



## An autosegmental analysis of the derivation of weak active participles from triconsonantal verbs in modern standard Arabic

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### Abstract

This study aims to analyze the derivation of weak active participles (APs) from triconsonantal imperfective verbs within the X-slot model of autosegmental phonology. The first stage of the research involves building a corpus of APs from a well-established corpus-based dictionary, namely *muʿdjam ʔalluyah ʔalʿarabijjah ʔalmuʿa:sirah* 'Dictionary of Modern Arabic Language'. The corpus contains 620 APs which are categorized, in accordance with the position of the glide in their stems, into initially, medially, finally and doubly weak APs. The analysis reveals that despite having irregular surface representations, the underlying representations of weak APs are parallel to those of their strong counterparts. The surface irregularities of these APs are attributable to the inherent instability of the glides which causes them to be susceptible to diverse phonological rules. These phonological rules are given accurate and simple representations in autosegmental phonology due to the autonomy that elements on different tiers have in this approach.

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## 1. Introduction

Arabic is a Semitic language that has a rich literary heritage dating back to the pre-Islamic period. In addition to Arabic, other major members of the Semitic language family include Aramaic, Ugaritic, Hebrew, Ethiopian, Amharic, Phoenician, Akkadian and Eblaite (Hetzron, 1992). Semitic languages share common phonological, morphological, and syntactic features (Watson, 2002). In terms of phonology, these languages generally employ a limited number of vowels and a wide number of consonants and their consonantal systems incorporate a rich inventory of gutturals, emphatics and geminates. Semitic languages are further marked by their root-and-pattern morphology in which the roots are semantic abstractions embodied by a set of consonants that are inserted into templatic patterns to indicate derivational and inflectional aspects. The distinguishing syntactic features of Semitic

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languages include the common usage of VSO (verb-subject-object) word order and the tendency of qualifiers to follow their qualified terms (e.g. adjectives follow the nouns they qualify).

Modern Standard Arabic (MSA) is argued to be a direct descendant of Classical Arabic (CA), i.e. the language of Quran. The emergence of MSA is attributed to the exposure to Western civilization and to the spread of literacy and education. A distinction between the two variants of Standard Arabic, viz. CA and MSA, is commonly made by linguists. The former is a literary form of Arabic used in the Quran and in the pre and early Islamic eras, whereas the latter is the form utilized in formal language contexts in contemporary Arab world. Even though the lexis and stylistics of MSA are different from those of CA, the two variants are largely similar in terms of phonology, morphology and syntax. In addition to the two standardized variants of Arabic, various regional vernaculars of Arabic are used in informal speech contexts. Examples of Arabic regional vernaculars include Jordanian Arabic, Palestinian Arabic and Iraqi Arabic. Table 1 presents the consonantal inventory of MSA:

**Table 1.** MSA Consonantal Inventory

b	Voiced bilabial stop	s	Voiceless dental-alveolar fricative	k	Voiceless velar plosive
m	Voiced bilabial nasal	z	Voiced dental-alveolar fricative	x	Voiceless uvular fricative
f	Voiceless labiodental fricative	ṭ	Voiceless emphatic dental-alveolar plosive	ʁ	Voiced uvular fricative
j	Voiced palatal glide	ḍ	Voiced emphatic dental-alveolar plosive	q	Voiceless uvular stop
w	Voiced labiovelar glide	ṣ	Voiceless emphatic dental-alveolar fricative	ħ	Voiceless pharyngeal fricative
θ	Voiceless interdental fricative	ḏ	Voiced emphatic interdental fricative	ʕ	Voiced pharyngeal fricative
ð	Voiced interdental fricative	r	Voiced dental-alveolar tap	ʔ	Voiceless glottal stop
t	Voiceless dental-alveolar stop	l	Voiced dental-alveolar lateral	h	Voiceless glottal fricative
d	Voiced dental-alveolar stop	ʃ	Voiceless postalveolar fricative		
n	Voiced dental-alveolar nasal	dʒ	Voiced postalveolar affricate		

As can be noticed from Table 1, MSA, as a member of the Semitic family, employs a set of glottal (ʔ, h), pharyngeal (ħ, ʕ) and uvular (x, ʁ) consonants. These consonants are grouped under one category labelled gutturals. Gutturals are consonants produced with “a primary constriction in the posterior region of the vocal tract” (McCarthy, 1994). The phonemic inventory of MSA also has a class of consonants whose production involves a primary constriction in the interior region of the vocal tract, or the oral cavity, accompanied by a secondary retraction of the tongue towards to the posterior region of the vocal tract, or the pharyngeal cavity. This class is referred to as emphatics and it includes four phonemes /ṭ, ḍ, ṣ, ḏ/ which contrast with their non-emphatic counterparts /t, d, s, ð/ (e.g. *ti:n* ‘figs’ and *ṭi:n* ‘mud’). Contrary to the rich consonantal inventory of MSA, the vocalic inventory of this variety of Arabic only contains three short vowels as shown in Table 2.

**Table 2.** MSA Short Vowels

i	high front unrounded
a	low central unrounded
u	high back rounded

Each of these three short vowels has a long counterpart. However, it is argued that even though long vowels have phonetic realizations, these vowels are not present on the underlying level of representation. Rather, a long vowel is composed of a sequence of a short vowel and a glide in the underlying representation. This sequence is changed to a long vowel through application of certain phonological processes such as syllabicity assimilation (e.g. /ij/ → /ii/ → /i:/) and glide deletion (e.g. /uwu/ → /uu/ → /u:/). In order to support this argument, many synchronic and diachronic pieces of evidence which suggest that this analysis of long vowels is capable of capturing significant generalizations about the shape of the basic stems in Arabic and the rules utilized for deriving the modified forms of these stems are presented (cf. Brame, 1970; Levy, 1971). In addition to the short and long monophthongs, MSA has two diphthongs, namely /aw/ and /aj/ (e.g. *nawm* ‘sleeping’, *bayt* ‘house’). As for the permissible syllables in MSA, there are only five types which are listed below with illustrative examples:

1. a. CV (open, light): *da-ra-sa* ‘he studied’
- b. CVC (closed, heavy): *min* ‘from’
- c. CVV (open, heavy): *qa:-ma:* ‘they (dual, masculine) stood up’
- d. CVVC (closed, super-heavy): *na:m* ‘he slept’
- e. CVCC (closed, super-heavy): *bint* ‘a girl’

### 1.1. Aims of the Study

This study attempts to explore the phonological processes that APs undergo during their derivation from triconsonantal verbs in MSA within the framework of autosegmental phonology. The AP, also known as the noun of agent and the noun of subject, is a nominal derivative of verbs which describes the entity that performs the action denoted by the verb from which it is derived (Al-Faxiri, 1996; Abd Al-Ghani, 2010; Al-Samurrai, 2013; among others). This nominal derivative belongs to the word class of substantives which consists of nouns and adjectives because it takes the same inflectional forms of this class, i.e., it is declined for definiteness (*?alka:tib* ‘the writer’, *ka:tibun* ‘a writer’) gender (e.g. *za:ʔirun* ‘a male visitor’, *za:ʔiratun* ‘a female visitor’), number (e.g. *ba:ḥiθ* ‘a researcher’, *ba:ḥiθa:n* ‘two researchers’, and *ba:ḥiθu:n* ‘researchers’) and case (e.g. the active participle form *muʿallim* ‘a teacher’ is declined for the nominative, accusative and genitive cases in *muʿallimun*, *muʿalliman* and *muʿallimin*, respectively) (Ryding 2005, 102). In terms of syntax, the AP may function as a noun (e.g. the AP *ʔa:libun* ‘a student’ in the phrase *ʔata: ʔa:libun* ‘a student came’), an adjective (e.g. the AP *ba:ridun* ‘cold’ in the phrase *hawa:ʔun ba:ridun* ‘cold air’), an adverb (e.g. the AP *mutaʔxxiratan* in the phrase *badaʔat mutaʔxxiratan* ‘she started late’) or a verb substitute (e.g. the AP *na:ʔimun* in the phrase *huwa na:ʔimun* ‘he is sleeping’) (Holes, 1995).

To make the examination feasible, one type of APs is chosen, namely the weak APs. Weak APs are chosen because they have a glide as one of their radicals. The APs which have glides are “more subject to various phonological rules than others, due to the instability of the glides in predictable phonological environment” (Mahadin, 1982, p. 211). The analysis of a category of APs that has glides can, thus, provide a more in-depth view of the phonological processes that are involved in their formation. Based on the position that the glide occupies, weak APs are classified into initially, medially, finally and doubly

weak (Wright, 1896). One of the major proposals concerning these weak stems is that, despite having irregular surface representations, their underlying representations are parallel to those of their strong counterparts. The apparent irregularity of weak stems is ascribed to their susceptibility to various phonological rules due to the inherent instability of the glides that constitute at least one of the radicals (cf. Brame, 1970 and Mahadin, 1982).

The APs can be derived from the ten forms of Arabic verbal stems whether the stems are triconsonantal or quadriconsonantal, transitive or intransitive, strong or weak (Ryding, 2005; Abd Al-Ghani, 2010; Alshdaifat, 2014). This study is restricted to examining the derivation of APs from form I of the imperfective verb. This form is generally identified as the basic, or non-derived, form of verbs which serves as the base of derivation for the other nine forms of verbs. Form I of the imperfective verb has the pattern  $|ja+C_1C_2\left\{\begin{matrix} a \\ u \\ i \end{matrix}\right\}C_3|$  (e.g. *ja-ktub* ‘he writes’) which consists of the third person masculine prefix  $|ja|$  and a triconsonantal stem that has one stem vowel. In addition to the  $|ja|$ , the unmarked prefix of the imperfective stem, a number of personal prefixes can attach to the imperfective stem such as  $|ʔa|$ , the first person singular prefix and  $|na|$ , the first person plural prefix. The  $|ja|$  prefix and other prefixes and suffixes are not part of the base for deriving forms from the verb, rather only the stem of the verb is used as the base of derivation.

It should be indicated that most of the analyses of the AP derivation considered the stem of the perfective verb, rather than that of the imperfective, as the base from which triconsonantal APs are derived (e.g. Shahin, 1980; Al-Raaghi, 1984). In contrast to the usual practice among researchers, Mahadin (1982), Benmamoun (1999) and Abdo (2008), among others, presented valid arguments for employing the imperfective stem as the base of derivation of the AP and the other derived forms in Arabic. For instance, Mahadin (1982) argued that the vowel of the perfective stem can be predicated from the vowel of imperfective stem, but not vice versa. That is, the stem vowel of the imperfective is lexically determined in the sense that it cannot be predicated accurately by general rules and thus native speakers are assumed to store the imperfective stems in their mental lexicons along with the rules that derive their perfective counterparts. Following these researchers, the use of the imperfective stem, instead of its perfective counterpart, as the base from which the APs are derived is tested in the present study.

## 1.2. Significance of the Study

The significance of the present piece of research derives from the fact that it employs a relatively recent innovation in generative phonological analysis, viz. the autosegmental approach, that no other studies have applied to the examination of the phonological processes that APs undergo throughout their derivation. That is, despite the fact that many studies analyzed the derivation of APs, none of these studies conducted their analyses within an autosegmental framework. The autosegmental approach is considered an important approach to phonology because it overcomes various theoretical and empirical inadequacies of a dominant theory, viz. generative phonology, in the field of linguistics. It is significant to assess the adequacy of this approach in accounting for various phonological processes that take place in MSA; especially that some of its aspects are proposed specifically for the analysis of the unique characteristics of the Semitic family but are not exhaustively examined on a corpus of one of its main members. Premising the analysis on the modifications introduced to the classical analysis of Arabic phonology adds further importance to the study (cf. Anis, 1975; Shahin, 1980; Abdo, 2010). Furthermore, the studies that explore the phonology of Arabic do not generally rely on corpora for their analyses, rather these studies provide examples in support of their arguments which might affect the comprehensiveness and thoroughness of the analyses. Accordingly, present study aims at bridging a gap

in the literature by employing the autosegmental approach of phonology for the analysis of an AP corpus which is built from a modern corpus-based dictionary.

## 2. Method

### 2.1. Data Collection

The first stage of the research involves building a corpus of APs from a well-established Arabic dictionary, namely *muʿdžam ʔalluyah ʔalʿarabijjah ʔalmuʿa:sirah* ‘Dictionary of Modern Arabic Language’. This dictionary (a four-volume work) is compiled by a large group of trained researchers lead by Omar in 2008 to cover the majority of words used in modern-day Arabic. One of the main goals of the dictionary compilers is avoiding the shortcomings of the pre-existing dictionaries. These shortcomings include mixing obsolete and common words in addition to excluding the new ones; building on earlier lexicographic work without conducting thorough examinations and failing to provide relevant morphological and semantic information (Omar, 2008). The dictionary is compiled from various written and auditory sources of MSA such as contemporary newspapers, news and news commentary programs, grammar books and dictionaries, children’s stories and prominent publications on literature, psychology, law, economy, philosophy, history, arts, environment, technology, education, sports, science, etc.

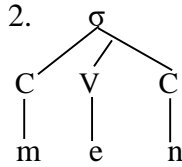
The data from these sources are assembled in a corpus that contains more than one hundred million words. The large corpus is processed and analyzed statistically to include the common words in the dictionary and exclude the uncommon ones. The corpus-based monolingual dictionary, viz. *muʿdžam ʔalluyah ʔalʿarabijjah ʔalmuʿa:sirah*, is meant for the general user of the language and thus it contains words of general use that represent various spheres of life. This dictionary provides morphological and semantic information on the words it defines as well as plenty of illustrative examples of the contexts in which the different senses of these words are used.

The 32,300 alphabetized dictionary entries are grouped under 5,778 consonantal roots and are dedicated for verbs (10,475), nouns (21,457) and function words (368). Since the APs are derived from verbs, they are listed under verbal entries. The APs that are derived from triconsonantal weak verbs (form I) are listed in a corpus. The corpus contains 620 APs which are categorized, in accordance with the position of the glide in their stems, into initially, medially, finally and doubly weak APs. These are presented in Appendix (A), Appendix (B), Appendix (C), Appendix (D), respectively. It should be noted that the APs that have the same form are listed under separate entries in the corpus if they have different meanings (e.g. *ja:min* ‘blessed’ and *ja:min* ‘turning right’) or if they are derived from different imperfective verbs (e.g. the AP *wa:biq* ‘perished’ can be derived from the stems of the imperfective verbs *ja-biq* or *ja-wbaq*).

