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The Behaviour of the Schwa in the Saoura Spoken Arabic: schwa epenthesis and deletion

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Abstract: *In the present study, we argue in favour of adopting a moraic approach to the syllable to describe and explain phenomena in prosodic phonology. We indicate that the implementation of the mora (Hyman, 1985) in the Saoura Spoken Arabic (henceforth SSA) syllables helps in explaining morpho-phonological processes, namely 'the Disparity in Epenthesis ' between words on the pattern CəCC and those on the pattern CCəC, and 'the Schwa Vowel deletion' in a specific morphological context. We attempt to clarify that in order to account for the difference in epenthesis between CəCC and CCəC, we have to refer to both the moraic structure and the inflectional paradigm. We also try to demonstrate that the assumed schwa vowel, inserted via an epenthesis rule, disappears in fluent speech.*
Keywords: *Inflectional Paradigm, Mora, Saoura Spoken Arabic, Schwa Deletion, Schwa Epenthesis, Syllable.*
Résumé : *Dans la présente étude, nous plaidons en faveur de l'adoption d'une approche moraique de la syllabe pour décrire et expliquer les phénomènes en phonologie prosodique. Nous indiquons que la mise en œuvre de la more (Hyman, 1985) dans les syllabes en arabe parlé de la Saoura (désormais APS) aide à expliquer les processus morpho-phonologiques, à savoir 'la Disparité dans l'Epenthèse' entre les mots sur le motif CəCC et ceux sur le motif CCəC, et 'la Suppression de la voyelle Schwa' dans un contexte morphologique spécifique. Nous essayons de clarifier qu'afin de tenir compte de la différence d'épenthèse entre CəCC et CCəC, nous devons nous référer à la fois à la structure moraique et au paradigme d'inflexion. Nous essayons également de démontrer que la voyelle schwa supposée, insérée via une règle d'épenthèse, disparaît dans un discours courant.*
Mots clés : *Arabe parlé de la Saoura, Epenthèse de Schwa, More, Paradigme d'inflexion, Suppression de Schwa, Syllabe.*

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1. Introduction

The schwa in SSA can be considered as epenthetic for many reasons. First, the main purpose of the vowel schwa is to break impermissible three-consonant clusters that the language does not allow, e.g. /χsr/ → / χsər/ 'to lose', /mlħ/→ /məlħ/ 'salt', /mrfg/ → /mər.fəg/ 'elbow', …etc. Second, unlike the other vowels of the language [ɪ, ɪː, u, uː, ɑ, ɑː] which can occur in both open and closed syllables, the schwa never occurs in open syllables, e.g. /rɑħ.mɑ / 'a pity', /ħɑː.mɑqˠ/ 'sour', /mʂəl.ħɑ/ 'a broom', /sən.slɑ/ 'a zip/chain'. Third, closed syllables headed by a schwa tend to be unstressed in the presence of syllables headed by other vowels, e.g. /mək.'tuːb / 'destiny', /'mæ.ləħ/ 'salty', … etc. In this paper, we examine the occurrence of the schwa vowel before and after the second consonant in triliteral verbs, adjectives and nouns. We argue in favour of adopting a moraic approach to the syllable to account for two phenomena in SSA morpho-phonology, namely 'the Disparity in Epenthesis ' between words on the pattern CəCC and those on the pattern CCəC and 'the Schwa Vowel Deletion' in a specific morphological context. The analyses in this study primarily focused on data provided and reinforced by judgments of the author who is a native speaker of SSA.

The paper is organized in ten sections. The first one includes the introduction. The second presents information about SSA and the city of Bechar. The third lists the consonantal and vocalic inventories. The fourth discusses the concept of the mora and the prosodic categories that dominate it. The fifth is about the sonority rule; in this section, we show that the distribution of the schwa is chiefly dependent on the sonority of input consonants. The sixth examines the mechanisms SSA resorts to in order to satisfy Foot Binarity and the nature of the Prosodic Word. The seventh explores the exhibition of the schwa in different sites of triliteral forms. The eighth states the reason behind the constant violation of the sonority condition by triliteral verbs. The ninth explains the process of short vowel deletion by the application of two different rules: Forward Syncope and Backward Syncope. Finally, the tenth summarizes the paper.

2. The Saoura Spoken Arabic-Southwestern Algeria

The Wadi Saoura (Saoura River) is located in the southwestern region of Algerian Sahara: it crosses a part of the great Western Erg from Ksabi, passes thru the oases of Kerzaz, Beni Abbes, Mazzer, Igli and leads to Abadla where it takes the name Wadi Guir (Guir River). The oases of Bechar and Kenadsa, although located on the river of Bechar, Lahmar, Mougheul and Boukais, are part of the natural and administrative area (wilaya) of the Saoura.

Geographically, the region of the Saoura itself covers all of western Algerian Sahara, from the eastern edge of the Western Grand Erg and the Tidikelt (Ain Salah region) to Tindouf, near the Western Sahara.

What is meant here by the "Saoura Arabic" covers a smaller restricted area: it is essentially the spoken Arabic of the oases of Bechar (including Lahmar, Mougheul, and Boukais), Kenadsa, Abadla, Igli, Mazzer, Beni Abbes, Elouata, Kerzaz and Ksabi, so the Arabic spoken in the region of Wadi Saoura. We will restrict our study to the City of Bechar which is the center of the province of the Saoura.

The variety of Algerian Arabic (AA) spoken in Bechar is characterized by certain particularities attributed to rural dialects. Despite the heterogeneity of the inhabitants of

the City of Bechar, we can nonetheless, speak of a somewhat homogeneous variety where regional variations have been neutralized to yield the variety referred to as SSA.

