A Re-examination of *Al-ʔiʕlaal* in Arabic: An Autosegmental Approach

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Abstract

This study analyses *Al-ʔiʕlaal* phenomenon which takes place in Modern Standard Arabic (henceforth, MSA) derivational processes. Based on the description of Arab traditionalists such as Al-Raagihi (1984: 155) and Al-Galaayiini (1991), *Al-ʔiʕlaal* is defined as "a change that occurs with vowel letters where they can be deleted or substituted by another letter in certain cases". For example, the letter[1] *w* in *daʕaw* 'prayed to God' is substituted by the letter *a* in *daʕaa* (Al-Raagihi 1984). Clearly, the previous example analysed by Arab traditionalists demonstrates that the changes that take place are heavily reliant on the orthography of MSA, rather than the phonological system. For instance, /y/ and /w/ are regarded as vowels, rather than glides or semi vowels. Therefore, this study analyses examples of words in which *Al-ʔiʕlaal* takes place based on autosegmental or non-linear phonology; an approach in which phonological representations consist of several levels or tiers (Goldsmith 1979). The analysis of the words reveals that there is actually no substitution of sounds and the change that occurs in these words is phonologically motivated. Finally, the study recommends the reconsideration of the concept of *Al-ʔiʕlaal* in Arabic morphological literature to account for the phonological changes that occur in these words.

Keywords: Arabic, Autosegmental phonology, phonological alternations

1. Introduction

Morphological processes that take place in some languages are sometimes phonologically conditioned. In other words, choosing an allomorph to represent a particular morpheme in a certain context relies on the phonological properties of that allomorph; whether it is similar to other neighbouring sounds found in that context or not. An example of phonologically conditioned morphological alternations in English is the past morpheme that has the underlying representation /d/. It is pronounced as [d], [t], and [əd] in the words played, talked, and added respectively, depending on the final segment of the stem to which it is attached, a process referred to as progressive assimilation in phonology (Katamba, 1989; Weisler and Milekic 2000(.

Phonologically alternating forms, such as the previous alternation in the English past tense morpheme, which are triggered by morphological processes, are in most cases rule-governed. Simply put, the derivation of the realization of morphemes (i.e. allomorphs) is done using phonological processes. In this regard, Spencer (1996: 55) suggests that phonological processes could be represented in the following model of derivation:
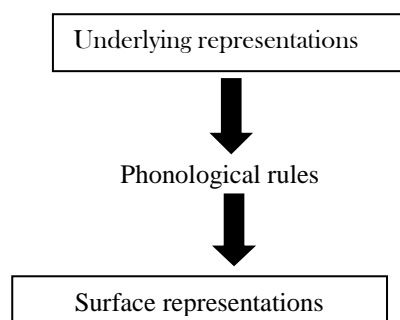

Figure 1. Phonological processes (Spencer 1996)

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[1] Note that traditional Arab morphologists use 'letters' to describe the sounds they represent.

Katamba (1993) defines derivations as the changes through which a particular form passes to derive its surface structure from its deep structure. In this study, we argue that certain derivational processes which take place in Arabic are, in fact, phonologically driven. Arabic is a Semitic language which is spoken mainly in North Africa, most of the Arabian Peninsula as well as other parts of the Middle East. Literary Arabic or Modern Standard Arabic (MSA) is the only formal form of Arabic. Essentially, this variety is used in news broadcasts and formal speeches. On the other hand, colloquial Arabic, which consists of many dialects, is the main spoken variety as opposed to MSA. The most prevalent dialects are those spoken in Syria, Iraq, the Gulf, Egypt and North Africa. Mainly, this study pays special attention to Al-ʔiʕlaal phenomenon which appears in MSA and other varieties of colloquial Arabic. It analyzes different types of Al-ʔiʕlaal, demonstrating that the changes that occur in the words are phonologically driven.

