals. Verb stems in group (C) have (adjacent) homorganic coronals in the second and third consonantal positions. The last group (i.e. D) contains stems in which the first and third positions are filled by (nonadjacent) homorganic coronals.

The above (24) examples exhibit clearly the morphological fact that non-identical homorganic coronals do act as the building blocks in many Arabic verb stems underlyingly.

Again, these unmarked coronals lack a Place node in URs. Consider, for instance, the feature-representations of the consonantal roots of the first four examples:

- 1.

2.

3.

4.

**(fig. 6)**

The above feature-representations illustrate the findings of the present study; that is to say, unmarked coronals whether adjacent or not lack a Place node in Arabic URs and that nothing can prohibit their occurrence in Arabic underlying consonantal roots. Of course, such results do not suggest that there are no MSCs

that restrict and specify the structure of Arabic URs, rather they declare that some MSCs are inadequate and they need to be reformulated. Certainly, their reformulation is the responsibility of those who propose them.

#### ***4. Conclusions:***

This study aimed at falsifying the claims that say coronals are fully specified in Arabic URs, and that homorganic consonants are disallowed underlyingly because of certain MSCs.

The morphophonological evidence presented in the present study seriously challenge such unsound claims and support the two fundamental contra-claims suggested by the present researcher.

Needless to say, the inadequacy of the phonological statements as well as the MSCs backing up the falsified claims need to be remedied. Still, the burden of this remedy lies on those who propose them in the first place.



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## *Appendix*

The following is a list of the abbreviations that are used in this paper:

ant : anterior

AF : Articulator Free

B : Back

CUP : Coronal Under specification Principle

cons : consonantal

cont : continuant

dist : distributed

F : Feature

Gut :Guttural

H : High

lat : lateral

L : Low

MSCs : Morpheme Structure Conditions

RN : Root Node

SP : Soft Palate

strid : strident

URs : Underlying Representations

UPS ID: University of California, Los Angeles, Phonological  
Segment Inventory Data Base.

## ملخص

### العقدة غير المرئية

د . بلقيس راشد (\*)

يقال ان الاصوات المنطوقة بطرف اللسان تتفرد بمكانة خاصة بينهم الانواع الاخرى من الاصوات الصحيحة. وهذه الحقيقة مبنية على اساس هذه الاصوات تفتقر الى العقدة المكانية التي تركز عليها. في هذا البحث سنوظف هذه الحقائق في تحليل صرفي صوتي لدحض المزاعم القائلة بان الاصوات الطرف لساني محدد على نحو شامل في العربية وان الاصوات المتماثلة النطق غير جائزة في العربية.

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(\*) جامعة البصرة.