3. Consonantal and Vocalic Inventories

3.1 Consonantal Inventory

The consonantal system of AA has perhaps received little treatment. But nevertheless, we postulate that the number of consonant phonemes the dialect of the Saoura has is only 27 consonant phonemes. The consonantal inventory of SSA is displayed in Table 1:

Place of Articulation

Manner of Articulation		Labial		Coronal			Dorsal		Pharyngeal	Glottal
		Bilabial	Labio-dental	Alveolar	Palato-alveolar	Palatal	Velar	Uvular		
Stops	V-			t ʈ			k	q		ʔ
	V+	b		d ɖ			g			
Fricatives	V-		f	s ʂ	ʃ			χ	ħ	
	V+			z				ɣ	ʕ	h
Affricate					ʒ					
Nasals		m		n						
Lateral				l						
Trill				r ɽ						
Glide		w				j				

Table1. Saoura Arabic Consonant Phonemes

The chart represents the consonants of SSA as pronounced by the majority of speakers. Sketchily, the most important features of the Arabic spoken in the Saoura are the following: first, the phoneme /q/ is often realized as /g/ e.g. /guːl/ 'say', /ʕɑgrəb/ 'scorpion', /gəmlɑ/ 'louse', /gənʈrɑ / 'bridge', etc. But there are numerous examples where the realization of /q/ has been preserved, e.g. /qbəl/ 'before/accept', /ʕɑqəl/ 'smart', /səqsi/ 'ask', etc. However, some words have /g/ for instance /mnɑgəʃ/ 'earrings', /dəgdəg/ 'chop up', /drəg/ 'disappear/hide', /gurʃɑːl/ 'dirt', /gərɖɑ/ 'a large piece/loaf', /guːb/ 'a kind of spots on the face', … etc. We also have an example of the shift of /q/ to /k/, e.g. /qtəl/ is realized as /ktəl/. Second, the interdentals do not occur in SSA. Accordingly, /θ/ has shifted to /t/ in the city dialect but to /f/ in rural areas. Thus, CA /θɑmmɑ/ 'over there' commonly becomes /təmmɑ/ and/or /təm/ and /fəmmɑ/ and/or /fəm/ in neighboring areas; /ð/ becomes /d/, example CA /hɑðɑ/ 'this' is /hɑdɑ/, CA /kɑðɑbɑ/ 'he lied' becomes /kdəb/, …etc. Third, the glottal stop /ʔ/ does not form part of the phonemic inventory of SSA; it

is only prothesized before vowel-initial words for onset purpose. Fourth, the phonemes /r/ and /ɽ/ are distinct as shown by the minimal pairs such as /dərb/ 'ghetto' and /ɖɑɽb/ 'hitting', /dær/ 'he did' and /dɑːɽ/ 'a house', /rbæħ/ 'win' and /ɽbɑʕ/ 'a quarter', /ʒæri/'liquid' and /ʒɑɽi/'my neighbour'; /jəbrɑ/'needle' and /jəbɽɑ/'he'll be healed'… etc.

3.2 Vocalic Inventory

Phonologically, SSA presents a vocalic system based on seven vowels, three long or medium and three short or ultra-short and an epenthetic schwa. These vowels have, of course, several allophones according to their consonantic contours as Table 2 depicts:

Short Vowels	Allophones	Long Vowels	Allophones
[ɑ] [ɪ] [u] [ə]	[æ] [e] [o] …	[ɑː] [iː] [uː] …	… [eː] [oː] …

Table 2. Saoura Arabic Vowel Phonemes

3.2.1 Long Vowels

We have the three long vowels of Classical Arabic [ɑː], [iː] and [uː] as autonomous phonemes and two allophones [oː] and [eː] which present themselves as contracted realizations of the diphthongs [əw] and [ej] sometimes alternating freely with the latter: [ʈeːn]→ [ʈejn]'clay', [ʂoːt] → [ʂəwt] 'sound' (Abdelhay, 2006),

[ɑː]: [gɑːl] 'he said'

[iː]: [ʕiːd] 'feast'

[uː]: [muːs] 'knife'

These vowel phonemes also have variants/allophones conditioned by the consonantal environments/contours:

[iː]has the variant/allophone[eː] in contact with a velar, pharyngeal or laryngeal consonant:

[ʂɣeːr]: 'small', [tqeːl] 'heavy', [jʈeːr] 'he flies.'

[uː] has the variant/allophone[oː]: [doːr] 'role', [noːr] 'light.'

3.2.2 Short Vowels

We have the three short vowels of classical Arabic [ɑ], [ɪ], [ʊ] and an epenthetic schwa [ə]:

[ɑ]: [jdɑwwər] 'he seeks',

[ɪ] : it can have the variant/allophone [ɐ] →[ʈɐħɑ] 'falling',

[ʊ]: [jħʊkk] 'he itches'. It can have the variant/allophone [o] in contact with emphatic consonants: [ɽ], [h], [l], [ʈ] e.g. [johɽob] 'he runs away', [joʈlob] 'he begs', [joʃrob] 'he drinks', [ʈobʂɪ] 'a plate'.

[ə]: [nəqqɑ]/[nəggɑ] 'he cleaned.'

The short vowels have in many cases been reduced to a schwa with various realizations depending on context : hence, [nsɑr] → [nsər] 'eagle', [mɑrgɑ] → [mərgɑ] 'stew'; [ʕurs] → [ʕərs] 'wedding', [ɣurbɑ:l] → [ɣərbɑ:l] 'a sieve'; [ʒɪnn] → [ʒənn] 'ghost', [wɑħɪd] → [wɑħəd] …etc. However, in some cases, almost always next to a velar or uvular , but occasionally near a bilabial, [ʊ] is retained; thus, [ħʊgrɑ] 'bullying', [fʊmm] 'mouth', [bʊrʒ] 'tower', [gʊlt] 'I said'. This alternation between the schwa and the short vowels can be viewed either as a process of schwa strengthening, i.e., a process whereby the schwa becomes a full vowel; or a process of vowel reduction. Whichever the case is, the alternation exists and reflects an intra-dialectal variation within the variety of SSA.