2. Theoretical framework

With the publication of Chomsky's and Halle (1968) *The Sound Pattern of English* (SPE), generative phonology has been dominated by linear phonology (McCarthy 1982). The most fundamental criticism of SPE is that it did not offer significant changes in the understanding of phonological representation. The theory of distinctive features by Jakobson, Fant, and Halle (1951) was adopted by Chomsky and Halle, with some modifications, for them to argue that an utterance and its underlying representation are formed from a matrix of distinctive features, so that every column corresponds to one single segment (McCarthy 1982). In this way, segments are constructed from unordered features, and utterances are merely ordered lists of segments. This means that the properties of an utterance, even prosodic ones pertaining to stress and syllabification are inherent in the segments. These properties are realized by distinctive features and rules that provide a phonetic interpretation for them. The most obvious problem with this approach is that segments may not have a one-to-one association with features (McCarthy ibid). An example would be affricates in English, i.e. /tʃ/ and /dʒ/. Since /t/ is a plosive sound, meaning that there is a complete restriction of the air flow, this indicates that it is [-continuant], whereas /ʃ/ is fricative, so naturally it is [+continuant]. This suggests that the affricate /tʃ/ should be [-continuant and +continuant] at the same time. However, non-linear phonology does not allow for two values of the same feature inside a single matrix (McCarthy ibid). This suggests that features should be separated and associated to specific segments. In sum, the fact that features are represented in a linear matrix is not sufficient and has many problems.

Due to the problems identified with linear phonology, the focus has shifted to another approach referred to as autosegmental phonology or non-linear phonology. This approach was first introduced by Goldsmith (1976). The theory acknowledges that different classes of features can be found on different levels. These levels are referred to as tiers, and each tier is unspecified in terms of features on other levels. The theory was first introduced to account for tone representation in tonal languages in Asia, Africa and Central America. Due to the fact that tones should be linked to other articulatory gestures, different autosegmental tiers are associated with each other by means of association lines. This makes this approach different from earlier association algorithms. Therefore, phonological representations are comprised of many tiers: segments and tones are represented on separate tiers that are quite distinct from each other. Another tier links the tonal and the segmental tiers, which is referred to as the skeletal or X tier. Association lines are then used to link the three tiers together. It should be noted that these lines are not used arbitrarily; they are governed by a set of conditions that regulate how segments are associated on different tiers. Goldsmith (1990: 319) calls these constrains the Well-Formedness Condition (WFC):
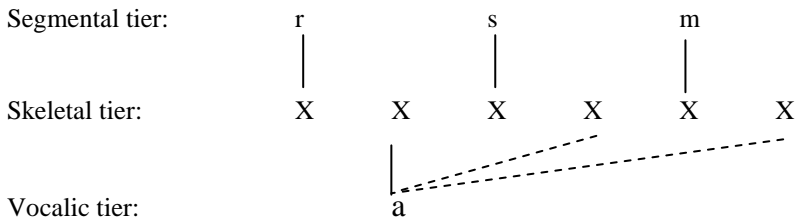
1. All vowels are associated with at least one tone.
2. All tones are associated with at least one vowel.
3. Association lines do not cross.

The purpose of WFC is to safeguard phonotactic constraints. In other words, it ascertains that the restrictions on the combination of phonological elements are not violated (Katamba and Stonham 2006: 158). WFC are referred to by some linguists as Universal Linking Conventions, which identify the means by which elements on different tiers can be associated. The differences between the two types of rule are related to automatic vs. non-automatic spreading. In the former, tone melodies automatically spread to tone bearing units (Goldsmith 1976). In the latter, however, melodies spread to toneless vowels non-automatically (Pulleyblank 1986). In particular, spreading only takes place if a specific rule in a particular language demands it. This study adopts the Universal Linking Convention found in Pulleyblank (1986: 114-116):

1. Link a sequence of autosegments with a series of elements on the skeletal tier that are capable of bearing them.
2. Perform the linking going from the beginning to the end of the word. Unless specific instructions are given in the grammar of the language to do otherwise, link autosegments with units that are capable of bearing those autosegments in a one-to-one fashion.
3. Association lines do not cross in the linking process.

The last condition prohibits the association of one tone with two syllables at the same time (Katamba and Stonham 2006: 159). As far as Semitic languages, e.g. Arabic and Hebrew, are concerned, words are constructed by the internal modification of the root itself, not a mere concatenation of affixes and roots as in agglutinating languages, e.g. Turkish (McCarthy 1979, 1981; Altakhaineh 2014). Thus, the morphological system of Semitic languages is described as non-concatenative. It is acknowledged that in Semitic languages, the root which often has three segments, e.g. *rsm* 'draw', functions as the skeleton on which flesh (i.e. vocalic melody) is put in word formation. This process has led McCarthy (1979, 1981) to propose prosodic morphology, which is similar to autosegmental phonology, to describe non-

concatenative morphological systems such as that of Arabic. He posits that three tiers are used to represent verbs in Arabic, namely, the segmental, the skeletal and the vocalic tier. An example of an Arabic verb /rasama/ is the following:

Segmental tier: r   s   m

                                   | | |

Skeletal tier: X   X   X   X   X   X

                                          |

Vocalic tier: a

The segmental tier conveys the meaning of the root, i.e. rsm 'draw', the skeletal tier constitutes the canonical shape which is connected with a certain meaning or grammatical function, and the vocalic tier provides information similar to that conveyed by English affixes, e.g. tense, aspect or voice (Katamba and Stonham 2006: 166). Note that association goes from left to right, and since there is only one vowel /a/, it is linked to the first V slot. Spreading is non-automatic in this case; there is a rule in Arabic that sanctions the spreading of /a/ to vacant slots (Katamba and Stonham ibid). This study adopts the analysis provided by McCarthy (1981) and Katamba and Stonham (2006) to analyse Arabic data, especially those in which Al-ʔiʕlaal appears. The next section provides the data analysis.

3. Data Analysis

In Arabic morphological literature, the description of *Al-ʔiʕlaal* phenomenon is done on the basis of the orthographical system of Arabic, in which one letter is substituted by another letter for a reason related to difficulty in pronunciation (Al-Raagihi, 1984: 155; Al-Galaayiini, 1991). For instance, in one case, the glottal stop is deleted from the beginning of the verb due to the impossibility of pronouncing the word, */ʔʔaħsan/ vs. [ʔaħsan] 'better'. However, the reasons that underlie such deletion and in which environment it takes place are not clearly delineated. Therefore, in this section, we examine some cases of *Al-ʔiʕlaal,* proposing an analysis that account for the phonological changes that occur on the basis of autosegmental phonology.

3.1 Analysis of Al-ʔiʕlaal phenomenon in Arabic

Firstly, according to Al-Raagihi (1984: 155-183), in one case of *Al-ʔiʕlaal,* "the vowels /y/ and /w/ are substituted by /a/ in verbs such as *daʕaw* 'prayed to God' and *ramay* 'threw'". Firstly, as it is well known in modern phonological theory, /y/ and /w/ are semi-vowels or glides. Secondly, what really occurs in these words is not substitution; the semi vowels are simply deleted (syncope) when they appear word finally. Then, the final vowel is lengthened in a process referred to as "compensatory lengthening" to make up for the loss of the consonant (Spencer 1996: 68). This can be illustrated in the following figures.
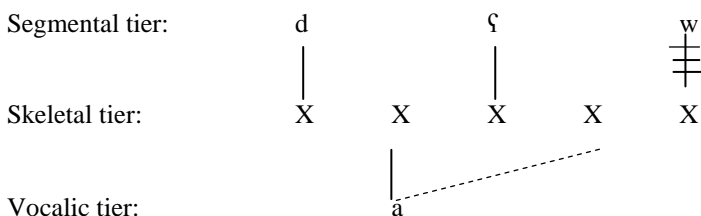
Segmental tier: d   ʕ   w

                             | | ‡

Skeletal tier: X   X   X   X   X

                                    |

Vocalic tier: a

Figure 2. Syncope of /w/ in the underlying representation /daʕaw/ 'prayed'

Segmental tier: d   ʕ

                             | |

Skeletal tier: X   X   X   X   X

                                    |
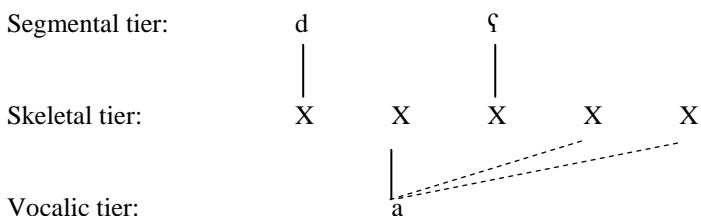
Vocalic tier: a

Figure 3. Compensatory lengthening of /a/ in the surface representation [daʕa:] 'prayed'

Figure (2) shows that in the underlying representation /daʕaw/ 'prayed', the /w/ is de-linked, i.e. deleted. It also shows that after delinking the /w/, the X slot becomes unattached. Hence, the vowel /a/ spreads from left to right (see Archangeli and Pulleyblank 1989; Altakhaineh and Zibin 2014), in accordance with the Universal Linking Convention, as in figure (3). This process is referred to as compensatory lengthening. The outcome of this process is the surface representation [daʕa:] 'prayed'.