### 2.2. The Approach

Autosegmental phonology is a non-linear approach to generative phonology proposed for overcoming the inadequacies of its linear counterpart. One of the main proposals of this approach is splitting the linear phonological representation into several tiers. These tiers consist of groups of autosegments and they are ordered independently of each other but are interconnected by means of association lines (McCarthy, 1982). The autosegmental structure of representation is originally proposed to handle suprasegmental features and thereafter its empirical domain is extended to various phonological areas.

CV phonology is an autosegmental model designed by Clements and Keyser (1983) to represent the internal structure of syllable. This representation is composed of three tiers, i.e. the syllable node, CV and segmental tiers. The three-tier hierarchical structure of the syllable /men/ is employed as an illustrative example below:



An advantage to utilizing distinct tiers for the characterization of the syllable structure is that the quantity of a segment can be referred to independently of its quality. In this regard, Spencer (1996) maintains that the CV tier is the level at which the quantity of a segment is represented, whereas its quality is described at the segmental tier. He refers to these tiers as the timing tier and melody tier, respectively. Employing these independent tiers facilitates accounting efficiently for the discrepancies between the quantity and quality of segments. To make this possible, a set of association conventions are used for connecting elements on these tiers.

Two of the major association conventions are the no-crossing constraint and the obligatory contour principle (OCP). The former prohibits the crossing of association lines and the latter prohibits identical adjacent segments at the segmental tier (Goldsmith, 1976). Adhering to these conventions allow accounting for cases in which the association between tiers is not formed in a one-to-one fashion. An example of a one-to-many association pattern is exemplified by complex segments, while a many-to-one association between the CV tier and the segmental tier is found in the representation of long segments. Instances of the two types of association are presented, respectively in 3:



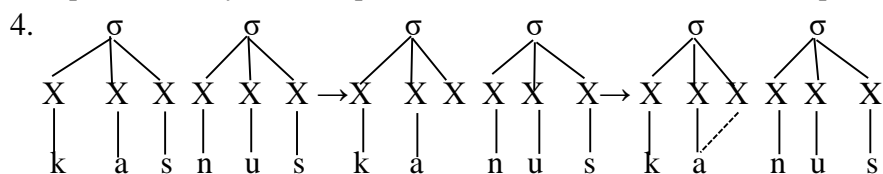
Providing an accurate account of the internal structure of segments is not the only advantage of CV phonology. Another key advantage of this model is that it utilizes a purely phonological unit, viz. the syllable, for the statement of phonological rules and phonotactic constraints. Accordingly, various phonological rules, such as consonantal deletion and vocalic epenthesis, are found to receive natural and simple notations because they are formulated in terms of the syllable notion (cf. Kenstowicz, 1994; Spencer, 1996).

The development of CV phonology involves introducing some modifications to this model. One of these modifications is based on considering the distinction between the C and V elements on the CV tier redundant and arguing that these elements are to be replaced with empty uniform positions labelled as X slots (Levin, 1985). A major impetus for the development of the X-slot model is ascribed to observing that C elements can be associated with vowels and V elements can be mapped to consonants. An example of this observation is found in the analysis of the frequent phonological process of compensatory lengthening. This process involves the lengthening of a segment triggered by the deletion of an adjacent segment (Clements & Keyser, 1983).

Hayes (1989, pp. 260-261) cites an example from Latin where “the segment /s/ was deleted before anterior sonorants.” When the deleted /s/ followed a vowel, the vowel was lengthened in compensation. For instance, the deletion of the /s/ in the Latin word *kasnus* ‘grey’ causes the lengthening of its preceding vowel *ka:nus*. Within autosegmental phonology, the autonomy given for elements that occupy different tiers enables providing a straightforward account of the compensatory lengthening process.

That is, the deletion of the /s/ takes place only on the segmental tier which leaves its C element, or timing slot, empty (ibid, p. 261). The empty timing slot spreads to the vowel that precedes the deleted /s/ forming the long vowel /a:/.

Despite that fact that compensatory lengthening lends itself to being analyzed within the autosegmental approach, the CV model of this approach faces a challenge in the analysis of this process. The challenge is that the empty timing slot was attached to the consonant /s/ and thus it is assumed to be specified as [+consonantal]. Spreading an empty C slot to a vowel melody is problematic. To resolve this problematic issue, the C and V slots are replaced with X slots unspecified for the feature [ $\pm$ consonantal]. An X-slot analysis of the compensatory lengthening of the /a/ sound in the Latin word *ka:nus* is adopted from Hayes (1989, p. 261) and used as an illustrative example below:



### 3. Results and Discussion

In line with Al-Faxiri (1996), Abd Al-Ghani (2010), Al-Samurrai (2013), among others, the analysis of the current AP corpus reveals that all the 620 instances of the APs which are derived from weak imperfective verbs (form I) are on the pattern |C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>|. Accordingly, the present analysis of the derivation of the APs is restricted to the pattern |C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>|. Table 3 below presents the frequencies of the initially, medially, finally and doubly weak APs that are analyzed in this study.

**Table 3.** The Frequencies of the Four Types of APs

APs of the pattern  C <sub>1</sub> a:C <sub>2</sub> iC <sub>3</sub>	Initially- weak APs	Medially-weak APs	Finally-weak APs	Doubly-weak APs	Total
Frequencies	99	264	230	27	620
Percentages	16%	42.6%	37%	4.4%	100%

As can be shown in Table 3, the most frequent AP type is the medially-weak which constitutes 42.6% of the AP corpus. It is followed by the finally-weak type which accounts for 37% then the initially-weak type which accounts for 16% and finally the doubly-weak type which accounts for 4.4%. The following sections attempt to analyze these four types of APs starting with the imperfective stems from which they are derived.

#### 3.1. Initially-Weak Aps

##### 3.1.1. The Imperfective Stems of Initially-Weak APs

Form I of initially-weak imperfective stems from which APs on the pattern |C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>| are derived have the underlying representation |GC<sub>2</sub>VC<sub>3</sub>|. The first radical in these stems, i.e. the glide, can be a /w/ or a /j/. Mahadin (1982) argued that the majority of initially-weak imperfective stems begin with a /w/ and a very few of them begin with a /j/. According to him, the initially-weak imperfective stems that begin with the /w/ have the following surface representations:

5. a. |C<sub>2</sub>iC<sub>3</sub>| (e.g. ja-**sil** ‘he arrives’)
- b. |wC<sub>2</sub>uC<sub>3</sub>| (‘e.g. ja-**wfur** ‘it is abundant’)
- c. |wC<sub>2</sub>aC<sub>3</sub>| (e.g. ja-**wdʒal** ‘he is scared’)
- d. |C<sub>2</sub>aC<sub>3</sub>| (e.g. ja-**da**<sup>c</sup> ‘he puts’)

As can be noted, the /w/ is deleted in the imperfective stems which are shown in (a) and (d). Mahadin (1982) and Brame (1970) argued that the glide /w/ is deleted when the stem vowel is /i/ and it remains when the stem vowels are /u/ or /a/. The w-deletion rule is stated as follows:

6.  $w \rightarrow \emptyset / \text{Ca\#--C}_2\text{iC}_3 \text{ [ +B-verbs ] ( \# = \text{morpheme boundary, +B = basic} )}$   
[personal prefix]

The w-deletion rule stipulates that the /w/ is deleted when it is preceded by a personal prefix, in this case the third person masculine prefix ‘ja’ and followed by a |C<sub>2</sub>iC<sub>3</sub>| sequence. The rule only applies to basic, i.e. non-derived or form I, verbs when their stem vowel is /i/. Mahadin (1982) and Brame (1970) argued that the deletion of the glide /w/ in some of the imperfective stems that have the stem vowel /a/ does not contradict the w-deletion rule. This is attributed to the assumption that the stem vowel of the imperfective forms that are exemplified in (d) is originally /i/ but it becomes /a/ through the application of the laryngeal-assimilation rule.

This rule requires changing the vowel /i/ into /a/ in non-derived imperfective stems when it is adjacent to a laryngeal, where laryngeal includes “those sounds produced in the area extending from the larynx to the upper regions of the pharynx” (Brame, 1970, p. 159). As can be noted from the definition, the term laryngeal encompasses not only the laryngeals but also the pharyngeal and uvular sounds. Accordingly, the laryngeal assimilation rule, as stated in 7 below, is assumed to apply to these three categories of sounds which are subsumed under the guttural category in the present analysis and it is consistent with the lowering effect this category of sounds has on adjacent vowels (cf. McCarthy, 1994).

$$7. i \rightarrow a / \begin{array}{l} \text{---L} \\ \text{L---} \end{array} / \left( \begin{array}{l} + \text{imperfect} \\ - \text{derived} \end{array} \right)$$

The w-deletion and the laryngeal assimilation rules apply in an ordered sequence to the imperfective stems that are exemplified in (d). The former rule deletes the /w/ from imperfective verbs of the pattern |ja-wCiL| or |ja-wLiC| (e.g. ja-wd<sup>i</sup>c → ja-d<sup>i</sup>c ‘he puts’) because they meet the deletion conditions. After the deletion of the /w/, the latter rule applies to |ja-CiL| or |ja-LiC| and changes the stem vowel /i/ to /a/ because it is adjacent to a laryngeal (e.g. ja-d<sup>i</sup>c → ja-da<sup>c</sup>). As for the non-derived imperfective stems which begin with the glide /j/, they are always on the pattern |ja-jCVC| which indicates that the glide /j/ is not subjected to the deletion rule which affects its counterpart, i.e. the /w/ (e.g. ja-jʔas ‘he loses hope’) (Mahadin, 1982).

One can conclude from the analysis of form I of the imperfective stems from which initially-weak APs are derived that all of them share the underlying pattern |GC<sub>2</sub>VC<sub>3</sub>| and that the deletion of the glide in some of their surface representations is ascribed to the application of certain phonological processes. Accordingly, all of the initially-weak APs in the present analysis are assumed to be derived from bases on the pattern |GC<sub>2</sub>VC<sub>3</sub>|.

### 3.1.2. The Derivation of Initially-Weak APs from their Imperfective Stems

In the analyses of the derivation of APs from initially-weak verbs, there is a general agreement that they are derived in much the same way as those of strong verbs (Al-Raaghi, 1984; Ryding, 2005; Abd



Al-Ghani, 2010; Al-Samurrai, 2013). The regularity of the derivation of form I APs from initially-weak verbs implies that all the radicals in the underlying representation of the verbal stem, i.e. the source of derivation, are retained in the AP form, i.e. the target of derivation.

Within the analyses that adopted the insights of classical Arabic grammarians, the derivation of the AP (form I) from initially-weak verbs, akin to its derivation from strong verbs, merely involves placing the perfective verb (form I) on the pattern  $|C_1a:C_2iC_3|$  (e.g. the perfective verb *wadʒad* ‘he found’ is placed on this pattern to derive its AP form *wa:dʒid* ‘a finder’). A more intricate analysis of this derivation process is carried out by Brame (1970) who argued, on the basis of the hypothesis that there are no long vowels in the underlying level of representation in Arabic, that the long vowel /a:/ does not exist in the underlying representation of the pattern  $|C_1a:C_2iC_3|$ , rather it only appears in its surface representation. He maintained that the derivation of APs on the pattern  $|C_1a:C_2iC_3|$  entails the infixation of /wa/ into the perfective stem.

The infixation of /wa/ to the perfective stem produces the form  $|CawwaC_2iC_3|$  (e.g. *wadʒad* ‘he found’ *wawadʒid*). The /w/ in the form  $|CawwaC_2iC_3|$  occurs in intervocalic position which triggers its deletion by the application of the glide elision rule (*wawadʒid* → *waadʒid*). Afterwards, the two adjacent /a/ vowels in  $|CaaC_2iC_3|$  are combined into a single long vowel through the application of a lengthening rule (*waadʒid* → *wa:dʒid*). The /wa/-infixation, the glide elision and the lengthening rules are, respectively, stated in 8 below:

8. a-  $wa [CVX \rightarrow [CVwaX]$
- b-  $G \rightarrow \emptyset / V_i \_ V_j$ , if  $j=[+low]$ ,  $i=[+low]$
- c-  $V_i V_i \rightarrow V_i:$

Brame (1970) asserted that the infixation of /wa/ in the course of the derivation of APs (form I) is plausible because the derivation of all the forms of the participles, whether they are active or passive, requires attaching a prefix to the verbal stem. The underlying representation of the participle prefix is /ma/ which is turned into /mu/ in the derived forms, i.e. forms other than form I, of the participles and turned into /wa/ when used as an infix. The rules that stipulate alternating /ma/ into /mu/ or /wa/ are given below:

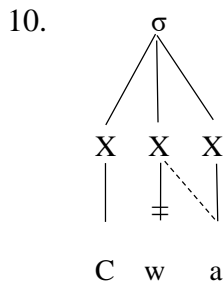
9. a-  $ma \rightarrow mu/ [+derived]$
- b-  $ma [CVX \rightarrow CVmaX \rightarrow CVwaX]$

Brame (1970) proposed that the glide /w/ is part of APs (form I) affix because it surfaces in some of the forms to which the affix is added. This proposal is considered plausible by Mahadin (1982) who established that the affixes which are added to modify the meaning of the basic stem should have the shape of the syllable, i.e.  $|CV|$ , and not of a single segment.

Changing the affix /wa/ to the long vowel /a:/ can be accounted for straightforwardly if the imperfective stem is employed as the base of derivation. That is, the imperfective stems have underlying representations of the shape  $|C_1C_2VC_3|$  in which there is no vowel between their first and second consonants. As mentioned in Section 1, the syllables that begin with a cluster of two consonants are not permissible in MSA. For this reason, the imperfective stem can never surface without a personal prefix of the shape  $|CV|$ . The addition of a  $|CV|$  prefix to the imperfective stem results in the re-syllabification of the stem by placing its first consonant in the coda position of the first syllable and its second consonant in the onset position of the second syllable. The resultant sequence, i.e.  $|CVC_1-C_2VC_3|$ , is composed of two permissible syllables and thus it can appear as a surface representation (e.g. *jak-tub* ‘he writes’).