4. The Concept of the Mora

The units of prosody are the mora (μ), the syllable (σ), the foot (F), and the prosodic word (PrWd). These prosodic units are arranged in a hierarchy of exhaustive domination as Figure 1 shows (Selkirk, 1980):

Prosodic Hierarchy

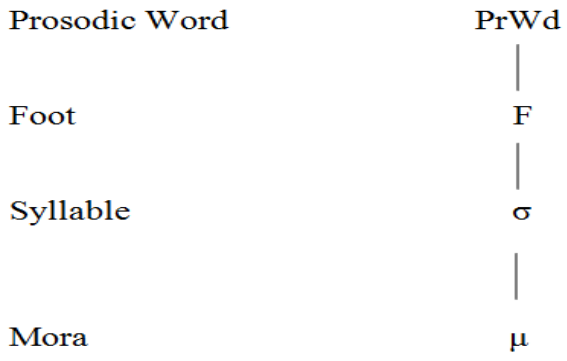


Figure 1. Prosodic units (Selkirk, 1980).

The mora, also called a beat, is the unit by which syllable weight is measured. The weight of a syllable can be measured by counting the number of moras it contains: a light

syllable contains one mora and a heavy syllable contains two moras. In other words, open, short-vowelled syllables are monomoraic (σμ) or light, whereas closed and long-vowelled syllables are bimoraic (σμμ) or heavy. This is represented in Figure 2 as follows :

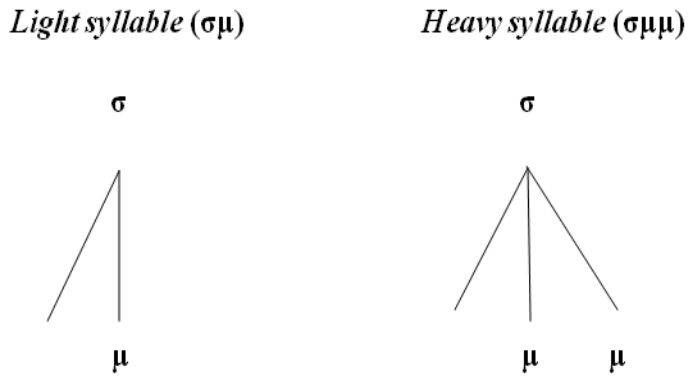


Figure 2. Monomoraic and bimoraic syllables

According to McCarthy and Prince (1988), the syllable and the prosodic word are necessary prosodic constituents when dealing with phenomena in suprasegmental phonology. Additionally, metrical phonology posits the categories foot and light/heavy syllables as its primitives, moras are assigned a prominent role in reduplicative and foot-and-pattern systems, in phonological phenomena such as Epenthesis (Itô, 1989) and Compensatory Lengthening (Hayes, 1989).

5. Sonority

The distribution of schwa is chiefly dependent on the sonority of input consonants. This schwa vowel is epenthesised before the most sonorous consonant in a string. In order to express this sonority-based insertion, we make use of Clements' (1988) sonority hierarchy from most to least sonorous which is defined as follows: Vowels, glides, liquids, nasals, fricatives and stops. The class of glides comprises, in addition to [w] and [j], the pharyngeals [ħ] and [ʕ]. Consider items in the following tables:

$C_1C_2C_3$ clusters / C_2 / ≥ / C_3 /

SSA CCC nouns

a. **C_1əC_2C_3 if C_2> C_3 or C_2C_3** is a geminate

CəCC	Gloss
[gəlb] [səlk] [fəkk]	heart wire jaw

*Table**3**.CəCC nouns*

***b*. $C_1C_2əC_3$ if $C_3 \geq C_2$** in sonority

CCəC	Gloss
[sbəʕ] [ɖfər] [tmər] [smən] [rməl]	lion nail dates home-made butter sand

*Table **4**. CCəC nouns*

SSA CCC verbs/adjectives

In verbs and adjectives, however, only the pattern CCəC is possible, regardless of sonority. Consider items in Table 3:

CCəC verbs	Gloss	CCəC adjectives	Gloss
[ɖrəb] [xsər] [ʈləb] [krəh] [nbəħ] [lbəs]	hit fail ask/demand hate bark wear	[ħrəʃ] [brəʂ] [ʃħəl] [ʈrəʃ] [qrəʕ] [ħwəl]	rough leprous brave deaf bald cross-eyed

Table 5. CCəC verbs and adjectives

As can be seen in the items above, schwa insertion is largely dependent on the sonority of the second and third consonants of tri-consonantal roots. This schwa is epenthesized before the most sonorous consonant in the string. It is epenthesised before the second consonant of the root if its sonority is greater than that of the third consonant. If the sonority of the third consonant is greater than that of the second consonant, the schwa is epenthesized before the third consonant. Likewise, the schwa is epenthesized before the third consonant if its sonority equals that of the second consonant.

It should be noted that there is an exceptional class of nours that do not conform to the sonority hierarchy. Examples of such nouns include items like [ħəbs] "prison", [ħnəʃ] "snake", [ʕməʃ] "blear" … etc. Surprisingly enough, these items include a pharyngeal as one of their elements. On the whole, we believe that a large number of nouns abide by the sonority principle whereas others, such as items in Table 6, do not:

CCəC	Gloss	CəCC	Gloss
[dhəb]	gold	[kəbʃ]	ram
[gʂəb]	reeds	[mədħ]	eulogy
[ʕləg]	leeches	[ləħn]	melody
[wɽən]	lizard	[xəmr]	wine
[ɽməd]	ash	[rəbħ]	winning
[ʕʒəb]	astonishment	[bədr]	moon
[knəf]	freckles	[ʔəmr]	order
[ʕrəg]	sweat	[qəbs]	short sighted
[qləm]	pen	[gəbʂ]	plaster
[zɣəb]	hair	[kəsr]	shattering/fraction
[kləx]	medicinal plant	[ħəml]	pregnancy
[sqəf]	roof	[rəml]	sand
[xnəz]	bad smell	[ʔəmr]	order
[brəg]	lightening	[ʕətʃ]	tenderness
[ʂrəd]	very cold weather	[ʔəʒr]	wage
[ʕnəb]	grapes	[ʕəʂr]	period
[fħəm]	coal	[ħəbs]	jail
[brəʂ]	leprosy	[mədɣ]	chewing

Table 6. Exceptional class of nouns

Resyllabification from CəCC to CCəC

CA strong triliteral stems of the shape CvCC- (with short v) are normally reflected as CəCC. According to Bouhania (2009), in AZRA (Adrar Spoken Arabic), we can find instances where CəCC stems are rendered as CCəC instead of the normal CəCC. As an example, noun [gɑmħ] 'wheat' (CA /qɑmħ-/) is realised as [gməħ]; whereas the general tendency of Algerian Arabic dialects is [gɑmħ]. In Table 5, we can cite some examples from AZRA where the expected stem is CCəC rather than CəCC:

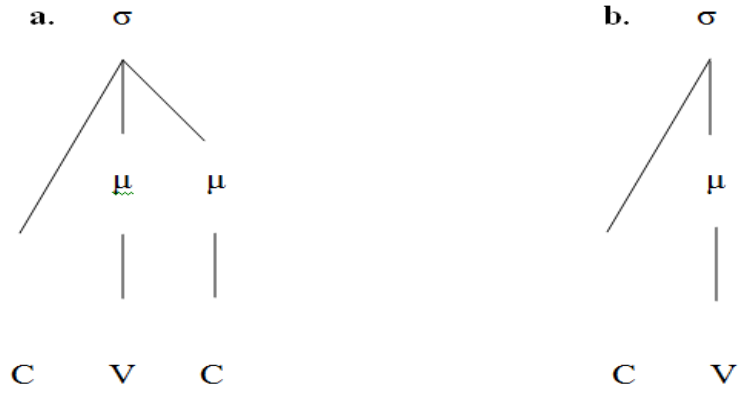
CA	SSA	AZRA	Gloss
[zaʀʕ]	[zəʀʕ]	[zrəʕ]	barley
[ʕalf]	[ʕəlf]	[ʕləf]	hay
[malħ]	[məlħ]	[mləħ]	salt
[ʃams]	[ʃəmʃ]	[ʃməʃ]	sun
[rabħ]	[rəbħ]	[rbəħ]	success
[ʒibs]	[gəbṣ]	[gbəṣ]	plaster
[rɪzq]	[rəzq]	[rzəq]	wealth
[kabʃ]	[kəbʃ]	[kbəʃ]	ram

Table 7. AZRA instances from CəCC to CCəC (Bouhania, 2009)

One remark that has to be made is that some of these items like [ʕləf] and [ʃməʃ] do not abide by the sonority principle.

6. Foot Binarity and the Prosodic Word in SSA

Feet are binary under syllabic or moraic analysis. More generally, the foot binarity constraint (henceforth FT-BIN) prohibits feet exceeding the two-mora limit. As shown below and according to (Zec, 1988; Hayes, 1989; Alghadi 1994), under moraic theory, SSA distinguishes between bimoraic CVC heavy syllables, where V is different from the schwa (a); and monomoraic light syllables, which fall into three types: the first where the mora dominates one segment (b); the second where the mora dominates the schwa and the following consonant (c); and the third where the mora dominates a consonant belonging to a minor syllable known as a degenerate syllable. The degenerate syllable consists of a single consonant only. A representation of the degenerate syllable is shown in (d) below:



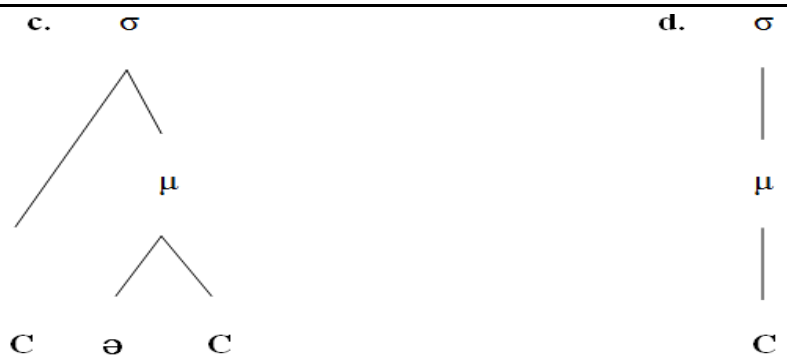


Figure 3. Monomoraic, bimoraic and degenerate syllables

The fact that schwa appears in different positions shows that it is epenthetic. We must point out that this schwa is moraless on its own and that it acquires a moraic status only in combination with a following consonant in the syllable (Zec, 1988). In other words, that schwa in SSA never occurs in open syllables follows from the fact that it must head monomoraic syllables, consisting of a single branching mora that both schwa and the following coda consonant share as shown in (c) above. This assumption explains why schwa vowels are banned from occurring in open syllables.