Figures (2-3) demonstrate that the semi-vowel /w/ is deleted at the end of the Arabic verbs that has the patterns or *binyan* (McCarthy 1981) faʕal and ftaʕal, such as /sˤawan/ 'preserve' (faʕal), /xawaf/ 'got scared' (faʕal), and /ʕtawad/ 'got used to' (ftaʕal). It also applies to verbs such as /ramay/ 'threw' and /nθanay/ 'got bent', in which the trilateral root contains a /y/. The following figures demonstrates the derivation of /ramay/ 'threw', in which the /y/ is deleted.
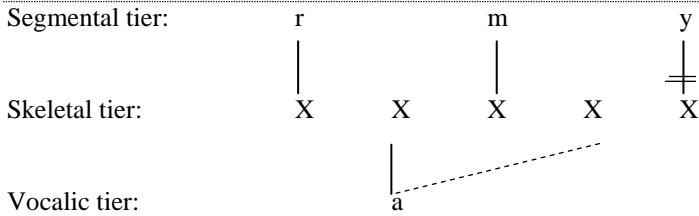
Segmental tier: r   m   y

Skeletal tier: X   X   X   X   X

Vocalic tier: a

Figure 4. Syncope of /y/ in the underlying representation /ramay/ 'threw'

Segmental tier: r   m

Skeletal tier: X   X   X   X   X
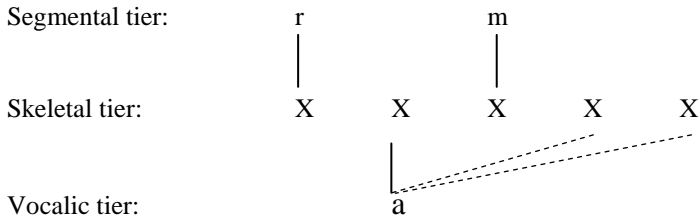
Vocalic tier: a

Figure 5. Compensatory lengthening of /a/ in the surface representation [rama:] 'threw'

The fact that the two processes, i.e. syncope and compensatory lengthening, occur in many verbs in Arabic means that a generalization can be made about the derivation of the patterns *faʕal* and *ftaʕal*, whereby the semivowels /y/ or /w/ that occur in trilateral roots are deleted. The reason behind such processes could be that final glides may not be pronounced at present. According to Holes (2004: 91), words that end in -/ay/ used to be pronounced with a final glide in west Arabia in the past, whilst in the east, these words were pronounced with a final -/a:/. However, in present day orthography, the spelling of the ancient west is preserved, i.e. –/y/, but the pronunciation follows that in east Arabia, i.e. -/a:/.

Secondly, another case of *Al-ʔiʕlaal* is discussed by Al-Raagihi (1984), in which "the vowel /w/ is substituted by the vowel /y/ in words such as *marmiwy* 'thrown' and *mardiwy* 'pleased', then the two *y*s become one, i.e. *marmiyy* and *mardiyy* respectively". We propose that what really occurs in such words is place assimilation, where the labio-velar glide /w/ assimilates to the place of articulation of the palatal glide /y/, which appears at the edge of the word, and then the two sounds are geminated. One may argue that the assimilation occurs to facilitate the pronunciation of these words. Producing the sounds /w/ and /y/ (i.e. consonant cluster) when they are adjacent, as in /marmiwy/ 'thrown' and /mardiwy/ 'pleased' may put pressure on the articulators involved in their production due to their different features (cf. Altakhaineh and Zibin 2014: 5). The following figures show the underlying and the surface representations of /marmiwy/ 'thrown':
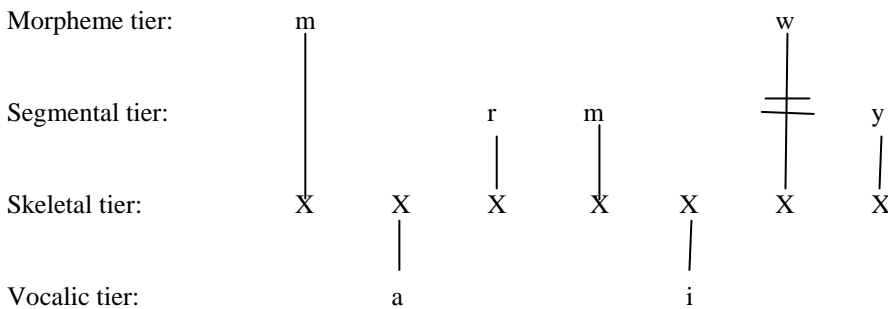
Morpheme tier: m   w

Segmental tier: r   m   y

Skeletal tier: X   X   X   X   X   X   X

Vocalic tier: a   i

Figure 6. Syncope of /w/ in the underlying representation /marmiwy/ 'thrown'