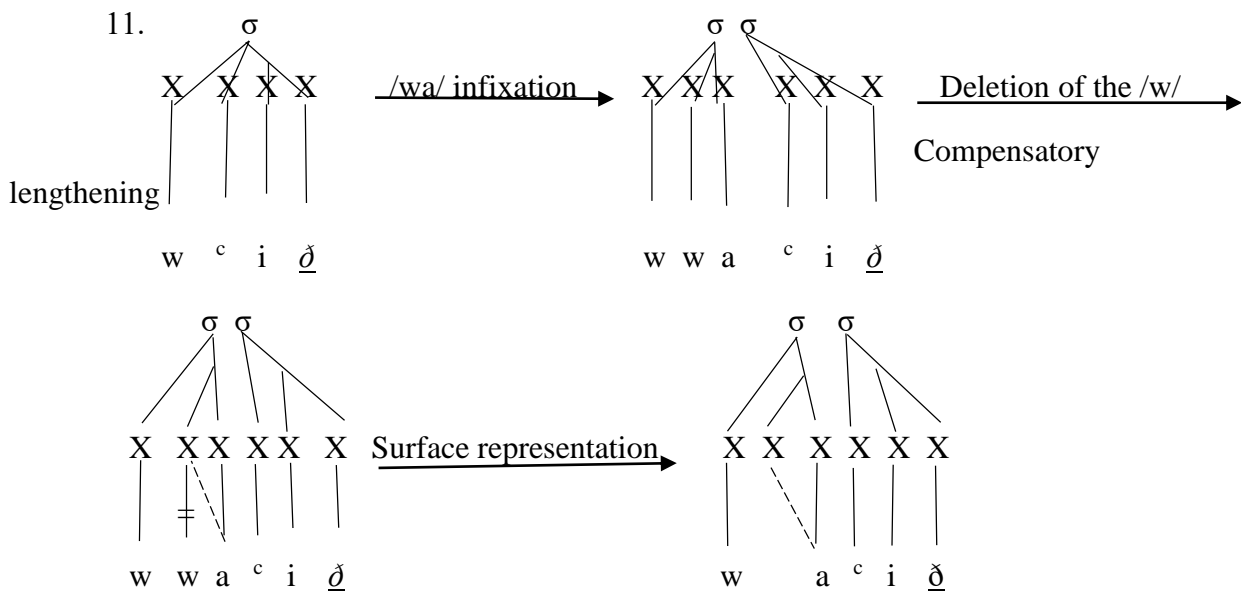
Infixing the /wa/, or any affix with a  $|CV|$  shape, to an imperfective stem to derive to its AP form causes the creation of a cluster of two consonants in the onset position of the syllable  $|C_1waC_2VC_3|$ . This triggers the application of a deletion rule which deletes the /w/ and the lengthens its adjacent vowel in

compensation (cf. Section 2.2). In the adopted model of autosegmental phonology, the representation of the deletion and the compensatory lengthening, as depicted in 10, involves deleting the /w/ melody from the segmental tier and spreading its empty X-slot to its following vowel.



In addition to the insertion of the /wa/ infix between the first and second consonant, another modification to the imperfective stem to derive its AP form is changing the stem vowel, which might be an /a/, /u/ or /i/, to /i/ ( $C_1C_2\left\{\begin{smallmatrix} \mathbf{a} \\ \mathbf{u} \\ \mathbf{i} \end{smallmatrix}\right\}C_3 \rightarrow C_1C_2iC_3$ ). This requires the application of an ablaut rule, i.e. a rule that involves systematic alterations in the stem vowel to indicate modifications of meaning or inflectional information, which changes the features of the stem vowel to [+high] and [-rounded]. As can be noted, the application of the compensatory lengthening and the ablaut rules need not to be ordered because neither of these rules affects the other.

The derivation of the 99 initially-weak APs in the analyzed corpus, as shown in Appendix (A), from their imperfective stems show no deviation from the general pattern. For instance, the derivation the AP form  $wa:^c i \underline{\partial}$  ‘a preacher’ from  $w^c i \underline{\partial}$ , i.e. the underlying representation of the stem of the imperfective verb  $ja-^c i \underline{\partial}$  ‘he preaches’, involves infixing the /wa/ between the /w/ and /<sup>c</sup>/, i.e. its first and second consonants, respectively. Afterwards, the /wa/ is changed to /a:/ through the application of the compensatory lengthening process. As for the ablaut rule that changes the stem vowel to /i/, there is no need for its application because the stem vowel of the verb  $ja-^c i \underline{\partial}$  is already /i/. The derivation of  $wa:^c i \underline{\partial}$  from its imperfective stem is shown in 11 below:



### 3.2. Medially-Weak APs

#### 3.2.1. The Imperfective Stems of Initially-Weak APs

The surface representations of medially-weak imperfective stems are on the pattern  $|C_1V:C_3|$ . This pattern is composed of two consonants and a long vowel and hence these stems are apparently biconsonantal. Based on the hypotheses that there are no long vowels in MSA underlying representations and that weak stems have the same structures as those of the strong stems, the medially-weak imperfective stems have underlyingly a pattern that resembles their strong counterparts, i.e.  $|C_1C_2VC_3|$ . The second consonant of these stems is generally assumed to be a glide that surfaces as a vowel due to its susceptibility to various phonological process (cf. Brame, 1970; Levy, 1971). Even though the glide does not exist in form I of the imperfective verb, it exists in the derived forms of the verb (e.g. *ja-xa:f* ‘he fears’ (form I) and *ju-xawwif* ‘he causes someone to fear’ (form II)). Accordingly, all the medially-weak imperfective stems have the underlying shape  $|C_1GVC_3|$  which surfaces as  $|C_1V:C_3|$  through the application of certain phonological processes.

Brame (1970) accounted for the surface representation of medially-weak imperfective stems by proposing a glide metathesis rule which applies to the sequence CGVC and metathesizes the glide and the stem vowel (e.g. *ja-<sup>c</sup>wud* → *ja-<sup>c</sup>uwd*). After the application of this rule, an assimilation rule applies to the sequence CVGC and assimilates the glide to its following vowel (e.g. *ja-<sup>c</sup>uwd* → *ja-<sup>c</sup>uud*). Finally, the two short identical vowels in the resultant sequence CV<sub>i</sub>V<sub>i</sub>C are combined into a single long vowel by the application of a vowel lengthening rule (*ja-<sup>c</sup>uud* → *ja-<sup>c</sup>u:d*). The glide metathesis, assimilation and lengthening rules are, respectively, stated in 12.

12. a. CGVC → CVGC
- b. CVGC → CV<sub>i</sub>V<sub>i</sub>C
- c. ViVi → Vi:

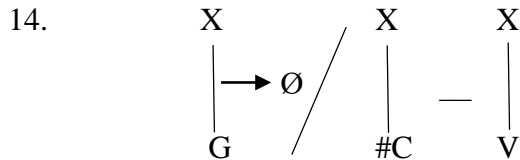
Mahadin (1982) regarded Brame’s (1970) analysis as being partially incorrect because of its inability to account for the  $|aG|$  sequence. This is ascribed to the permissibility and as such the general stability of the  $|aG|$  sequence, as opposed to the  $|uG|$  and  $|iG|$  sequences, in Arabic. This can be manifested in the facts that the only two diphthongs in Arabic have the  $|aG|$  shape, i.e. /aj/ and /aw/, and that the  $|aG|$  sequence does not undergo Brame’s (1970) assimilation rule in finally-weak verbs (e.g. *ramayna* ‘we threw’) and in the verbal nouns with the shape  $|CVGC|$  (e.g. the /aj/ and /aw/ sequences are stable in the verbal nouns *xawf* ‘fear’ and *baj<sup>c</sup>* ‘selling’).

Mahadin (1982) proposed another rule to account for the surface representation of medially-weak verbs in Arabic. This rule, as shown in 13, applies to the sequence  $|CGV|$  when it is preceded by a morpheme boundary (#), such as the morpheme boundary of the personal prefix /ja/ in *ja#<sup>c</sup>wud* ‘he comes back’, and causes the assimilation of the glide to its following vowel which results in the sequence  $|CV<sub>i</sub>V<sub>i</sub>|$ . The assimilation rule is followed by the vowel lengthening rule which is stated in 12 (c).

13. #CGV<sub>i</sub> → CV<sub>i</sub>V<sub>i</sub> (# designates morpheme boundary)

As can be noticed, this assimilation rule only applies to the  $|CGV|$  and not to metathesized  $|CVG|$  and this prevents its application to the stable  $|aG|$  sequence. Moreover, Mahadin (1982, 255) maintained that specifying the conditioning environment of the rule prevents it from applying to the finally-weak verbs and verbal nouns in that the two of them are not preceded by morpheme boundary. He further asserted that this assimilation rule also applies to various forms of nouns such as the nouns of place *ma#<sup>t</sup>yar* and *ma#<sup>q</sup>wam* which surface as *ma#<sup>t</sup>a:r* ‘airport’ and *ma#<sup>q</sup>a:m* ‘site’, respectively (ibid, 256).

The rule that is proposed by Mahadin (1982) accounts for cases where the glide assimilates to its cognate vowels, i.e. the assimilation of the /w/ and /j/ to the /u/ and /i/, respectively, but it faces problems in accounting for the assimilation of the glide to its non-cognate vowel, e.g. the assimilation of the /w/ to the /a/. This is ascribed the general assumption that the source and the target of assimilation processes should be phonetically similar (cf. Kenstowicz, 1994; Spencer, 1996). A straightforward analysis of the surface forms of medially-weak stems can be provided if the X-slot model of autosegmental phonology is adopted. That is, the glide in the sequence [#CGV<sub>i</sub>] undergoes a glide elision process, instead of the glide assimilation process, and its adjacent vowel is lengthened in compensation. The statement of this process in the X-slot model of phonology is depicted in 14.



### 3.2.2. The Derivation of Medially-Weak APs from their Imperfective Stems

In contrast to the derivation of the [C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>] pattern from initially-weak verbs which resembles its derivation from strong verbs, this pattern shows some modifications when it is derived from medially-weak verbs. Traditional Arab linguists, such as Ibin Jinni, 1954; Sibawayh, 1982 and Ibin Asfor, 1987, and the researchers who followed their leads, such as Al-Raagihi, 1984; Al-Faxiri, 1996; Abd Al-Ghani, 2010 and Al-Samurrai, 2013, argued that the medially-weak perfective verbs from which the APs are assumed to be derived generally have the letter *ʔalif*, which corresponds to the long vowel /a:/, as their second radical (e.g. *ba:*<sup>c</sup> ‘he sold’). The *ʔalif* is substituted with the glottal stop /ʔ/ when these verbs are placed on the pattern [C<sub>1</sub>a:C<sub>2</sub>C<sub>3</sub>] to derive their AP forms (e.g. the *ʔalif* of the verb *ba:*<sup>c</sup> ‘he sold’ is realized as /ʔ/ when it is placed on the pattern [C<sub>1</sub>a:C<sub>2</sub>C<sub>3</sub>] to derive the AP *ba:ʔi*<sup>c</sup> ‘a seller’).

Brame (1970) contended that the APs (form I) are expected to retain the three consonants, or radicals, of their medially-weak perfective bases. However, one of these radical, i.e. the second one which is originally a glide, is substituted with a glottal stop in the surface representation of these APs (e.g. the APs *sa:wid* and *za:jid* surface as *sa:ʔid* ‘prevailing’ *za:ʔid* ‘increasing’ by inserting a glottal stop in the place of their medial glides). To account for this alternation, he proposed a rule that changes a glide to a glottal stop when it is preceded by /a:/ and followed by a short vowel and called it the glottal formation rule. The glottal formation rule is also observed to apply to a broken plural form of nouns (e.g. the plural form of *dari:batun* ‘a tax’ surfaces as *dara:ʔibun* ‘taxes’ instead of *dara:jibun* due to changing the /j/ which occurs between /a:/ and a short vowel into the /ʔ/). This rule is given in 15.

$$15. G \rightarrow ʔ / a: \_ V$$

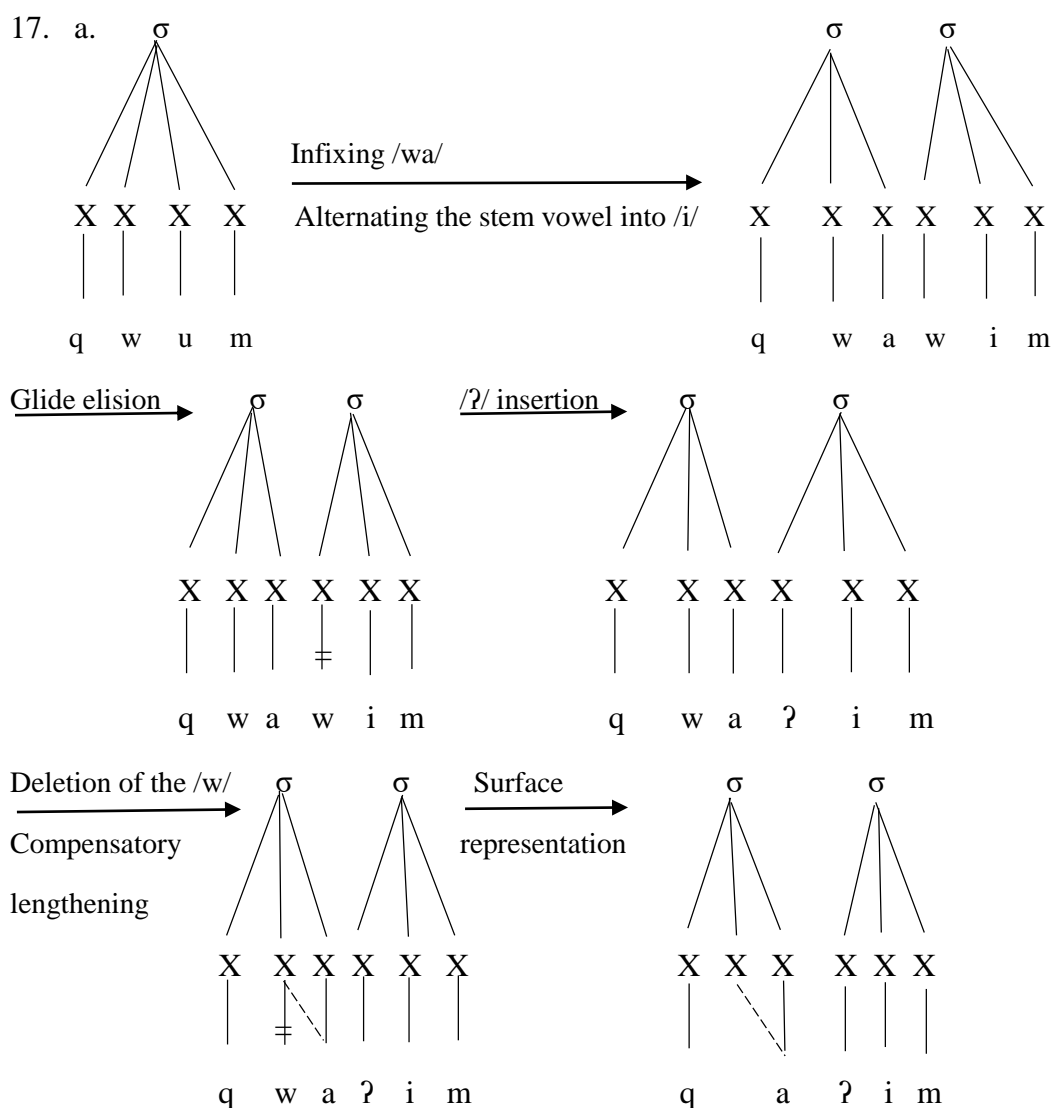
Abdo (2010) assumed that the glottal stop /ʔ/ is infixes after the first stem vowel in these AP forms (e.g. *qawil* → *qaʔwil*). Subsequently, a glide metathesis rule switches the position of the infixes /ʔ/ and its following glide (*qaʔwil* → *qawʔil*). The glide metathesis is followed by an assimilation rule that assimilates the glide to its preceding vowel (*qawʔil* → *qaaʔil*). Finally, a vowel lengthening rule combines the two identical adjacent vowels into a single long one (*qaaʔil* → *qa:ʔil* ‘a teller’).