The moraic representation in 4 above which is also adopted for Moroccan Arabic by Alghadi (1994), has led to lay down the following equalities between syllables with a full vowel nucleus and syllables with a schwa nucleus:

a. CV = CəC
b. CVC = CəCC
c. CVCV = CəCCəC
d. CCV = CCəC

Both the templates in (b) and (c) meet the requirement of a PrWd and satisfy the constraint FT-BIN by virtue of their being bimoraic. But, the templates in (d) are monomoraic and therefore constitute a clear violation of FT-BIN. As we can see, both templates start with a consonant cluster (CCV and CCəC). To clarify, consider the following structure of the verb [klɑ] in Figure 4:

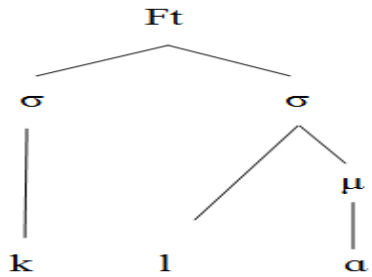


Figure 4. Monomoraic structure

This structure shows that the lexical word [klɑ] does not meet the requirement of a PrWd. In other words, it does not satisfy FT-BIN, a constraint observed cross-linguistically. The question we ask here is that how is it possible to satisfy FT-BIN? The answer to this question is that the first member of an initial consonant cluster or the second member of a final consonant cluster is considered as part of a degenerate syllable, where the consonant is dominated by a mora. This mora must also be adjoined directly to the foot rather than projecting its own syllable. Following Alghadi, the lexical words [klɑ] 'he ate' and [gəlb] 'heart' will have the following structures:

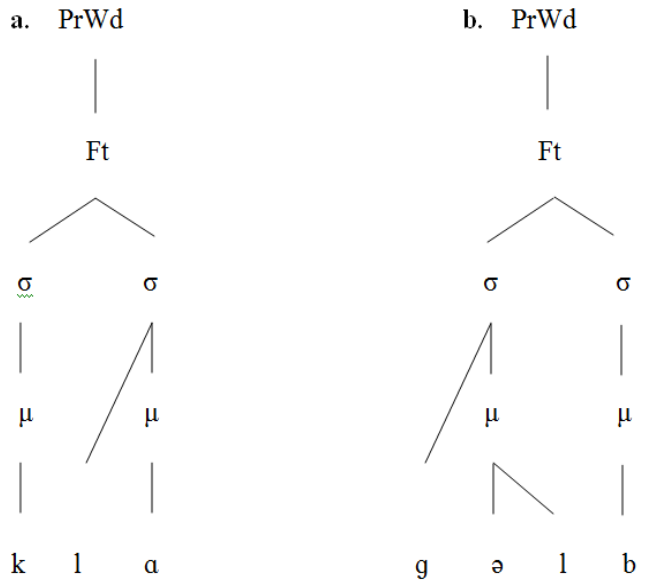


Figure 5. Bimoraic structures

These structures show that the moraification of the consonants [k] and [b] is the result of the requirement that feet be binary. Thus, in forms such as [klɑ] and [gəlb], satisfying the constraint FT-BIN forces the consonants [k] and [b] to be moraic.

In sum, the behaviour of initial and final consonant clusters in tri-consonantal words points towards the fact that the only way to satisfy FT-BIN is by assigning a moraic status to a member of the cluster. Hence, satisfying foot binarity is very common and is found cross-linguistically.

7. Schwa Insertion

Nearly all dialects agree on the repair mechanism available to rectify unwanted clusters, namely, epenthesis, but disagree on the position in the cluster where the epenthetic vowel is inserted. In a tri-consonantal cluster CCC, an epenthetic vowel may be inserted after or before the second consonant. In SSA monosyllabic words, the epenthesis site varies from verbs, to adjectives to nouns. Whereas all tri-segmental verbs, adjectives, and a subset of nouns exhibit a schwa after the second consonant (CCəC), we find that another subset of tri-segmental nouns insert a schwa before the second consonant (CəCC). To illustrate this situation, consider the following data:

Verbs: CCəC

[dxəl] 'to enter,' [xrəʒ] 'to go out,' [gsəm] 'to split,' [ʃkər] 'to thank,' [səmħ] 'to forgive,' [rbəħ] 'to win,' [ʃʈəb] 'to drink,' [hɖəʈ] 'to speak,' [səmʕ] 'to hear,' [ħzəm] 'to tie,'… etc.

Adjectives: CCəC

[ʂləʕ] ‘bald,’ [zʕər] ‘fair,’ [smər]/[zrəg] ‘sunburnt, tanned/blue,’ [ħmər] ‘red,’ [kħəl] ‘black,’ [ʕwər] ‘one-eyed,’ [krəd] ‘curly,’ [ʃhəb] ‘used up,’ [qʒəʕ] ‘someone who walks with a limp,’ [mləs] ‘slick,’ [mləʈ] ‘hairless,’ … etc.

Nouns: CCəC/CəCC

a. CCəC

[lħəm] 'meat', [ʃħəm] 'fat', [qbər] 'tomb', [ʕrəg] 'sweat', [ʒməl] ‘camel’, [ħʈəb] 'timber', [r ʒ əl] 'leg', [ʃʕər] 'hair', [ʃdəg] 'cheek', [ʕnəb] 'grapes', [bɣəl] 'mule', [kfən] 'shroud', [fʒər] 'dawn', … etc.

b. CəCC

[kəbʃ] 'ram', [ʃəmʃ] 'sun', [təlʒ] 'snow', [məlħ] 'salt', [səʕd] 'luck', [kənz] 'treasure', [wəsʈ] 'middle', [kəlb] 'dog', [nəms] 'mongoose', [ʈərf] 'piece', [bərd] 'cold', [gəmħ] 'wheat', etc.