Morpheme tier: m

Segmental tier: r   m   y

Skeletal tier: X   X   X   X   X   X   X

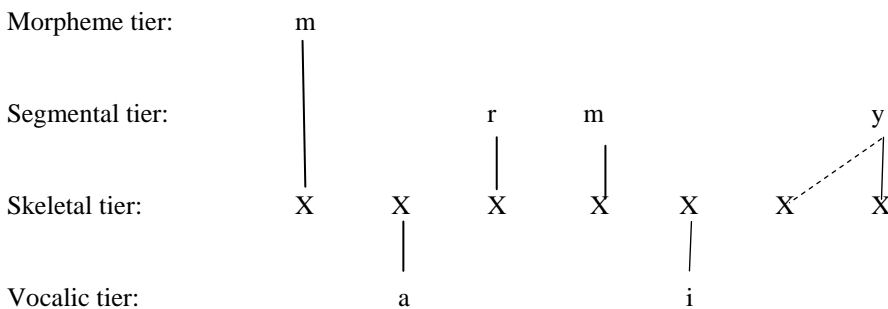Vocalic tier: a   i

Figure 7. Gemination in the surface representation [marmiyy] 'thrown'

Figures (6-7) show that there is another tier called "the Morpheme Tier". McCarthy (1981) proposes that infixes can be represented on a separate tier called 'the Morpheme Tier'. In non-concatenative morphological processes such as those in Arabic, discontinuous morphemes that have intervening infixes between them can be found (Altakhaineh and Zibin 2014: 5). Therefore, McCarthy (1981: 379) argues that morphemes should be represented on a separate tier from root consonants. The morphemes /m/ and /w/ are represented on the morpheme tier in figures (6-7), separated from the

segmental or the consonantal tier. This being said, figure (6) shows that the /w/ is delinked, leaving the X slot unattached. Therefore, in figure (7), the /y/ spreads to the vacant slot, which means that it is associated with two slots simultaneously in a process referred to as gemination (Spencer 1996). Note, however, that instead of representing the /y/ twice on the consonantal tier, it is only represented once but attached to two slots at the same time. This can be accounted for by referring to the Obligatory Contour Principle (OCP), which prohibits the juxtaposition of two identical adjacent sounds (Goldsmith 1979).

In this regard, Altakhaineh and Zibin (2014: 5) discuss the case of substitution which occurs in the causative pattern ftaʕal in Arabic (see Zibin and Altakhaineh 2016), explaining that what actually takes place in this pattern is not substitution at all, but a number of phonologically motivated processes. An example is /ytasar/ vs. [ttasar] 'became easy', where the /y/ is deleted due to the differences between /y/ and /t/ in terms of voicing, place of articulation and manner of articulation. The difference in features places pressure on the articulators when the two segments, /y/ and /t/ are juxtaposed. Therefore, after delinking the /y/, the X slot becomes unattached. Hence, based on the Universal Linking Convention, the infix t spreads from left to right to the X-slot. The result is the attachment of t to two slots at the same time. The outcome of this process is [ttasar] (Altakhaineh and Zibin ibid).

Thirdly, Al-Raagihi (1984) mentions a case in which "the vowels /w/ and /y/ are substituted by the letter /ʔ/ in words such as /sama:w/ 'sky', /bina:y/ 'building', /radʒa:w/ 'pray'. The reason for this substitution is the existence of the letter /a/". One may note that Al-Raagihi's (1984) explanation is quite odd. We propose that what really occurs in these words is glottalisation. This process refers to the plosive production of consonants with a totally closed glottis (Roach 2010: 44). In Arabic, the semi-vowels /y/ and /w/ are usually glottalised at the edge of the word, after a long /a:/. This process can be represented in the following figures:
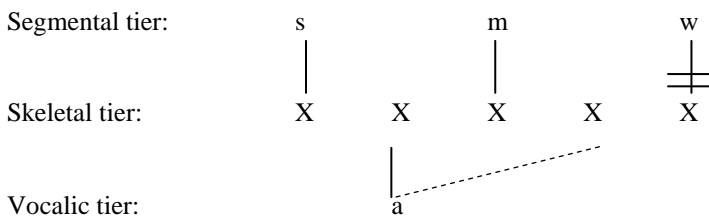
Segmental tier: s   m   w

Skeletal tier: X   X   X   X   X

Vocalic tier: a

Figure 8. Syncope of /w/ in the underlying representation /sama:w/ 'sky'