A problematic issue in these analyses is that the /a:Gi/ sequence in medially-weak APs surfaces in other nominal and verbal forms without undergoing any phonological processes. Examples of these forms are presented in 16.

16. a. *ju-qa:wim* ‘he resists’ (imperfective verb)  
 b. *qa:jid* ‘trade’ (imperative verb)  
 c. *mu-qa:wil* ‘a contractor’ (active participle)

Even though the alternation between glides and the glottal stop is stated as a general rule, the examples of this alternation are only drawn from two forms (cf. Ibin Jinni, 1954; Brame, 1970; Sibawayh, 1982; Ibin Asfor, 1987; Al-Nuri, 2007). The first is the AP (form I) and second is the broken plural form on the pattern  $|C_1aC_2a:C_3iC_4|$ . One can argue, in line with Brame (1970), that the infixed /a:/ in these two forms is underlyingly /wa/. Based on this argument, the underlying pattern of the medially-weak APs and the broken plural form are  $|CwaGiC|$  and  $|C_1aC_2waGiC_4|$ , respectively.

In both of these patterns, the glide occurs between two short vowels and this triggers its deletion by the glide elision rule which is stated 8 (b). The deletion of the glide results in making its syllable onsetless. Because onsetless syllables are not allowed in MSA, a prosthetic glottal stop is inserted to function as the onset of the onsetless syllable (cf. Abu Salim, 1988; Żygis, 2010). The representation of the derivation of medially-weak APs from their imperfective stems in the X-slot model of autosegmental phonology is exemplified by the AP *qa:ʔim* ‘standing’ which is shown in 17.



As can be shown in 17, the underlying representation of the stem of the imperfective verb *ja-qu:m* ‘he stands up’ is *qwum*. The derivation of its AP form requires inserting the infix /wa/ between its first and second consonants and alternating its stem vowel into /i/. The second /w/ in the resultant sequence, i.e. *qwawim*, occurs between the two short vowels /a/ and /i/ and thus it is subjected to the glide elision rule. The deletion of /w/ causes the production of an onsetless syllable which triggers the application of a

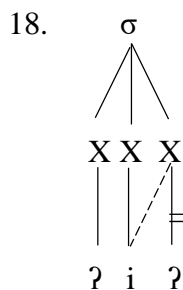
glottal epenthesis process. Finally, the /w/ in the sequence *qwaʔim* is deleted to avoid violating the constrain on complex onsets in MSA syllable structure and its empty X-slot spreads to its following vowel which yields the surface representation *qa:ʔim* ‘standing’.

The 264 medially-weak APs, as presented in Appendix (B), that are analyzed in the current study are found to be regularly derived following this pattern except for six, which are shown in Table 4. It should be noted that these six AP forms are listed in the current corpus in the pattern |Ca:ʔin| instead of |Ca:ʔi:| because the nominative or genitive case markers and the indefinite suffix /n/ are attached to the forms that end with a long vowel in the dictionary from which the current corpus is built (see Section 3.3.2).

**Table 4.** Medially-Weak APs which Deviate from the Derivational Pattern

Dictionary number	entry	Consonantal root	Imperfective verb	Gloss	Active participle
804		b w ʔ	ja-bu:ʔ	to deserve	ba:ʔin
3151		ḏ w ʔ	ja-ḏu:ʔ	to be lightened up	ḏa:ʔin
3902		f j ʔ	ja-fi:ʔ	to return	fa:ʔin
4148		q j ʔ	ja-qi:ʔ	to vomit	qa:ʔin
5265		n w ʔ	ja-nu:ʔ	to burden	na:ʔin
5492		h j ʔ	ja-ha:ʔ	to look good	ha:ʔin

As can be observed from Table 4, the imperfective verbs of these APs end with a glottal stop. The insertion of a glottal stop in the course of deriving their AP forms results in the sequence |Ca:ʔiʔ| which has a glottal stop as its second and third radicals. The sequence |Ca:ʔiʔ| surfaces as |Ca:ʔi:|. The surface representation of this sequence is consistent with Sibawayh (1982) who argued that adjacent glottal stops are not allowed in SA. In the current model of analysis, one can simply postulate that the second /ʔ/ is deleted in accordance with the OCP and its preceding vowel is lengthened in compensation, as depicted in



Accounting for the alternation of the /ʔiʔ/ sequence into /ʔi:/ is only possible in the X-slot model of autosegmental phonology. This is ascribed to the observation that the /ʔ/ is not phonetically similar to the /i/ and thus it cannot assimilate to it which leaves its deletion as the only option for avoiding the adjacency of glottal stops. The deletion of a segment in the standard approach of phonology entails eliminating both its quantity and quality. On the other hand, the deletion of a segment within autosegmental phonology only takes place on the segmental tier, which represents the quality of segments, which leaves its quantity, represented in the CV tier or X-tier, intact and capable of spreading to its adjacent segment.

Moreover, utilizing the X-slot model of autosegmental phonology instead of the CV model of this approach for the representation of this instance of compensatory lengthening is attributed to the fact that the quantity, or timing, slots in the former model are not specified for the feature [±consonantal]. This enables accounting for the compensatory lengthening cases which are triggered by the deletion of a consonant and the lengthening of its adjacent vowel in compensation (see Section 2.2).

### 3.3. Finally-Weak Aps

#### 3.3.1. The Imperfective Stems of Finally-Weak APs

The surface representations of finally-weak verbs are on the pattern |C<sub>1</sub>C<sub>2</sub>V:|. The long vowel in the pattern |C<sub>1</sub>C<sub>2</sub>V:| appears as /u:/ (e.g. *ja-ndzu*: ‘he survives’), /i:/ (e.g. *ja-bri*: ‘he sharpens’), /a:/ (e.g. *jarqa*: ‘he advances’), or alternative /a:/ and /i:/ (*ja-yθa*: and *ja-yθi*: ‘he talks a lot’). Proposing that the underling representation of finally-weak imperfective verbs, as well as the other weak imperfective verbs, is identical to those of their strong counterparts, requires identifying the phonological processes that change their underling representation, i.e. |ja- C<sub>1</sub>C<sub>2</sub>VG|, to their surface representation, i.e. |ja- C<sub>1</sub>C<sub>2</sub>u:|. In this regard, Mahadin (1982) observed that most of the changes to the underling representations of finally-weak verbs are triggered by the interaction between their stems and the suffixes that are attached to them. He maintained that the third radical of finally-weak verbs, i.e. the glide, is regularly deleted when these verbs inflect for their indicative case. The deletion is caused by the glide elision rule, as stated in 8 (b), which takes place when a glide occurs between two vowels VGV, except for when the first vowel is high and the second is low, i.e. uGa and iGa.

For instance, the addition of the indicative case suffix /u/ to the imperfective verb *ja-d<sup>h</sup>uw* ‘he invites’ causes the occurrence of the glide /w/ between two high vowels, i.e. |uGu|, which triggers its deletion by the glide elision rule. Subsequently, the two identical short vowels become one long vowel by the application of the vowel lengthening rule which is stated in 12 (c). The application of these phonological processes changes the underlying representations of the imperfective verb *ja-d<sup>h</sup>uw* to its surface representation, i.e. *ja-d<sup>h</sup>u*: ‘he invites, indicative case’.

On the other hand, the addition of the subjunctive case suffix /a/ to *ja-d<sup>h</sup>uw* places the glide /w/ between the high vowel /u/ and the low vowel /a/. The sequence |uGa| does not undergo the glide elision rule and thus this imperfective verb surfaces as *ja-d<sup>h</sup>uwa* ‘he invites, subjunctive case’. The addition of the subjunctive case suffix does not always result in retaining the glide of finally-weak verbs. For example, inflecting the imperfective verb *ja-lqaj* ‘he encounters’ for the subjunctive case results in the sequence *ja-lqaj-a*. Because the glide /j/ in this sequence occurs between two short low vowels, it undergoes the glide elision rule. After application the glide elision, the two adjacent /a/ vowels are combined into the long vowel /a:/ which results in the surface representation *ja-lqa*: ‘he meets, subjunctive case’.

As for the imperfective verbs that have non-identical stem and case vowels, a vowel assimilation rule is to be posited between the glide deletion rule and the lengthening rule to enable their derivation. This can be demonstrated by inflecting the imperfective verb *ja-rmiy* ‘he throws’ for the indicative case which produces *ja-rmiy-u*. The application of the glide elision rule to this sequence leads to the existence of the two adjacent vowels /iu/. Apparently, these two vowels are not identical and hence they cannot be contracted into a single long vowel. The /iu/ vowel cluster is not allowed because two vowels cannot occupy the same nucleus position and if each of these vowels is assumed to constitute its own syllable, then the second syllable becomes onsetless which is not allowed in Arabic. According to Mahadin (1982, 234), the /iu/ cluster undergoes a vowel assimilation rule in which the second member of the cluster assimilates to the first member. The resultant sequence, i.e. /ii/, undergoes the vowel lengthening rule and the targeted imperfective verb surfaces as *ja-rmi*: ‘he throws, indicative case’.

#### 3.3.2. The Derivation of Finally-Weak APs from their Imperfective Stems

All what is mentioned about finally-weak APs in the traditional analyses of their derivation is that their third radical, i.e. the glide, when their indefinite forms are inflected for the nominative and genitive cases (e.g. *ra:min* ‘a thrower, nominative/genitive case’) and its retained when they are inflected for the accusative case (e.g. *ra:mijan* ‘a thrower, accusative case’) (Al-Faxiri, 1996; Abd Al-Ghani, 2010; Al-Samurrai, 2013; among others). These analyses tend to consider the indefinite form which is declined

for the nominative/genitive case and has the surface pattern  $|C_1a:C_2in|$  as the unmarked form of finally-weak APs. Similarly, *mu<sup>c</sup>dʒam ʔalluyah ʔal<sup>c</sup>arabijjah ʔalmu<sup>c</sup>a:sirah*, i.e. the dictionary from which the current corpus is compiled, uses this form as the citation form of finally-weak APs as opposed to the initially and medially weak APs which are listed in it in their uninflected, i.e. pausal, forms.

The deletion of the glide in these forms was observed by Brame (1970) who found that declining the indefinite form of finally-weak APs for the nominative or genitive case results in causing their final glide to be in a position that meets the conditions of the glide elision rule. For instance, attaching the genitive case suffix to the AP *da:<sup>c</sup>iw* yields *da:<sup>c</sup>iw-i*. The /w/ of this AP occurs between two short /i/ vowels and this prompts its deletion by the glide elision rule. The identical contiguous vowels in the resultant form, i.e. *da:<sup>c</sup>ii*, are turned into the long vowel /i:/ due to the application of the vowel lengthening rule. Attaching the indefiniteness suffix /n/ to the surface form *da:<sup>c</sup>i:* derives the form *da:<sup>c</sup>i:-n* ‘a caller’. This form undergoes a vowel shortening rule which shortens long vowels when they are followed by one consonant which occurs in the final position of the word. This rule, as presented in 19, causes the form *da:<sup>c</sup>i:-n* to surface as *da:<sup>c</sup>in* ‘a caller’.

19. V: → V/ \_\_\_Cψ (ψ designates the word boundary)

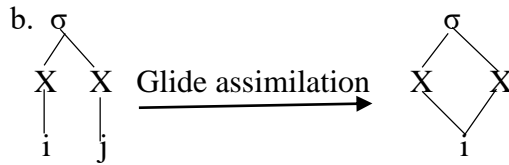
The declination of this AP for the nominative case results in the same representation, i.e. *da:<sup>c</sup>in*, but requires the application of the vowel assimilation rule after the glide elision (*da:<sup>c</sup>ij-un* → *da:<sup>c</sup>i-un* → *da:<sup>c</sup>iin*). The removal of the indefiniteness suffix /n/ from *da:<sup>c</sup>in* changes it to *da:<sup>c</sup>i:* ‘caller’ due to its failure to meet the conditioning environment for the vowel shortening rule. Finally, similar to its imperfective base, the declension of this AP for the accusative case results in retaining its final glide (*da:<sup>c</sup>ijan* ‘a caller, accusative case’).

It should be indicated that the derivation of the uninflected forms of finally-weak APs is generally neglected in the literature since the changes to the underlying representation of these APs are, similar to their verbal bases, assumed to be stimulated by the interaction between their stems and the suffixes that are attached to them. The analysis of the derivation of the uninflected forms of finally-weak APs requires taking a closer look at their underlying representation. The underlying representation of these APs, in the current analysis, is  $|C_1waC_2iG|$  which results from inserting the infix /wa/ between the first and second consonants of the underlying representation of their imperfective stems, which are on the pattern  $|C_1C_2VG|$ , and alternating their stem vowels into /i/. The glide in the pattern  $|C_1waC_2iG|$  might be a /j/ or a /w/ and thus the /iG/ sequences are realized as /ij/ or /iw/.