Examples of SSA nouns of the pattern in (b), where the schwa is inserted before the second consonant, are problematic. In its normal application, the schwa epenthesis rule inserts a schwa between every two stranded consonants as shown in the following data:

Ø ə / C __ C ⟶

mrbʈ ⟶ mər.bəʈ'a pigsty'

mktb ⟶ mək.tɑ.bɑ 'a library'

n-lʕb ⟶ nəl.ʕəb 'I/we will play'

7.1. General Epenthesis Rule

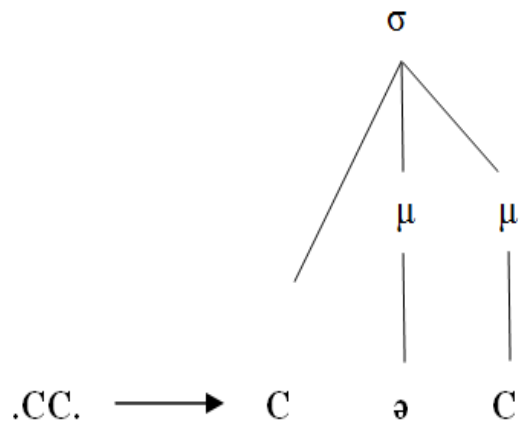


Figure 6. Schwa epenthesis rule

This rule shows that the schwa is epenthesized for syllabification purpose. It is inserted to act as a nucleus to every two adjacent and stranded consonants. However, as far as triliteral forms are concerned, this rule does not determine the locus of the schwa either CəCC or CCəC. It only says that two CCs in CCC structures should be parsed, but does not specify them. So, additional rules should be applied to fix the schwa in tri-consonantal roots.

As the following rules depict, the distribution of schwa is dictated by the morphological category of the base, and is largely governed by two different rules. The first is the sonority rule, which is active in nouns, inserts the schwa before the most sonorous consonant or between the second and third consonant if they have the same sonority index. While the second inserts the schwa between the last two consonants in verbs and adjectives:

7.2. *Triconsonantal Nouns Epenthesis Rule/Sonority Rule*[1]

The rule responsible for schwa epenthesis may be formalized as follows:

O ⟶ ə / a. C1 ___ C2C3 if C2 > C3
/ b. C1C2 ___ C3 if C3 > C2
or C2 = C3
Or C1C2C3 / C2 / ≥ / C3 /

These rules say that the insertion of schwa is sensitive to the sonority of the last two consonants of tri-consonantal roots.2 Schwa is epenthesised before the most sonorous consonant in the string or between the last two consonants with the same sonority index in nouns. For example, [kənz] 'treasure', [wəsʈ] 'middle', [sʈəħ] 'roof', [ʒməl] 'camel', [ɣnəm] 'sheep' …etc.

7.3 *Tri-consonantal Verbs / Adjectives Epenthesis Rule*

The rule responsible for schwa insertion in verbs and adjectives may be formalized in the following way:

O ⟶ ə / CC ___ C] Stem Right Edge (V/Adj.)

This rule which should refer to the categories VERB and ADJECTIVE aligns the last full syllable with the stem at the right edge (McCarthy & Prince, 1993 b). So, why is right edge so vital for tri-literal verbs? In other words, what is the reason behind the constant violation of the sonority condition by this category of verbs?

8. Rationale Behind Verbs' Violation of Sonority

As stated above, in triliteral nouns, the choice between CCəC and CəCC is determined by sonority conditions. In verbs, however, only the pattern CCəC is possible, regardless of sonority.: [səʕ] 'hear', [rħəm] 'take pity', [hɖər] 'speak', [zʕəf] 'get angry', …etc. The reason behind the constant violation of the sonority condition by this category

of verbs is paradigmatically and phonologically motivated. With the exception of the 3rd person singular and plural, the paradigm of tri-segmental verbs in Table 8 below shows that the stem is totally identical with the base [ʃrəb] 'to drink':

CCəC		CəCC	
3rd p. m. sg. perf.	ʃrəb	3rd pers. plur.	ʃərb-u
1stp. m/f. sg. perf.	ʃrəb-t	3rd pers. sing. fem.	ʃərb-ət
1st p. m/f. pl.	ʃrəb-nɑ		
2nd p. f. sg. perf.	ʃrəb-tɪ		
2nd p. m/f. pl. perf.	ʃrəb-tu		

Table 8. Paradigm of the Perfective Verb

Total faithfulness to the base [ʃrəb] is violated only when the universal constraint Onset ("syllables must have onsets") is at risk since *[ʃrəb-u] and *[ʃrəb-ət], where the suffixes [-u] and [-ət] are onsetless, are unacceptable. Yet, one holds the view that the sonority condition is not satisfied in sound triliteral stems due to the inflectional paradigm of this category of verbs; specifically, it is the 1st person singular member that is responsible for this constant violation. If the sonority condition is satisfied, we will have bases like *[ʃərb] 'drinking' instead of [ʃrəb] since [r] is more sonorous than [b].

8.1 Hypothetical Perfective Paradigm

As schematized below, if we concatenate the suffix {-t} to a hypothetical verb that includes a schwa before the second consonant like *[ʃərb] (ʃrəb 'to drink'), we will end up with the form *[ʃərbt] 'I drank', which is ill-formed as it violates the universal constraint against trimoraic structures (σμμμ) word-internally.3 As far as the other persons are concerned, forms with this CəCC stems can be derived without any problem:

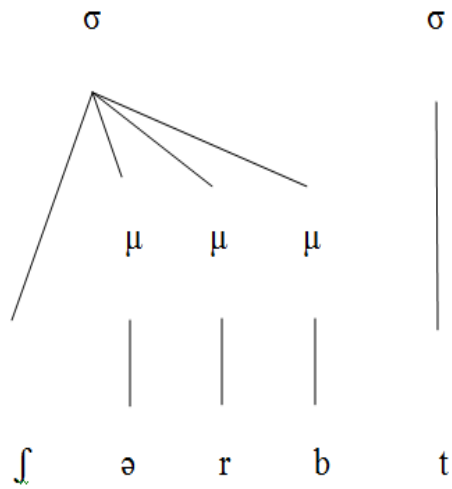


Figure 9. CəCC hypothetical verb

Likewise, the hypothetical paradigm in Table 10 below depicts a situation in which we conjugate a verb that respects the sonority parameter in the perfective:

CəCC stem	
1st/2nd p. sg. m.	* ʃərb -t
2nd p. sg. f.	* ʃərb -tɪ
3rd p. sg. m.	* ʃərb
3rd p. sg. f.	* ʃərb -ət
1st p. pl.	* ʃərb -nɑ
2nd p. pl.	* ʃərb -tu
3rd p. pl.	* ʃərb -u

Table 10. Hypothetical Perfective Paradigm

With the exception of the first and second persons singular forms *[ʃərb-t], the other forms are all well-formed as the third consonant is assigned as an onset of the suffixal vowel [ʃər.bu], as a member of a complex onset [ʃər.btɪ]/[ʃər.bnɑ], as the onset of a schwa by the General Epenthesis Rule [ʃər.bət], or as a Degenerate Syllable [ʃər.b].