Segmental tier: s   m   ʔ

Skeletal tier: X   X   X   X   X
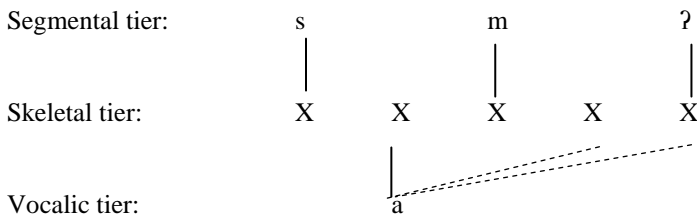
Vocalic tier: a

Figure 9. Glottalisation in the surface representation [sama:ʔ] 'sky'

Figures (8-9) demonstrate that the process that takes place in words such as /sama:w/ vs. [sama:ʔ] 'sky' is simply glottalisation, rather than substitution as discussed by Al-Raagihi (1984). Other examples of glottalisation are /qa:wil/ vs. [qa:ʔil] 'speaker', /ba:yiʕ/ vs. [ba:ʔiʕ] 'seller', /za:wir/ vs. [za:ʔir] 'visitor', /fa:yidˤ/ vs. [fa:ʔidˤ] 'superfluous', /basˤa:yir/ vs. [basˤa:ʔir] 'visions', etc. Note that the glottal stop makes an appearance after a long /a:/ in all cases. This means that the generalization I made could be plausible.

Fourthly, in what clearly is a process of assimilation, Al-Raagihi (1984) argues that "the vowel /w/ is substituted by /y/ in words such as radˤiw 'satisfied', qawiw 'strong', i.e. radˤiy 'satisfied' and qawiy 'strong', respectively". The reason for such substitution according to Al-Raagihi (1984) is the presence of the diacritic i before the vowel w. It is suggested that Al-Raagihi's (1984) reason for the change that occurs in the above words could be correct, i.e. the presence of the vowel /i/. However, his explanation of the process may not be correct. In particular, the /w/ assimilates in order to be more compatible with what precedes it, i.e. the front vowel /i/. Since /y/ is [-back], similar to /i/, whereas /w/ is [+back], /w/ assimilates to accommodate the frontness of /i/. This is illustrated in the following figures:
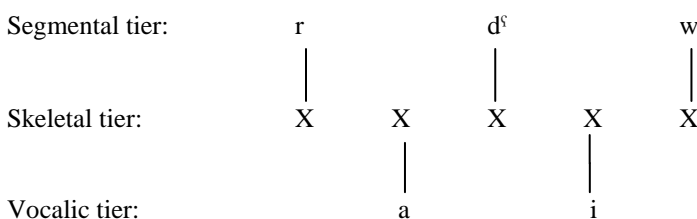
Segmental tier: r   dˤ   w

Skeletal tier: X   X   X   X   X

Vocalic tier: a   i

Figure 10. The underlying representation /radˤiw/ 'satisfied'

Segmental tier:	r		dˤ		y

Skeletal tier:	X	X	X	X	X

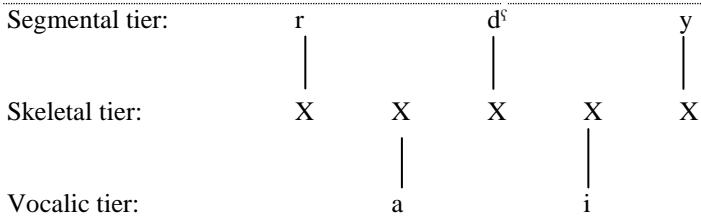| Vocalic tier:		a		i	

Figure 11. The assimilation process in the surface representation [radˤiy] 'satisfied'

It is suggested that the change that takes place in the word /radˤiw/ vs. [radˤiy] 'satisfied' occurs to make the production of the sounds involved easier. It makes sense for the /w/ to change into /y/ as a result of the frontness of the vowel that precedes it. In the production of front sounds, the tongue is located as far in front of the mouth as possible, whereas sounds which are characterized as [+back] are produced with the tongue behind the palatal region in the oral cavity. Instead of moving the tongue quickly from the front of the mouth to the back for the production of /w/, it makes sense for the /w/ to assimilate to the frontness of /i/; thus, keeping the tongue in the front of the mouth.