These two vowel/glide sequences are not permissible diphthongs in MSA and thus they are not allowed to occur in the same syllable. The /ij/ sequence is regularly changed to /ii/ through the application of the glide, or syllabicity, assimilation process which involves the assimilation of glides to their cognate vowels when they are preceded by these vowels (cf. Brame, 1970; Abushunar & Mahadin 2017; among others). The glide assimilation rule, as stated in 20 (a), alternates the sequences /ij/ and /uw/ into /ii/ and /uu/, respectively, when these sequences occur at the end of the word or when are followed by consonants. This rule is argued to be a natural rule that reflects the facts that Arabic does not have the /ij/ and /uw/ diphthongs and that the diphthongs that it has, i.e. /aj/ and /aw/, are not affected by this rule because the /a/ vowel does not have a cognate glide which assimilates to it. The application of this rule to the /ij/ to change it to /i:/ in the X-slot model is depicted in 20 (b).

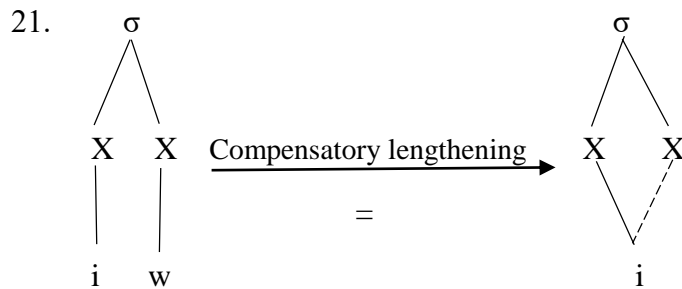


$$20. a. \left\{ \begin{array}{c} j \\ w \end{array} \right\} \rightarrow \left\{ \begin{array}{c} i \\ u \end{array} \right\} / \left\{ \begin{array}{c} i \\ u \end{array} \right\} \text{ — } \left\{ \begin{array}{c} C \\ \psi \end{array} \right\}$$



Because the stem vowel of the pattern  $|C_1waC_2iG|$  is /i/, the surface representation of the finally-weak APs that have the glide /j/ as its last radical can be straightforwardly accounted for by the application of the glide assimilation rule. For instance, the application of this rule to *rwamij*, i.e. the underlying representation of the AP *ra:mi*: ‘thrower’, causes the assimilation of the /j/ to its cognate vowel /i/ and this yields *rwamii*. This sequence undergoes the vowel lengthening rule and surfaces as *ra:mi*: ‘thrower’. As opposed to the surface representation of the finally-weak APs that end with the /j/, accounting for the surface representation of those that end with the /w/ cannot be done through the glide assimilation rule. This is ascribed to the fact the /w/ cannot assimilate to the /i/ in the sequence /iw/ because it is not its cognate vowel.

Since the assimilation rule cannot apply to the sequence /iw/ because its two members are phonetically dissimilar and the deletion of the first member of the sequence, i.e. the /i/, is not possible because it constitutes the nucleus of the syllable, resolving the problem of the impermissible sequencing of the /i/ and /w/ needs to target the second member which can be done in two ways. The first way is applying a rule proposed by Brame (1970) which changes the /w/ into /j/ when it is preceded by /i/ and applying the glide assimilation rule to the resultant sequence, i.e. /ij/. The other way, which is simpler and more economic, is deleting the /w/ and lengthening its adjacent vowel, i.e. the /i/, in compensation which yields /i:/. This can be exemplified in the alternation of the underlying representation *dwa<sup>f</sup>iw* to its surface representation *da:<sup>f</sup>i*: ‘caller’ which involves, in addition to changing the infix /wa/ into /a:/, the deletion of the /w/ and the lengthening of the /i/ in compensation as presented in 21.

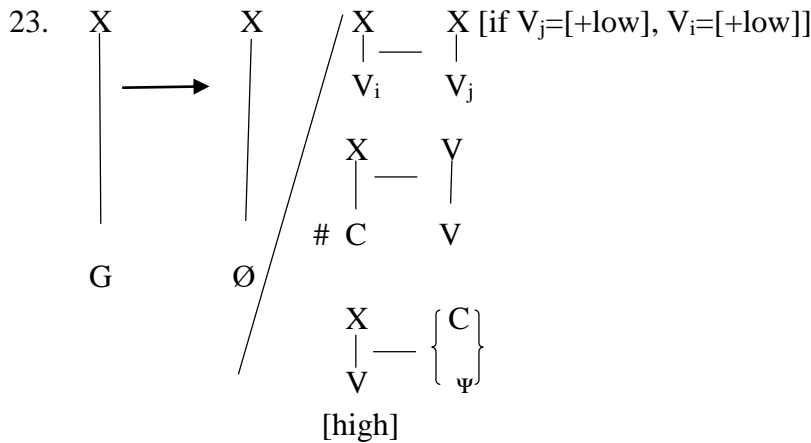


As shown in 20 (b) and in 21, glide assimilation and compensatory lengthening rules produce similar surface representations in the X-slot model of phonology. However, the latter rule is considered more general because in addition to accounting for the alternations of /ij/ and /uw/ into /i:/ and /u:/, respectively, it also straightforwardly accounts for the alternations of /iw/ and /uj/ into /i:/ and /u:/, respectively. One can add that the latter rule is mainly employed in the standard approach of phonology due its inability to account for compensatory lengthening processes. Therefore, the compensatory lengthening rule is going to be used instead of the glide assimilation to account for changing impermissible diphthongs to long vowels in MSA. On the grounds that compensatory lengthening follows elision rules, the conditioning environment for the glide elision in the impermissible diphthongs needs to be specified. Since the permissible diphthongs in MSA are composed of the low vowel /a/ and a glide and the impermissible ones are composed of a high vowel, i.e. /u/ or /i/, and a glide, the glide elision in the latter

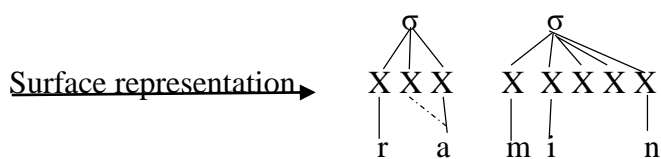
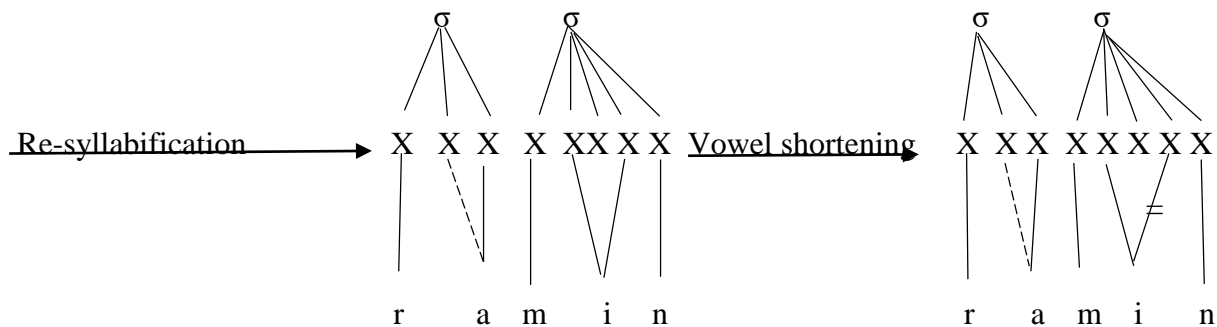
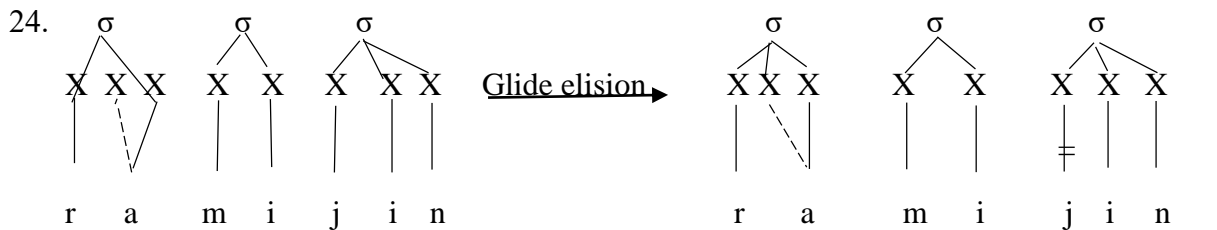
diphthongs occurs when the glide is preceded by a high vowel. Re-stating the glide assimilation rule which is given in 20 (b) as an instance of glide elision is shown in 22.

$$22. G \rightarrow \emptyset / V \_\_ \begin{Bmatrix} C \\ \psi \end{Bmatrix} \\ \text{[high]}$$

The conditioning environments for the all the three instances of glide elision that have been discussed so far, as stated in 8 (b), 14 and 22, are combined into one rule to form a general account of glide elision in MSA. The statement of this rule in the X-slot model of phonology is shown in 23.



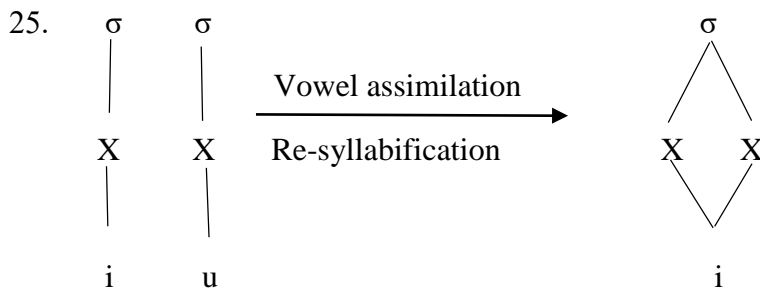
The surface representations of the 230 finally-weak APs which are listed in Appendix (C) are all of the pattern |C<sub>1</sub>a:C<sub>2</sub>in|. The representation of the derivation of these forms from their imperfective stems in the X-slot model of autosegmental phonology, ignoring the alternations of the infix /wa/ into /a:/ and of the stem vowel into /i/, is exemplified in *ra:min* ‘a thrower, genitive case’ as depicted in 24.



Two points should be indicated regarding the derivation process in 24. The first is that if the empty X-slot, or timing slot, is not filled by the insertion of a segment like in 17 or by the application of the compensatory lengthening process like in 18, it remains floating (cf. van der Hulst and Smith, 1982). Two instances of floating X-slots are shown in 24. One of them results from the application of the glide elision rule to the /j/ and the other results from the application of the vowel shortening rule to the /i:/.

The second point is that when the output of a phonological rule does not conform to the constraints on syllable structures in the course of derivation, re-syllabification processes operate to re-syllabify it in accordance with these constraints (Clements & Keyser, 1983; Mahadin, 1994). For example, the application of the glide elision rule in 24 causes the appearance of the two adjacent syllables /mi/ and /in/. The second syllable, i.e. /in/, is onsetless which violets MSA syllabification constraints. Accordingly, a re-syllabification rule applies and combines these two syllables into one syllable. The syllable /miin/ conforms to permissible syllable structures in MSA but it violates the OCP principle which bans adjacent identical elements at the segmental tier. Consequently, the two adjacent identical elements /ii/ are combined into the single long element /i:/ to ensure maintaining the OCP at the segmental tier.

As mentioned previously in this section, the AP surface representation *ra:min* is not only the result of declining *ra:mi:* for its genitive case but it can be also the outcome of declining this AP for its nominative case. Even though the declinations of this AP to its genitive and nominative cases yield the same surface representation, the latter case requires an extra rule, i.e. the vowel assimilation rule, to change the /iu/ sequence into /i:/. The representation of this instance of vowel assimilation rule is given in 25.



### 3.4. Doubly-Weak Aps

#### 3.4.1. The Imperfective Stems of Doubly-Weak Aps

Doubly-weak imperfective stems, i.e. the stems that possess two glides in their consonantal roots, which serve as the bases for deriving doubly-weak APs in the current study are divided into two categories. The first category consists of stems which have their second and third radicals as glides, whereas the second category consists of stems which have glides as their first and third radicals. These two categories are identified by traditional grammarians as *ʔallafi:f ʔalmaqru:n* ‘weak stems that have adjacent glides in their consonantal roots’ and *ʔallafi:f ʔalmafru:q* ‘weak stems that have non-adjacent glides in their consonantal roots’, respectively (cf. Al-Faxiri, 1996; Abd Al-Ghani, 2010 and Al-Samurrai, 2013). The former category of stems exhibits an underlying representation of the shape  $|C_1G_1VG_2|$  which surfaces as  $|C_1G_1V:|$  (e.g. *ja-lwij* → *ja-lwi:* ‘he bends’) and the latter has an underlying representation of the shape  $|G_1C_2VG_2|$  which surfaces as  $|C_2i:|$  (e.g. *ja-wqij* → *ja-qi:* ‘he protects’).

The derivation of the surface representations of the second category from their underlying representations conforms to the regular patterns of deriving initially and finally weak verbs. That is, the glide which occurs underlyingly in the initial position of these stems is /w/ and their stem vowel is /i/ and thus they all undergo the w-deletion rule stated in 6 (e.g. *ja-whij* → *ja-hij*) and the glide that occurs

underlyingly in their final position undergoes the glide elision process stated in 23 (e.g. *ja-hij* → *ja-hi:* ‘he inspires’).

As for the stems of the first category, they follow the same derivational pattern of finally-weak verbs (e.g. *ja-twij* → *ja-twi:* ‘he folds’) but they deviate from the pattern of deriving medially-weak verbs. This is ascribed to the observation that the |GV| sequence in these forms fails to alternate to |V:| akin to its counterpart in medially-weak verbs. For instance, the |GV| sequence in the medially-weak verb *ja-<sup>c</sup>wud* surfaces as *ja-<sup>c</sup>u:d* ‘he returns’ but this sequence does not alternate to |V:| in the doubly-weak verb *ja-rwij* which surfaces as *ja-rwi:* ‘he narrates/quenches’. In this regard, Brame (1970, p. 267) stated that “the medial glide of all roots of the shape CGG is exceptional with regard to Glide Metathesis.” The glide metathesis is, according to Brame (1970), the first step for deriving the surface representations of medially-weak verbs from their underlying representations (see Section 3.2.1). This rule creates an environment in which the glide assimilation and vowel lengthening rules can apply. As a result of not applying the glide metathesis rule to the doubly-weak verbs which have roots of the shape |CGG|, the conditioning environment for its subsequent rules are not met in these verbs and thus their medial glides are retained.