To sum up, since the form *[ʃərbt] is not acceptable for moraic reason (σμμμ), the rule in (7.3) is used to freeze all sound triliteral forms. Then the general sonority effects are neutralized in verbs by aligning all sound triliteral verbs' syllables with the right edge of the stem through schwa insertion between the last two consonants e.g., [lbəs] ‘wore’, [rbəħ] ‘won’. The schwa shifts leftwards in two cases only. First, in the third person plural, the schwa moves leftwards because the resulting *[ɖrə.bu] is not allowed in SSA as it violates a powerful constraint that prohibits open syllables with schwas. Second, in the third person singular feminine, the schwa moves leftwards because the quadriconsonantal string [ɖrbt] is realized as [ɖər.bət] by the General Epenthesis Rule.

8.2. Attested Perfective Paradigm

If we apply the ‘General Epenthesis Rule’ for first and second person singular, we will end up with two homophonous forms*[kədbət] (1st & 2nd p. sg. perf.) and *[kədbət] (3rd p. sg. fem. perf.). To avoid this similarity in form, the General Epenthesis Rule is violated in order to satisfy a high ranked paradigmatic constraint requiring from members of a given paradigm to be distinct in form. To put it differently, to avoid phonological merger between the above forms, the rule in (5.3) has applied before the General Epenthesis Rule to prohibit forms undergoing normal epenthesis from emerging for paradigmatic reasons.

In short, in order to account for the 'Disparity in Epenthesis' between words on the pattern CCəC and those on the pattern CəCC, we have to refer to both the moraic structure and the inflectional paradigm of tri-consonantal verbs. The rationale behind this difference is that it is impossible for tri-consonantal verbs to satisfy the sonority parameter as CəCC cannot be concatenated with {-t} suffix for moraic reasons, and the whole CCCC string cannot be parsed as CəCCəC [kəd.bət] for paradigmatic reasons.

9. Schwa Deletion

As the following examples show, the process of short vowel deletion in open syllables or word-finally is attested in most, if not all, Algerian dialects including the variety used in this investigation. This process has resulted in various consonant clusters in both onset and coda positions, e.g., CA *[dɑχɑltu] → SSA [dχəlt], CA *[kɑtɑbɑ] → SSA [ktəb], CA *[kɪtɑ:b] → SSA [ktɑ:b], … etc.

The most important rule deleting short vowels is "Syncope", which is the deletion of a medial unstressed vowel near a stressed vowel. It is divided into "Forward Syncope", where the controlling vowel induces deletion of a following short vowel, and "Backward Syncope", where the controlling vowel induces deletion of a preceding short vowel. Consider data in the following tables:

Stem	Syncopated Form	Gloss
[mɣɑɽəf]	[mɣɑɽf]	spoons
[frɑʃət]	[frɑʃt]	forks
[mʂɑləħ]	[mʂɑləħ]	brooms
[sdɑdər]	[sdɑdr]	sofas

Table 11. Forward Syncope

Stem	Gloss	Affixed Form	Gloss
[ləħjɑ]	beard	[lħɑj-tɪ] / [lħɪ-tɪ]	my beard
[χut]	sister	[χt-ɪ] / [χt-u]	my/his sister
[χurʂ]	earring	[χrɑʂ]	earrings
[ləħjɑ]	beard	[lħɑjɑ]	beards
[ʒɪb]	pocket	[ʒjub]	pockets

Table 12. Backward Syncope

As can be seen in Table 11 above, the rule of Schwa Epenthesis applies to insert a schwa between the last two consonants to yield the template [CCɑCəC]. This schwa is omitted by the application of Forward Syncope rule to give [CCɑCC]. Our hypothesis is that the vocalic element inserted between the last two consonants, henceforth denoted as *ə is a short vowel just like the other short vowels of SSA, ə and its rounded version u. However, if this assumption is made, then Forward Syncope is optional. So, both [mʂɑləħ] and [mʂɑlħ], [mɣɑɽəf] and [mɣɑɽf] …etc. are possible. In fact, under fast speech condition, [mʂɑlħ]/[mɣɑɽf] is the output. Therefore, and in the view of *ə as a vowel, this corresponds to an application of Forward Syncope which deletes the vowel *ə.

To sum up, the assumed schwa vowel *ə inserted through an epenthetic rule called Schwa Insertion, disappears in fast speech whereas the short vowel ə does not. Therefore, previously discussed words of the pattern CCəC maintain their schwa while words of the

pattern CəCC do not. To put it differently, the schwa vowel in CCəC is epenthetic and does not delete in fast speech but the schwa in CəCC is underlyingly specified and does delete. Hence, *ə the assumed schwa vowel is not a vowel gesture (not a true vowel) but rather a transition between two consonant gestures, whereas ə is a true vowel.

In addition, under the view of *ə as a vowel, it has been demonstrated that Forward Syncope contrasts with Backward Syncope, deleting the true short vowels ə and u in the stem when further suffixes containing vowels are added in the following syllable (Table 12). Here, Backward Syncope treats both ə and u equally. In contrast, Forward Syncope does not treat *ə and u in the same way.