A similar case to this one is also discussed by Al-Raagihi (1984). However, in this case "the /y/ is substituted by /w/ in words such as muysir 'not poor' and muyqin 'certain' vs. muwsir 'not poor' and muwqin 'certain', respectively". In these words, the /y/ is substituted by /w/ as a result of the diacritic u (Al-Raagihi 1984). Again, it is proposed that the reason behind the change discussed by Al-Raagihi may be correct, i.e. the presence of the vowel /u/. However, what really takes place in these words is assimilation, as represented in the following figures:
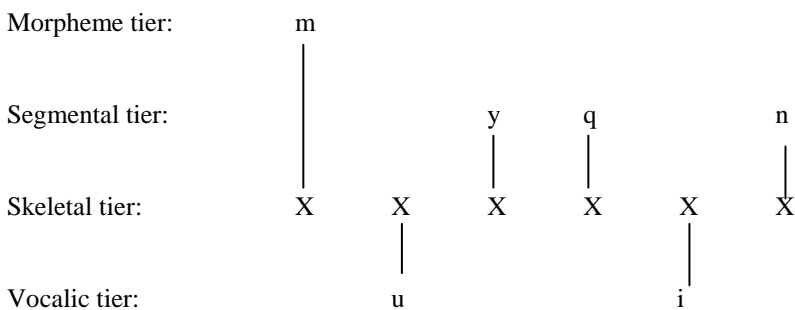
Morpheme tier:	m					

Segmental tier:			y	q		n

Skeletal tier:	X	X	X	X	X	X

Vocalic tier:		u			i	

Figure 12. The underlying representation /muyqin/ 'certain'

Morpheme tier:	m					

Segmental tier:			w	q		n

Skeletal tier:	X	X	X	X	X	X

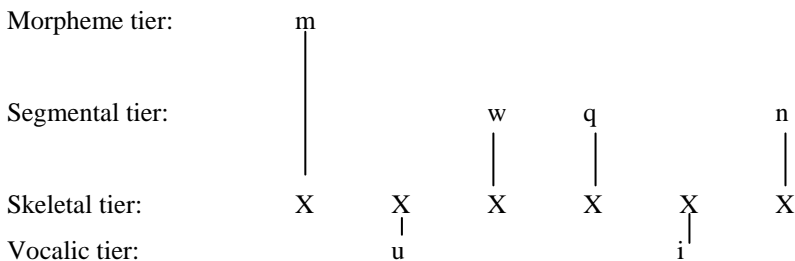| Vocalic tier:		u			i	

Figure 13. The assimilation process in the surface representation [muwqin] 'certain'

Since the semi-vowel /w/ and the vowel /u/ are both [+back], it is reasonable for the /y/ to assimilate in order to accommodate the backness of the vowel /u/. Keeping the tongue in the back of the mouth is easier than fronting it suddenly for the production of /y/. Consequently, the assimilation process takes place to facilitate the articulation of words such as /muysir/ vs. [muwsir] 'not poor' and /muyqin/ vs. [muwqin] 'certain'. Another case which is also similar to this one but with one exception, i.e. the /y/ does not assimilate; it is deleted all together along with the front vowel that precedes it. This happens in words such as /qa:dˤiyu:n/ 'judges' and /qa:siyu:n/ 'cruel', in which the semi vowel /y/ and the front vowel /i/ are deleted all together, i.e. [qa:dˤu:n] 'judges' and [qa:su:n] 'cruel'. The change that occurs in these words is represented in the figures below:
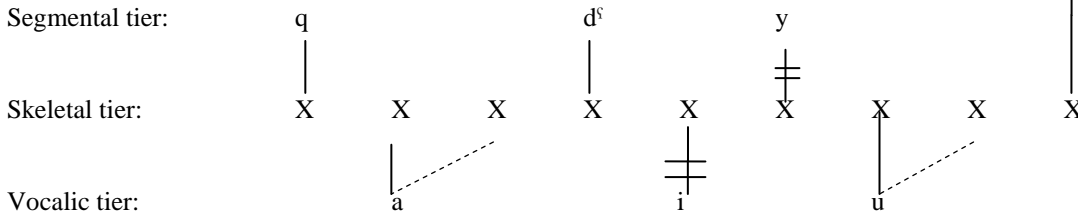
Morpheme Tier: n

Segmental tier: q   dˤ   y

Skeletal tier: X   X   X   X   X   X   X   X   X

Vocalic tier: a   i   u

Figure 14. The underlying representation /qa:dˤiyu:n/ 'judges'