Allowing the imperfective verbs that have roots of the shape |CG<sub>1</sub>G<sub>2</sub>| to bypass the regular derivation of medially-weak verbs can be avoided if the second conditioning environment for the glide elision rule which is stated in 14 is slightly modified. Based on this conditioning environment, the glide which is preceded by a consonant and followed by a vowel, i.e. |CGV|, undergoes the elision rule. The elision of the glides that occur in the |CGV| sequence can be further restricted by proposing that the vowel in this sequence must be followed by a [consonantal] consonant. The only consonants that lack the feature [consonantal] are the glides (Spencer 1996). Thus, |G<sub>1</sub>| in the sequence |CG<sub>1</sub>VG<sub>2</sub>| does not undergo the glide elision rule because its following vowel is followed by a glide, i.e. |G<sub>2</sub>|, lacking the [consonantal] feature.

Since the underlying form of the doubly-weak imperfective stems that have the root shape |CG<sub>1</sub>G<sub>2</sub>| is |CG<sub>1</sub>VG<sub>2</sub>|, the glide elision rule does not apply to their medial glides. On the other hand, |G<sub>2</sub>| in these stems meets the third conditioning environment for the glide elision rule, as stated in 23, hence, it undergoes this rule. For example, the derivation of the surface representation of the doubly-weak verb as *ja-rwi:* ‘he narrates/quenches’ involves applying the glide elision rule to the final radical in the underlying representation of its stem, i.e. *rwij*, and retaining its medial glide because it does not meet the conditioning environments for the glide elision rule.

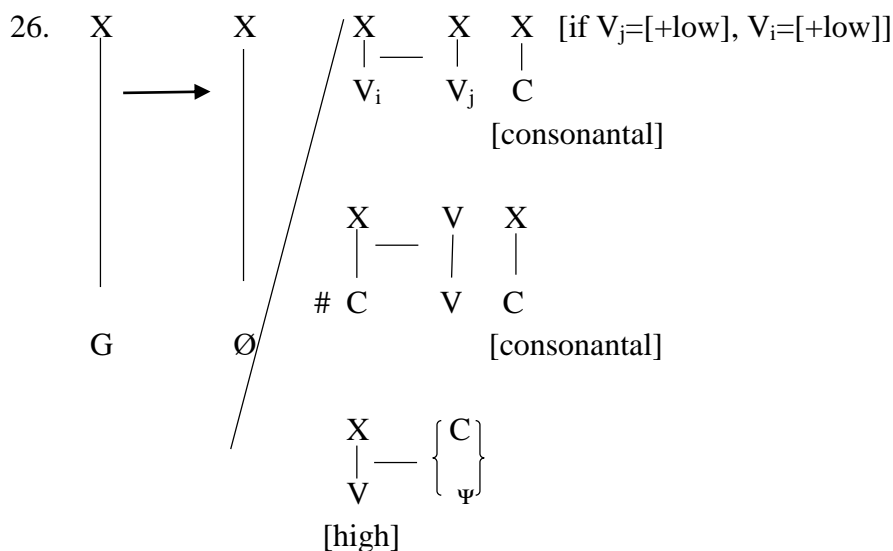
### 3.4.2. The Derivation of Doubly-Weak APs from their Imperfective Stems

The 27 doubly-weak APs, which are listed in Appendix (D), exhibit derivational patterns that resemble the two categories of the imperfective bases from which they are derived. The APs that are derived from the imperfective bases of the shape |G<sub>1</sub>C<sub>2</sub>VG<sub>2</sub>|, akin to their imperfective bases, follow the general derivational patterns of initially and finally weak APs. Accordingly, the initial glide in these APs is retained and the final glide undergoes the elision rule. For instance, the derivation of the AP *wa:qin* ‘a protector’ from the imperfective stem *wqij* involves, in addition to alternating the stem vowel into /i/ and the infix /wa/ into /a:/, applying the glide elision, re-syllabification and vowel shortening rules that are stated in 24.

On the other hand, similar to their imperfective bases, the doubly-weak APs which are derived from bases of the shape |C<sub>1</sub>G<sub>1</sub>VG<sub>2</sub>| follow the same pattern of deriving finally-weak APs but deviate from the derivational pattern of medially-weak APs. That is, the medial |G| alternates to a glottal stop in medially-weak APs (e.g. *qa:wil* → *qa:ʔil* ‘a teller’) but this alternation does not take place in these doubly-weak verbs (e.g. *ta:win* → *ta:win* ‘a folder’). According to Brame (1970), the roots of the shape |CGG| are not only considered exceptions to the application of the glide metathesis rule but they are also exceptional with regard to the glottal formation rule and thus their medial glide does not alternate into |ʔ|.

Similar to their imperfective bases, the apparent irregularity of these AP stems can be simply accounted for by making a minor modification to the first conditioning environment for the glide elision rule which is stated in 23. Based on this conditioning environment, the glide which occurs between two vowels |VGV| undergoes the elision rule, except for the glides which are preceded by high vowels and followed by low vowels. The elision of the glides that occupy intervocalic positions can be further restricted by postulating that the second vowel in the |VGV| sequence must be followed by a [consonantal] consonant. Accordingly, |G<sub>1</sub>| in the sequence |VG<sub>1</sub>VG<sub>2</sub>| does not undergo the glide elision rule because the second vowel in this sequence is followed by a consonant which lacks the [consonantal] feature, i.e. |G<sub>2</sub>|. The underlying representation of the doubly-weak APs which have the root |CGG| is |CwaG<sub>1</sub>iG<sub>2</sub>in|. |G<sub>1</sub>| in this representation is preceded by the vowel /a/ and followed by the vowel /i/ which in turn is followed by |G<sub>2</sub>|. Therefore, the glide elision does not target |G<sub>1</sub>| because it does not meet the first conditioning environment for this rule.

The restatement of the glide elision rule in 4.19 with the modifications to its first and second conditioning environments, which are made in Sections 3.4.2 and 3.4.1, respectively, is shown in 26.



#### 4. Conclusions

The analysis of the current AP corpus reveals that the derivation of initially-weak APs from their imperfective bases involves no additional processes to the ones employed for the derivation of their strong counterparts. On the other hand, the medially, finally and doubly weak APs undergo, in addition to the process that derive strong APs, the glide elision rule which is followed by compensatory lengthening, re-syllabification and insertion processes. Accounting for these processes is only possible in the X-slot model of autosegmental phonology due to its reference to the quantity of segments independently of their quality and to its utilization of a purely phonological unit, viz. the syllable, for the statement of phonological rules.

#### 5. Ethics Committee Approval

The author(s) confirm(s) that the study does not need ethics committee approval according to the research integrity rules in their country (Date of Confirmation: October 22, 2020).

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## Appendix A. An example appendix

**Table 5.** Initially-Weak APs of the Pattern C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>

Number	Dictionary entry	Gloss	Active participle				
				23	5571	to settle down	<u>wa:di<sup>c</sup></u>
				24	5575	to leave	<u>wa:ḍir</u>
				25	5577	to inherit	<u>wa:riḥ</u>
1	5525	to bury alive	<u>wa:ʔid</u>	26	5578	to arrive	<u>wa:rid</u>
2	5527	to agree with	<u>wa:ʔim</u>	27	5583	to expand	<u>wa:rif</u>
3	5539	to perish	<u>wa:biq</u>				
4	5539	to perish	<u>wa:biq</u>	28	5584	to put forth	<u>wa:riq</u>
5	5540	to rain	<u>wa:bil</u>			leaves	
		heavily		29	5585	to have large	<u>wa:rik</u>
6	5540	to have bad consequences	<u>wa:bil</u>	30	5587	hips	
						to become	<u>wa:rim</u>
7	5541	to wedge	<u>wa:tid</u>			swollen	
8	5542	to hold back	<u>wa:tir</u>	31	5592	to sin	<u>wa:zir</u>
9	5545	to jump	<u>wa:ʔib</u>	32	5594	to stop	<u>wa:zi<sup>c</sup></u>
10	5547	to trust	<u>wa:ʔiq</u>	33	5596	to weigh	<u>wa:zin</u>
11	5548	to settle	<u>wa:ʔin</u>	34	5600	to be centered	<u>wa:sit</u>
12	5499	to fall down	<u>wa:dsib</u>	35	5601	to expand	<u>wa:si<sup>c</sup></u>
		to be imperative		36	5601	to encompass	<u>wa:si<sup>c</sup></u>
		to have a meal		37	5602	to envelop	<u>wa:siq</u>
		to beat rapidly		38	5603	to need	<u>wa:sil</u>
				39	5604	to mark	<u>wa:sim</u>
				40	5608	to intertwine	<u>wa:fidj</u>
13	5550	to be sad for	<u>wa:dsid</u>	41	5613	to tattoo	<u>wa:ʔim</u>
		to adore		42	5616	to be consistent	<u>wa:sib</u>
		to hate					
		to come across		43	5618	to describe	<u>wa:sif</u>
		to have money		44	5619	to arrive	<u>wa:sil</u>
		to know				to connect	
						to treat good	

14	5551	to be brief	<u>wa:ɗɗiz</u>	45	5620	to disgrace	<u>wa:sim</u>
15	5552	to be hidden	<u>wa:ɗɗis</u>	46	5624	to be clear	<u>wa:dih</u>
		to fear		47	5625	to put	<u>wa:di<sup>c</sup></u>
16	5554	to hurry up	<u>wa:ɗɗif</u>			to humiliate	
17	5556	to be speechless	<u>wa:ɗɗim</u>	48	5626	to deprive	
18	5558	to hit one's face	<u>wa:ɗɗih</u>	49		to put on the cutting board	<u>wa:dim</u>
19	5559	to be alone	<u>wa:hid</u>	50	5627	to weave	<u>wa:din</u>
20	5565	to pierce	<u>wa:xiz</u>	51	5628	to be simple	<u>wa:ti?</u>
21	5566	to become gray-haired	<u>wa:xit</u>	52	5632	to step	
22	5571	to leave	<u>wa:di<sup>c</sup></u>	53	5634	to break	<u>wa:tis</u>
						to inhabit	<u>wa:tin</u>
54				78	5676	to delegate	<u>wa:kil</u>
55	5636	to be persistent	<u>wa:ɗib</u>	79	5678	to decrease	<u>wa:lit</u>
56	5638	to collect	<u>wa:ʔib</u>	80	5679	to enter	<u>wa:lidɜ</u>
57	5640	to promise	<u>wa:ʔid</u>	81	5680	to give birth	<u>wa:lid</u>
		to threaten		82	5682	to drink	<u>wa:liy</u>
58	5641	to be bumpy	<u>wa:ʔir</u>	83	5685	to grieve	<u>wa:lih</u>
59	5642	to designate	<u>wa:ʔiz</u>	84	5685	to grieve	<u>wa:lih</u>
60	5643	to preach	<u>wa:ʔiɗ</u>	85	5688	to indicate	<u>wa:mi?</u>
61	5644	to be in pain	<u>wa:ʔik</u>	86	5690	to twinkle	<u>wa:mid</u>
62	5648	to be filled with hatred	<u>wa:yir</u>	87	5694	to bestow	<u>wa:hib</u>
63	5648	to be filled with hatred	<u>wa:yir</u>	88	5695	to inflame	<u>wa:hidɜ</u>
64	5649	to intrude upon	<u>wa:yil</u>	89	5698	to imagine	<u>wa:him</u>
		to delve into		90	5698	to be delusional	<u>wa:him</u>
65	5651	to arrive at	<u>wa:fid</u>	91	5699	to be weak	<u>wa:hin</u>
66	5652	to increase	<u>wa:fir</u>	92	5699	to weaken	<u>wa:hin</u>
67	5654	to be right	<u>wa:fiq</u>	93	5709	to lose hope	<u>ja:ʔis</u>
68	5656	to darken	<u>wa:qib</u>	94	5724	to be dry	<u>ja:bis</u>
69	5657	to time	<u>wa:qit</u>	95	5739	to become easy	<u>ja:sir</u>
						to be rich	
						to dispense with	
70	5659	to inflame	<u>wa:qid</u>	96	5739	to become easy	<u>ja:sir</u>
71	5661	to be deaf	<u>wa:qir</u>	97	5743	to shout	<u>ja:ʔir</u>
72	5663	to happen	<u>wa:qi<sup>c</sup></u>	98	5749	to hit on the fontanelle	<u>ja:fix</u>
		to appear		99	5750	to be young	<u>ja:fi<sup>c</sup></u>
		to fall		100	5757	to make blessed	<u>ja:min</u>
73	5664	to stand up	<u>wa:qif</u>	101	5757	to turn right	<u>ja:min</u>
		to inform					
74	5671	to nest	<u>wa:kir</u>				
75	5672	to hit	<u>wa:kiz</u>				
76	5673	to decrease	<u>wa:kis</u>				
77	5675	to flow	<u>wa:kif</u>				



## Appendix (B)

Table 6. Medially-Weak APs of the Pattern C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>