When final /CuC/ sequences are found after full vowels, Forward Syncope does not apply (Heath, p. 248). For example, stems like [ɑχur] 'other (masculine singular) ‘and [t-ɑ kul]/[kɑ-t-ɑkul] 'you/she eat(s)' do not have *[ɑχr] and *[t-ɑkl]/[kɑ-t-ɑkl]. These vowels do delete by Backward Syncope e.g., [ɑχur] ‘other’ (masculine singular) has the feminine singular form [χrɑ] and [t-ɑkul]/[kɑ-t-ɑkul] ‘you/eat(s)' has the feminine singular form[t-ɑklı]/[kɑ-t-ɑklı] 'you eat', when in the feminine forms Backward Syncope applies to delete the short vowel u. Hence, both vowels ə and u as demonstrated in Table12 above delete by Backward Syncope, but Forward Syncope must single out one of these vowels.

But if *ə is not a vowel, as we argue, there is no need for such a stipulation. Its effect has been demonstrated to fall out from the assumption that *ə is not a vowel gesture, but rather a transition between two consonant gestures. The same holds true for Schwa Insertion. It inserts the *ə that may later be omitted by Forward Syncope.

As shown in the examples of Table 12, the addition of further affixes containing vowels has triggered Backward Syncope which has resulted in the deletion of the short vowels in the stem. Other examples are:

[ʂıfəʈ] 'send' + [-u] → [ʂıfʈ-u]'they sent'.

[dɑfəʕ] 'defend' + [-u] → [dɑfʕ-u] 'they defended'.

[χɑtəm] 'a ring' + [-ɑ-] → [χwɑtəm] 'rings'.

[gıʈun] ‘a tent’ + [-ɑ-] →[gwɑʈın] ‘tents’.

[muχ] ‘a brain’ + [-ɑ-] → [mχɑχ] ‘brains’.

[χɑd] ‘a cheek’ + [-u-] → [χdud] ‘cheeks’.

[χɑʈ] ‘a line’ + [-u-] → [χʈuʈ] ‘lines’.

[ʕəbd] ‘a slave’ + [-ı-] → [ʕbıd] ‘slaves’.

[məʕzɑ] ‘a goat’ + [-ı-] → [mʕız] ‘goats’.

[kəlb] ‘a dog’ + [-ı-] → [klıb] ‘a puppy’

One last remark to be made about Syncope, according to Watson (2002), is that it is not strictly required as a repair process, but is usually invoked to reduce the number of monomoraic syllables in the utterance and maximize the number of optimal bimoraic

syllables. In SSA, as in many Maghrebi dialects, any of the short vowels /ɑ/, /ɪ/, /u/, and /ə/ may be subject to Syncope as the examples above depict.

To conclude, the facts reviewed so far provide reasonable support for the proposal that the schwa-like element in final CC clusters of templates is not a vowel but a transition between two consonants.

10. Conclusion

In order to account for the 'Disparity in Epenthesis' between words on the pattern CəCC and those on the pattern CCəC, we have to refer to both the moraic structure and the inflectional paradigm of triconsonantal verbs. The determining factor behind this 'Disparity in Epenthesis' is the fact that it is impossible for triconsonantal verbs to satisfy the sonority parameter because CəCC cannot be concatenated with the suffix [-t] for moraic reasons, and the whole CCCC string cannot be parsed as CəCCəC for paradigmatic reasons. Finally, we have demonstrated that the assumed schwa vowel *ə inserted via an epenthesis rule called 'Schwa Insertion', disappears in fluent speech whereas the short vowel ə does not. Accordingly, the schwa-like element in final CC clusters of templates is not a true vowel but a transition between two consonants.

References

[1] Abdelhay, B. (2006). Females' and Males' Identity as revealed in phonology and Grammar: a case study of Mostaganem Spoken Arabic. University of Mostaganem, Revue Traduction et Langues (5), p 21.

[2] Alghadi, A. (1994). An OT Account of Moroccan Arabic Prosody. Ms. DelwareUniversity, and Mohamed V University, Faculty of Letters, Rabat.

[3] Bernouss, M.R. (2007). Moroccan Arabic morpho – phonology: A Moraic approach. Sidi Mohammed Ben Abdellah University (Fes-Sais, Morocco).

[4] Bouhania, B. (2009). Sociolinguistic and Dialectological Description of Adrar Arabic.Unpublished Doctoral Thesis, the University of Oran, Es-Senia.

[5] Clements, G. N. (1988). *The Sonority Cycle and Syllable Organisation*. In phonologica, ed. Dreshler et al., pp. 63-76. Cambridge, MA : MIT Press.

[6] Hayes, B. (1989). Compensatory Lengthening in moraic phonology. Linguistic Inquiry20, pp. 253-306.

[7] Heath, J. (1987). Ablaut and Ambiguity: Phonology of Moroccan Arabic Dialect, State University of New York Press, Albany.

[8] Hyman, L. (1985). A Theory of Phonological Weight. Dodrecht: Foris.

[9] Itô, J. (1986). Syllable theory in prosodic phonology. Doctoral dissertation, University of Massachussetts, Amherst.

[10] ---------- (1989). A prosodic theory of epenthesis. Natural Language and Linguistic Theory 7, pp. 217-260.

[11] McCarthy, J. J. & Prince, A. (1988). *Prosodic Morphology and Templatic Morphology.*University of Massachusetts and Brandeis University.

[12] --------- (1993b). Generalized Alignement. In Yearbook of Morphology, Ed. Geert Booij and Jaap van Marle, pp. 70-153. Dordrecht : Kluwer.

[13] Selkirk, E. (1980). *The Role of Prosodic Categories in English Word Stress*. Linguistic Inquiry, pp. 2, 563-605.

[14] Watson, Janet C.E. (2002). *The Phonology and Morphology of Arabic*. Oxford University Press Inc., New York.

[15] Zec, D. (1988). Sonority Constraints on Syllable Structure. Ph.D. Dissertation. Stanford, CA: Stanford University.