Morpheme Tier: n

Segmental tier: q   dˤ

Skeletal tier: X   X   X   X   X   X   X

Vocalic tier: a   u
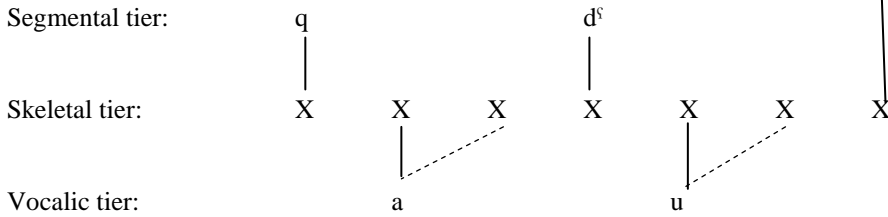
Figure 15. The surface representation [qa:dˤu:n] 'judges'

With regard to this case, Al-Raagihi (1984) does indicate that the /y/ is deleted in these words. However, he does not say anything about the front vowel deletion. One may argue that the front vowel is deleted because after the deletion of /y/, the pronunciation of the words would be impossible, i.e.*/qa:dˤiu:n/ 'judges' and */qa:siu:n/ 'cruel'. A front vowel followed by a back vowel is very hard to pronounce; hence, the deletion.

Finally, the vowels /y/ and /w/ are deleted in words such as dˤuuw 'call' and rmiiy 'throw' according to Al-Raagihi (1984). His description of what occurs in these words is correct as far as the deletion of the semi-vowels is concerned. However, Al-Raagihi (1984) does not discuss what takes place after the deletion. In particular, the tense vowel is shortened at the end of the word. This phonological change is represented in the following figures:
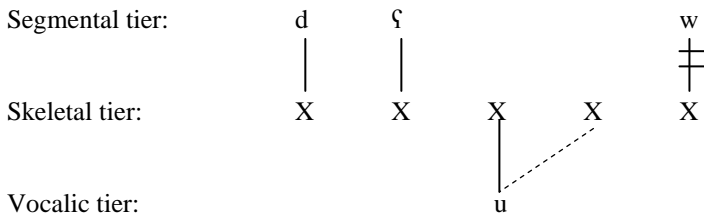

Segmental tier: d   ʕ   w

Skeletal tier: X   X   X   X   X

Vocalic tier: u

Figure 16. The underlying representation /dˤu:w/ 'call'

Segmental tier: d   ʕ

Skeletal tier: X   X   X   X

Vocalic tier: u

Figure 17. The surface representation /dˤu:/ 'call'

Segmental tier: d   ʕ

Skeletal tier: X   X   X
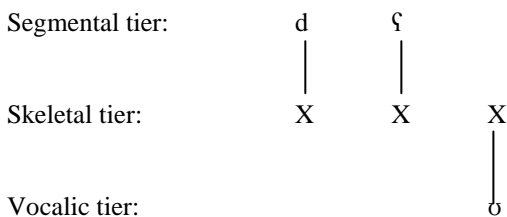
Vocalic tier: ʊ

Figure 18. The surface representation /dˤʊ/ 'call'

Figure (16) shows that the semi-vowel /w/ is delinked or deleted. Since there is no spreading rule regulating the non-automatic spreading from left to right, the X in the skeletal tier is deleted, because it is not allowed to remain unattached. After the deletion takes place, another process occurs, i.e. vowel shortening (see figure 18). One may argue that the syncope process feeds the vowel shortening process. In figure (17), the association line in the vocalic tier is delinked and the X slot on the skeletal tier is also deleted, since there is no rule sanctioning the spreading. McCarthy (2005: 1) indicates that word final vowels in Arabic are usually short. This explains the vowel shortening process that occurs in these words.

4. Conclusion and recommendations

In this study, we provided an analysis of Al-ʔiʕlaal phenomenon which takes place in many verbs and nouns in MSA derivational processes. Through reviewing works on this phenomenon by Arab traditionalists, it became evident that the description of this phenomenon is based on the orthography of the language, rather than the phonology. As a result, we analysed the changes that occur in the words from a phonological perspective, using autosegmental phonology. The analysis reveals that what actually happens in these words is not substitution of sounds at all, a range of phonological processes take place to yield the surface representation of the words. For instance, the analysis shows that in a word such as /daʕaw/ 'prayed to God', what really occurs is that the semi vowel /w/ is simply deleted (syncope) when it appears word finally. Then, compensatory lengthening takes place to make up for the loss of the consonant, i.e. [daʕa:]. A number of other phonological processes such as assimilation, glottalisation, gemination and vowel shortening occur in the words under examination, rather than substitution. Based on this analysis, it is recommended that the description of these words in Arabic morphological literature should be modified to account for the phonological change that happens. It can also be interesting to examine the phonological changes that happen in these words from the viewpoint of Optimality Theory (OT).

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