Number	Dictionary entry number	Gloss	Active participle
1	804	to deserve	ba:ʔin
2	812	to reveal	ba:ʔih
3	813	to become silly	ba:ʔix
4	817	to leave uncultivated	ba:ʔir
5	822	to kiss	ba:ʔis
6	829	to sell	ba:ʔi <sup>c</sup>
7	834	to urinate	ba:ʔil
8	850	to become	ba:ʔit
9	855	to diminish	ba:ʔid
10	871	to lay eggs	ba:ʔid
11	873	to sell	ba:ʔi <sup>c</sup>
12	879	to appear to leave	ba:ʔin
13	1006	to repent	ta:ʔib
14	1013	to long	ta:ʔiq
15	1018	to get lost	ta:ʔih
16	1022	to make possible for	ta:ʔih
17	1029	to be in love	ta:ʔim
18	1031	to get lost	ta:ʔih
19	1079	to come back to one's senses	θa:ʔib
20	1080	to rebel	θa:ʔir
21	1261	to wander	dʒa:ʔib
22	1264	to exist in large numbers or amounts	dʒa:ʔid
23	1267	to be unjust	dʒa:ʔir
24	1269	to be accepted	dʒa:ʔiz
25	1270	to keep coming back	dʒa:ʔis
26	1271	to be hungry	dʒa:ʔi <sup>c</sup>
27	1275	to roam	dʒa:ʔil
28	1282	to occur	dʒa:ʔin
29	1287	to quake	dʒa:ʔil
30	1288	to rot	dʒa:ʔif
31	1497	to sin	ha:ʔib
32	1500	to keep	ha:ʔi <sup>ð</sup>
33	1501	to come back	ha:ʔir
34	1502	to possess	ha:ʔiz
35	1503	to stop	ha:ʔif
36	1507	to guard	ha:ʔit
37	1510	to contrive	ha:ʔik
38	1511	to elapse to stop	ha:ʔil
39	1513	to move in circles	ha:ʔim
40	1518	to alter one's course	ha:ʔid
41	1519	to be confused	ha:ʔir
42	1520	to possess	ha:ʔiz
43	1523	to try to escape	ha:ʔis
44	1524	to menstruate	ha:ʔid
45	1526	to be unfair	ha:ʔif
46	1527	to confine	ha:ʔiq
47	1528	to weave	ha:ʔik
48	1529	to change	ha:ʔil
49	1530	to approach	ha:ʔin
50	1703	to roar to become weaker	xa:ʔir
51	1705	to go through	xa:ʔid
52	1706	to be scared	xa:ʔif
53	1708	to betray	xa:ʔin
54	1710	to fail	xa:ʔib
55	1711	to pick	xa:ʔir
56	1715	to sew	xa:ʔit
57	1716	to be arrogant to assume	xa:ʔil
58	1882	to feel dizzy	da:ʔix
59	1884	to keep moving in circles	da:ʔir
60	1887	to step on	da:ʔis
61	1892	to be changed	da:ʔil
62	1896	to persist	da:ʔim
63	1898	to be despicable	-----
64	1922	to borrow	da:ʔin
65	1984	to melt	ða:ʔib
66	1985	to prevent	ða:ʔid
67	1986	to experience	ða:ʔiq
68	1993	to be widespread	ða:ʔi <sup>c</sup>
69	1994	to have a tail	ða:ʔil
70	2216	to make skeptical	ra:ʔib
71	2218	to drop dung	ra:ʔiθ
72	2219	to be current	ra:ʔidʒ
73	2220	to leave	ra:ʔih
74	2220	to feel comfortable	ra:ʔih
75	2221	to lead	ra:ʔid
76	2228	to train	ra:ʔid
77	2229	to be scared	ra:ʔi <sup>c</sup>
78	2230	to elude	ra:ʔiy
79	2231	to be pure	ra:ʔiq
80	2234	to aspire to	ra:ʔim

81	2243	to make skeptical	<u>ra:ʔib</u>	119	2921	to kick	<u>ʃa:ʔit</u>
82	2244	to slow down	<u>ra:ʔiθ</u>	120	2923	to see	<u>ʃa:ʔif</u>
83	2246	to smell	<u>ra:ʔih</u>	121	2925	to yearn	<u>ʃa:ʔiq</u>
84	2247	to have feathers	<u>ra:ʔif</u>	122	2926	to become strong	<u>ʃa:ʔik</u>
85	2248	to increase	<u>ra:ʔi<sup>c</sup></u>	123	2926	to be pierced with a thorn	<u>ʃa:ʔik</u>
86	2250	to be poured	<u>ra:ʔiq</u>	124	2928	to become high	<u>ʃa:ʔil</u>
87	2252	to depart	<u>ra:ʔim</u>	125	2931	to be ugly	<u>ʃa:ʔih</u>
88	2253	to cover	<u>ra:ʔin</u>	126	2938	to build	<u>ʃa:ʔid</u>
89	2370	to run	<u>za:ʔib</u>	127	2941	to burn	<u>ʃa:ʔit</u>
90	2373	to dislocate	<u>za:ʔih</u>	128	2943	to spread	<u>ʃa:ʔi<sup>c</sup></u>
91	2374	to prepare supplies	<u>za:ʔid</u>	129	2947	to pick up	<u>ʃa:ʔil</u>
92	2375	to visit	<u>za:ʔir</u>	130	2949	to disgrace	<u>ʃa:ʔin</u>
93	2377	to be removed	<u>za:ʔi<sup>c</sup></u>	131	3073	to be correct	<u>sa:ʔib</u>
94	2378	to deviate	<u>za:ʔiv</u>	132	3074	to yell	<u>sa:ʔit</u>
95	2382	to cease to exist	<u>za:ʔil</u>	133	3078	to direct	<u>sa:ʔir</u>
96	2383	to get angry	<u>za:ʔim</u>	134	3079	to measure	<u>sa:ʔi<sup>c</sup></u>
97	2386	to oil	<u>za:ʔit</u>	135	3080	to mold	<u>sa:ʔiv</u>
98	2390	to disappear	<u>za:ʔih</u>	136	3082	to assault	<u>sa:ʔil</u>
99	2391	to increase	<u>za:ʔid</u>	137	3085	to fast	<u>sa:ʔim</u>
100	2394	to become noisy	<u>za:ʔit</u>	138	3087	to protect	<u>sa:ʔin</u>
101	2395	to swerve	<u>za:ʔiv</u>	139	3089	to scream	<u>sa:ʔih</u>
102	2396	to act in a dishonest way	<u>za:ʔif</u>	140	3090	to hunt	<u>sa:ʔid</u>
103	2399	to beautify	<u>za:ʔin</u>	141	3092	to become	<u>sa:ʔir</u>
104	2667	to prevail	<u>sa:ʔid</u>	142	3095	to stay in the summer	<u>sa:ʔif</u>
105	2669	to get angry	<u>sa:ʔir</u>	143	3151	to be lightened up	<u>da:ʔin</u>
106	2670	to rule	<u>sa:ʔis</u>	144	3152	to be hungry	<u>da:ʔir</u>
107	2672	to lash	<u>sa:ʔit</u>	145	3154	to smell good	<u>da:ʔi<sup>c</sup></u>
108	2673	to be permitted	<u>sa:ʔiv</u>	146	3156	to harm	<u>da:ʔir</u>
109	2677	to lead	<u>sa:ʔiq</u>	147	3158	to be lost	<u>da:ʔi<sup>c</sup></u>
110	2678	to rub	<u>sa:ʔik</u>	148	3159	to host	<u>da:ʔif</u>
111	2682	to wander	<u>sa:ʔim</u>	149	3160	to be narrow	<u>da:ʔiq</u>
112	2687	to flow	<u>sa:ʔib</u>	150	3161	to be unjust	<u>da:ʔim</u>
113	2692	to flow to cruise	<u>sa:ʔih</u>	151	3252	to go astray	<u>ta:ʔih</u>
114	2693	to sink	<u>sa:ʔix</u>	152	3258	to obey	<u>ta:ʔi<sup>c</sup></u>
115	2695	to walk	<u>sa:ʔir</u>	153	3259	to go around	<u>ta:ʔif</u>
116	2703	to taste good	<u>sa:ʔiv</u>	154	3260	to bear	<u>ta:ʔiq</u>
117	2707	to stream	<u>sa:ʔil</u>	155	3261	to reach	<u>ta:ʔil</u>
118	2916	to blemish	<u>ʃa:ʔib</u>	156	3294	to go astray	<u>ta:ʔih</u>
				157	3265	to fly	<u>ta:ʔir</u>
				158	3266	to be headless	<u>ta:ʔif</u>
				159	3267	to obey	<u>ta:ʔi<sup>c</sup></u>
				160	3268	to go around	<u>ta:ʔif</u>

161	3269	to bear	<u>ta:ʔiq</u>	197	3916	to be filled	<u>fa:ʔid</u>
162	3271	to throw mud	<u>ta:ʔin</u>			with	
163	3489	to contort	<u>ʕa:ʔidʒ</u>	198	4129	to feed	<u>qa:ʔit</u>
164	3490	to return	<u>ʕa:ʔid</u>	199	4131	to lead	<u>qa:ʔid</u>
165	3491	to seek	<u>ʕa:ʔið</u>	200	4133	to measure	<u>qa:ʔis</u>
		protection		201	4134	to demolish	<u>qa:ʔid</u>
166	3493	to miss	<u>ʕa:ʔiz</u>	202	4137	to follow	<u>qa:ʔif</u>
167	3496	to compensate	<u>ʕa:ʔid</u>	203	4138	to cackle	<u>qa:ʔiq</u>
168	3497	to be stopped	<u>ʕa:ʔiq</u>	204	4141	to speak	<u>qa:ʔil</u>
169	3498	to be unjust	<u>ʕa:ʔil</u>	205	4145	to stand up	<u>qa:ʔim</u>
170	3500	to float	<u>ʕa:ʔim</u>	206	4148	to vomit	<u>qa:ʔin</u>
171	3504	to disfigure	<u>ʕa:ʔib</u>	207	4151	to tie	<u>qa:ʔid</u>
172	3505	to ravage	<u>ʕa:ʔiθ</u>	208	4154	to measure	<u>qa:ʔis</u>
173	3506	to disgrace	<u>ʕa:ʔir</u>	209	4158	to crack	<u>qa:ʔid</u>
174	3510	to hate	<u>ʕa:ʔif</u>	210	4159	to become hot	<u>qa:ʔið</u>
175	3511	to stop	<u>ʕa:ʔiq</u>	211	4160	to crackle	<u>qa:ʔiq</u>
176	3512	to become	<u>ʕa:ʔil</u>	212	4161	to nap	<u>qa:ʔil</u>
		poor		213	4451	to drink from	<u>ka:ʔiz</u>
177	3625	to fall in	<u>ya:ʔir</u>			a jug	
178	3628	to dive	<u>ya:ʔis</u>	214	4473	to exist	<u>ka:ʔin</u>
179	3629	to sink	<u>ya:ʔit</u>	215	4480	to deceive	<u>ka:ʔid</u>
180	3631	to destroy	<u>ya:ʔil</u>	216	4487	to weigh	<u>ka:ʔil</u>
181	3633	to speak ill of	<u>ya:ʔib</u>	217	4494	to be weak	<u>ka:ʔin</u>
		somebody		218	4641	to dirty	<u>la:ʔiθ</u>
		to fall into a		219	4644	to appear	<u>la:ʔih</u>
		coma		220	4645	to escape	<u>la:ʔið</u>
		to absent		221	4649	to ask for	<u>la:ʔiz</u>
		oneself from				protection	
182	3634	to help	<u>ya:ʔiθ</u>	222	4651	to cling to	<u>la:ʔit</u>
						to be gay	
183	3636	to be jealous	<u>ya:ʔir</u>	223	4653	to be	<u>la:ʔi<sup>c</sup></u>
184	3637	to disappear	<u>ya:ʔid</u>			impatient	
185	3638	to sink	<u>ya:ʔit</u>	224	4655	to chew	<u>la:ʔif</u>
186	3639	to enrage	<u>ya:ʔið</u>	225	4656	to chew	<u>la:ʔik</u>
187	3642	to harm	<u>ya:ʔil</u>	226	4660	to blame	<u>la:ʔim</u>
188	3643	to be cloudy	<u>ya:ʔim</u>	227	4666	to deprive	<u>la:ʔit</u>
189	3872	to pass	<u>fa:ʔit</u>			from	
190	3879	to spread a	<u>fa:ʔih</u>	228	4675	to be fit for	<u>la:ʔiq</u>
		strong odor		229	4945	to die	<u>ma:ʔit</u>
191	3880	to boil over	<u>fa:ʔir</u>	230	4947	to surge	<u>ma:ʔidʒ</u>
192	3882	to win	<u>fa:ʔiz</u>	231	4949	to surge	<u>ma:ʔir</u>
193	3890	to surpass	<u>fa:ʔiq</u>	232	4968	to be rich in	<u>ma:ʔih</u>
		hiccup				water	
194	3900	to utter	<u>fa:ʔih</u>	233	4974	to sway	<u>ma:ʔid</u>
195	3902	to return	<u>fa:ʔin</u>	234	4976	to provide	<u>ma:ʔir</u>
196	3905	to spread a	<u>fa:ʔih</u>	235	4977	to distinguish	<u>ma:ʔiz</u>
		strong odor		236	4978	to strut	<u>ma:ʔis</u>

237	4979	to move away from	ma:ʔit	249	5281	to rise	na:ʔif
238	4980	to become fluid	ma:ʔi <sup>c</sup>	250	5284	to get	na:ʔil
239	4990	to deviate from	ma:ʔil	251	5285	to sleep	na:ʔim
240	4996	to be rich in water	ma:ʔih	252	5291	to be unfortunate	na:ʔib
241	5265	to burden	na:ʔin	253	5296	to line up	na:ʔir
242	5266	to return	na:ʔib	254	5303	to achieve	na:ʔil
		to be affected by		255	5480	to repent	ha:ʔid
		to take place of		256	5482	to collapse	ha:ʔir
243	5269	to moan	na:ʔih	257	5484	to tremble	ha:ʔif
244	5271	to illuminate	na:ʔir	258	5486	to fear	ha:ʔil
245	5275	to vacillate	na:ʔis	259	5492	to look good	ha:ʔin
246	5276	to take	na:ʔif	260	5494	to fear	ha:ʔib
247	5278	to resort to	na:ʔis	261	5496	to be agitated	ha:ʔidɜ
248	5279	to be dependent on	na:ʔit	262	5510	to break	ha:ʔid
				263	5511	to be wide	ha:ʔi <sup>c</sup>
				264	5517	to wander	ha:ʔim
						to be thirsty	

## Appendix (C)

Table 7. Finally-Weak APs of the Pattern C<sub>1</sub>a:C<sub>2</sub>iC<sub>3</sub>

Number	Dictionary entry number	Gloss	Active participle				
1	43	to become a father	ʔa:bin	13	713	to cry	ba:kin
2	45	to refuse	ʔa:bin	14	751	to test	ba:lin
3	56	to come	ʔa:tin	15	751	to wear off	ba:lin
4	83	to have a brother	ʔa:xin	16	789	to build	ba:nin
5	178	to comfort	ʔa:sin	17	803	to look beautiful	ba:hin
6	179	to heal	ʔa:sin	18	985	to follow	ta:lin
7	253	to weaken	ʔa:lin	19	1057	to recite	
8	324	to slow down	ʔa:nin	20	1078	to bleat	θa:vin
9	522	to appear	ba:din	21	1110	to bend	θa:nin
10	605	to sharpen	ba:rin	22	1111	to collect	dʒa:bin
11	689	to be unjust	ba:vin	23	1114	to collect	dʒa:bin
		to want		24	1164	to bow	dʒa:θin
12	703	to stay	ba:qin	25	1172	to run	dʒa:rin
				26	1197	to recompense	dʒa:zin
				27	1214	to harden	dʒa:fin
				28	1245	to rinse	dʒa:lin
						to commit a crime	dʒa:nin
						to gather	

29	1328	to throw	<u>ha:θin</u>	58	1803	to call	<u>da:θin</u>
30	1329	to throw	<u>ha:θin</u>	59	1840	to express	<u>da:lin</u>
31	1337	to be wise	<u>ha:dʒin</u>			one's opinions	
32	1337	to be wise	<u>ha:dʒin</u>	60	1856	to bleed	<u>da:min</u>
33	1347	to sing for camels	<u>ha:din</u>	61	1863	to get closer	<u>da:nin</u>
		to follow		62	1876	to be experienced by	<u>da:hin</u>
34	1355	to imitate	<u>ha:ðin</u>	63	1878	to be experienced by	<u>da:hin</u>
35	1397	to sip	<u>ha:sin</u>			to be insightful	
36	1404	to stuff	<u>ha:fin</u>	64	1958	to disperse	<u>ða:rin</u>
37	1434	to give generously	<u>ha:fin</u>	65	1959	to disperse	<u>ða:rin</u>
38	1434	to walk barefoot	<u>ha:fin</u>	66	1969	to intensify	<u>ða:kin</u>
39	1446	to talk	<u>ha:kin</u>	67	2032	to increase	<u>ra:bin</u>
40	1459	to be sweet	<u>ha:lin</u>	68	2032	to row	<u>ra:bin</u>
41	1476	to be hot	<u>ha:min</u>	69	2045	to commemorate	<u>ra:θin</u>
42	1477	to protect to put someone on a diet	<u>ha:min</u>	70	2046	to commemorate	<u>ra:θin</u>
		to be hot		71	2059	to hope	<u>ra:dʒin</u>
43	1493	to feel compassion for	<u>ha:nin</u>	72	2066	to cause to revolve	<u>ra:hin</u>
44	1494	to bend	<u>ha:nin</u>	73	2067	to grind	<u>ra:hin</u>
45	1553	to be extinguished	<u>xa:bin</u>	74	2104	to moor	<u>ra:sin</u>
46	1624	to fear	<u>xa:fin</u>	75	2112	to bribe	<u>ra:fin</u>
				76	2124	to be satisfied	<u>ra:din</u>
47	1632	to be castrated	<u>xa:sin</u>	77	2140	to herd sheep	<u>ra:θin</u>
48	1650	to walk	<u>xa:fin</u>			to care for	
49	1657	to be hidden	<u>xa:fin</u>	78	2146	to froth	<u>ra:vin</u>
50	1658	to hide	<u>xa:fin</u>			to grunt	
51	1658	to be hidden	<u>xa:fin</u>	79	2160	to get married	<u>ra:fin</u>
				80	2171	to recite Quran over someone for healing and protection	<u>ra:qin</u>
52	1673	to be empty to be devoted to	<u>xa:lin</u>	81	2171	to advance	<u>ra:qin</u>
53	1696	to use impolite language	<u>xa:nin</u>	82	2196	to throw	<u>ra:min</u>
54	1697	to use impolite language	<u>xa:nin</u>	83	2206	to look forward to	<u>ra:nin</u>
55	1747	to become dark	<u>da:dʒin</u>	84	2274	to push gently	<u>za:dʒin</u>
56	1753	to flatten	<u>da:hin</u>	85	2297	to mock	<u>za:rin</u>
57	1754	to flatten	<u>da:hin</u>	86	2325	to increase	<u>za:kin</u>
				87	2326	to increase	<u>za:kin</u>
				88	2365	to fornicate	<u>za:nin</u>

89	2369	to be arrogant	<u>za:hin</u>	126	3136	to increase	<u>da:fin</u>
90	2434	to imprison	<u>sa:bin</u>	127	3184	to flatten	<u>ta:hin</u>
91	2454	to be calm	<u>sa:d3in</u>	128	3208	to be despotic	<u>ta:yin</u>
		to cover		129	3217	to float	<u>ta:fin</u>
92	2466	to dredge	<u>sa:hin</u>	130	3030	to paint	<u>ta:lin</u>
93	2466	to dredge	<u>sa:hin</u>	131	3040	to silt	<u>ta:min</u>
94	2474	to become generous	<u>sa:xin</u>	132	3248	to cook	<u>ta:hin</u>
95	2475	to become generous	<u>sa:xin</u>	133	3249	to cook	<u>ta:hin</u>
96	2511	to walk	<u>sa:rin</u>	134	3308	to be arrogant	<u>ca:tin</u>
		to spread				to be very old	
97	2520	to assail	<u>sa:tin</u>	135	3311	to cause mischief	<u>ca:θin</u>
98	2527	to strive	<u>sa:in</u>	136	3312	to cause mischief	<u>ca:θin</u>
		to betray				to run	<u>ca:ðin</u>
99	2545	to disperse	<u>sa:fin</u>	137	3330	to be unjust	<u>ca:ðin</u>
100	2554	to give someone a drink	<u>sa:qin</u>	138	3355	to befall	<u>ca:rin</u>
101	2590	to forget	<u>sa:lin</u>	139	3356	to get naked	<u>ca:rin</u>
102	2590	to cause to forget	<u>sa:lin</u>	140	3367	to be ascribed to	<u>ca:zin</u>
103	2618	to rise up	<u>sa:min</u>	141	3368	to be ascribed to	<u>ca:zin</u>
104	2652	to lighten	<u>sa:nin</u>	142	3395	to disobey	<u>ca:sin</u>
105	2658	to forget	<u>sa:hin</u>	143	3419	to be removed	<u>ca:fin</u>
106	2760	to rain	<u>fa:tin</u>			to forgive	
107	2766	to become sad	<u>fa:d3in</u>	144	3449	to be high	<u>ca:lin</u>
108	2788	to sing	<u>fa:ðin</u>	145	3451	to rise	<u>ca:lin</u>
109	2792	to smell good	<u>fa:ðin</u>	146	3482	to take by force	<u>ca:nin</u>
110	2813	to buy	<u>fa:rin</u>			to submit to	
111	2858	to heal	<u>fa:fin</u>	147	3484	to pay attention to	<u>ca:nin</u>
112	2866	to be distressed	<u>fa:qin</u>			to be exhausted	
113	2873	to complain	<u>fa:kin</u>			to feel sick	<u>ya:θin</u>
114	2875	to complain	<u>fa:kin</u>	148	3530	to feel sick	<u>ya:θin</u>
115	2969	to long for	<u>sa:bin</u>	149	3531	to feel sick	<u>ya:θin</u>
116	2970	to act boyishly	<u>sa:bin</u>	150	3531	to feel sick	<u>ya:θin</u>
117	2977	to wake up	<u>sa:hin</u>	151	3531	to talk a lot	<u>ya:θin</u>
118	2978	to wake up	<u>sa:hin</u>	152	3538	to leave at lunch time	<u>ya:ðin</u>
119	2991	to get thirsty	<u>sa:ðin</u>			to become	
120	3010	to decline from	<u>sa:yin</u>	153	3540	to feed	<u>ya:ðin</u>
121	3011	to decline from	<u>sa:yin</u>	154	3559	to glue	<u>ya:rin</u>
122	3020	to be pure	<u>sa:fin</u>	155	3565	to invade	<u>ya:zin</u>
123	3039	to be tortured	<u>sa:lin</u>	156	3571	to darken	<u>ya:fin</u>
124	3113	to be in the forenoon	<u>da:hin</u>			to come upon	
125	3126	to fight hard	<u>da:rin</u>				

157	3590	to sleep	<u>ya:fin</u>	198	4838	to walk	<u>ma:fin</u>
158	3591	to sleep	<u>ya:fin</u>	199	4848	to go away	<u>ma:diin</u>
159	3603	to become expensive	<u>ya:lin</u>	200	4888	to whistle	<u>ma:kin</u>
		to be excessive		201	4927	to test	<u>ma:nin</u>
160	3604	to boil	<u>ya:lin</u>	202	4928	to test	<u>ma:nin</u>
161	3622	to become rich	<u>ya:nin</u>	203	4999	to be distant	<u>na:ʔin</u>
162	3714	to sacrifice	<u>fa:diin</u>	204	5026	to be inconsistent	<u>na:bin</u>
163	3761	to lie	<u>fa:rin</u>			with	
164	3779	to fart	<u>fa:sin</u>	205	5055	to make a secret	<u>na:dʒin</u>
165	3787	to spread	<u>fa:fin</u>			conversation	
166	3797	to be empty	<u>fa:diin</u>			to survive	
167	3845	to delouse	<u>fa:lin</u>	206	5066	to head for	<u>na:hin</u>
168	3848	to delouse	<u>fa:lin</u>	207	5076	to be proud	<u>na:xin</u>
169	3863	to perish	<u>fa:nin</u>	208	5103	to need	<u>na:zin</u>
170	3945	to bend	<u>qa:bin</u>	209	5116	to leave	<u>na:sin</u>
171	3970	to have moles in the eye	<u>qa:ʃin</u>	210	5117	to forget	<u>na:sin</u>
172	4007	to follow	<u>qa:rin</u>	211	5133	to get drunk	<u>na:fin</u>
173	4008	to host	<u>qa:rin</u>	212	5142	to catch from the forelock	<u>na:sin</u>
174	4021	to be harsh	<u>qa:sin</u>	213	5150	to undress	<u>na:diin</u>
175	4042	to become distant	<u>qa:sin</u>	214	5171	to make a sound	<u>na:ʔin</u>
176	4046	to judge	<u>qa:diin</u>	215	5172	to announce the death of someone	<u>na:ʔin</u>
177	4058	to miaow	<u>qa:tin</u>			to babble	<u>na:yin</u>
178	4073	to follow	<u>qa:fin</u>	216	5183	to deny	<u>na:fin</u>
179	4089	to fry	<u>qa:lin</u>	217	5200		
180	4089	to hate	<u>qa:lin</u>	218	5235	to defeat	<u>na:kin</u>
181	4121	to become red	<u>qa:nin</u>	219	5248	to grow	<u>na:min</u>
182	4224	to fall	<u>ka:bin</u>	220	5250	to increase	<u>na:min</u>
183	4342	to sheathe	<u>ka:sin</u>	221	5264	to prevent	<u>na:hin</u>
184	4372	to have enough	<u>ka:fin</u>	222	5350	to rise	<u>ha:bin</u>
185	4428	to call	<u>ka:nin</u>	223	5366	to satirize	<u>ha:dʒin</u>
186	4428	to imply	<u>ka:nin</u>	224	5379	to guide	<u>ha:diin</u>
187	4544	to peel	<u>la:hin</u>	225	5383	to ramble	<u>ha:ʃin</u>
188	4570	to blaze	<u>la:ʃin</u>	226	5399	to hit with a baton	<u>ha:rin</u>
189	4585	to smatter	<u>la:yin</u>	227	5402	to wear out clothes	<u>ha:rin</u>
190	4585	to smatter	<u>la:yin</u>	228	5429	to be mistaken	<u>ha:fin</u>
191	4603	to encounter	<u>la:oin</u>	229	5464	to wander	<u>ha:min</u>
192	4634	to be amused	<u>la:hin</u>				
		to be distracted					
193	4634	to divert from	<u>la:hin</u>				
194	4754	to remove	<u>ma:hin</u>				
195	4756	to erase	<u>ma:hin</u>				
196	4769	to stab	<u>ma:diin</u>				
197	4808	to be ungrateful	<u>ma:rin</u>				

**Appendix (D)****Table 8.** Doubly-weak APs of the Pattern C<sub>1</sub>A:C<sub>2</sub>iC<sub>3</sub>

Number	Dictionary entry number	Gloss	Active participle				
				15	4477	to burn	<u>ka:win</u>
				16	4664	to bend	<u>la:win</u>
				17	5289	to depart	<u>na:win</u>
						to intend	
1	372	to accommodate	<u>ʔa:win</u>	18	5490	to fall	<u>ha:win</u>
2	1083	to settle	<u>θa:win</u>	19	5564	to perish	<u>wa:hin</u>
3	1709	to be empty	<u>xa:win</u>	20	5574	to inspire	<u>wa:hin</u>
4	1514	to include	<u>ha:win</u>	21	5615	to give blood money	<u>wa:win</u>
5	1901	to make loud noise	<u>da:win</u>	22	5646	to adorn	<u>wa:fin</u>
6	1990	to wither	<u>ða:win</u>	23	5655	to inform against	<u>wa:fin</u>
7	2241	to quench	<u>ra:win</u>	24	5665	to realize	<u>wa:ʕin</u>
8	2385	to narrate	<u>za:win</u>	25	5687	to fulfill	<u>wa:fin</u>
9	2932	to dismiss	<u>ʒa:win</u>	26	5692	to increase	<u>wa:qin</u>
10	3155	to barbeque	<u>ʃa:win</u>	27	5701	to protect	<u>wa:qin</u>
11	3155	to join	<u>da:win</u>			to be close	<u>wa:lin</u>
12	3262	to be weak	<u>da:win</u>			to rule	
13	3503	to fold	<u>ta:win</u>			to abandon	<u>wa:nin</u>
14	3632	to bark	<u>ʕa:win</u>			to be weak	<u>wa:hin</u>
		to deviate from what is right	<u>ya:win</u>				

## Modern standart Arapça'da üç ünsüzden oluşan fiillerden zayıf aktif sıfat-fiil türetilmesinin otomatik segment analizi

**Öz**

Bu çalışma, otosegmental fonolojinin X-slot modelinde triconsonantal eksik fiillerden zayıf aktif sıfat fiil türetilmesini analiz etmeyi amaçlamaktadır. Araştırmanın ilk aşaması, sağlam köklü bir sözlükten korpus oluşturmayı içerir. Korpus, başta, ortada, sonda ve iki kat zayıf sıfat fiil olarak kategorize edilen 620 sıfat fiil içerir. Analiz, düzensiz yüzey temsillerine sahip olmalarına rağmen, zayıf sıfat fiillerin temeldeki temsillerinin güçlü emsallerininkilerle paralel olduğunu ortaya koymaktadır. Bu sıfat fiillerin yüzey düzensizlikleri, kaymaların çeşitli fonolojik kurallara duyarlı olmalarına neden olan doğal kararsızlığına atfedilebilir. Bu fonolojik kurallara, bu yaklaşımda farklı katmanlardaki öğelerin sahip olduğu özerklik nedeniyle, otomatik segmental fonolojide doğru ve basit temsiller verilmiştir.

*Anahtar sözcükler:* Otosegmental fonoloji; MSA; korpus çalışması; zayıf gövdeler; sıfat fiil



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