Available online at www.sciencedirect.com

ScienceDirect

Lingua xxx (xxxx) xxx

Lingua

www.elsevier.com/locate/lingua

Syllable structure and syllabification in Maaloula Aramaic

Ghattas Eid *, Ingo Plag *

Institut für Anglistik und Amerikanistik, Heinrich-Heine-Universität Düsseldorf, Universitätsstraße 1, 40225 Düsseldorf, Germany

Received 9 September 2022; revised 28 September 2023; accepted in revised form 28 September 2023

1. INTRODUCTION

One of the intricate topics in the phonology of the Semitic languages is their syllabification and epenthesis processes. Much attention has been given to this topic in the different Arabic dialects (e.g. Broselow, 2017, 1992; Itô, 1989; Kiparsky, 2003; Selkirk, 1981; Watson, 2007, 2002). This topic, however, has received significantly less attention in the neighboring Neo-Aramaic dialects although they present similarly intricate problems.

Neo-Aramaic is the name given to all the varieties of Aramaic still spoken today. These varieties fall into four distinct groups: Western Neo-Aramaic, Central Neo-Aramaic, Eastern Neo-Aramaic (also called Northeastern Neo-Aramaic) and Neo-Mandaic (Heinrichs, 1990: x–xv). Western Neo-Aramaic, which is the variety described in this paper, is spoken in three Syrian villages located in the Qalamoun Mountains, namely Maaloula, Bakhaa (officially known as al-Sarkha) and Jubbaadin. Since our work primarily focuses on the dialect of Maaloula, the term 'Maaloula Aramaic' will be used throughout the paper to denote the Western Neo-Aramaic dialect of Maaloula. The geographical location of Maaloula with respect to the capital city, Damascus, is displayed in Map 1, and its location with respect to the other Aramaic-speaking villages, Jubbaadin and Bakhaa, is shown in Map 2.

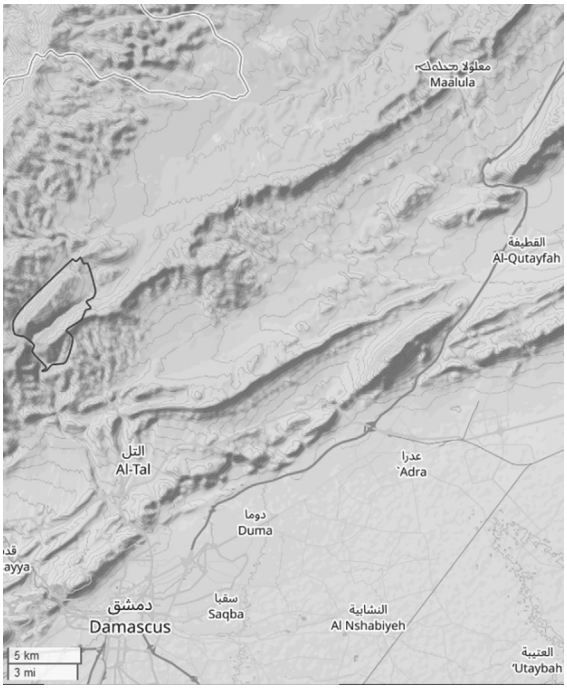
Syllable structure and syllabification in Maaloula Aramaic are described in two reference grammars: Spitaler (1938) and Arnold (1990). Spitaler's (1938: 44–46) treatment of the subject will not be reviewed because it is diachronic in nature. Arnold's (1990: 37–40) synchronic account provides a good starting point and will therefore be reviewed in detail in the next section. As can be seen, the sources on the phonology of Maaloula Aramaic are scarce and language-specific, and the language itself is now considered endangered.[1] Therefore, the need to understand these phonological processes from a broader comparative perspective has become increasingly important. The present study attempts to describe and analyze these processes from a cross-linguistic perspective which compares Maaloula Aramaic to the surrounding Arabic varieties.

We present the analysis in a rule-based format without commitment to potential theoretical underpinnings of a rule-based approach. An alternative approach is possible and feasible, using the stratal Optimality Theory model proposed and applied to Arabic by Kiparsky (2003). We will not engage in a comparison between the two approaches, as none of our main points hinges on the choice of framework.

* Corresponding authors.
E-mail addresses: ghattas.eid@hhu.de (G. Eid), ingo.plag@uni-duesseldorf.de (I. Plag).

[1] See Ethnologue's entry for Western Neo-Aramaic (Eberhard et al., 2023) (accessed July 16, 2023, at https://www.ethnologue.com/language/amw/). According to Ethnologue, a language is considered endangered when "it is no longer the norm that children learn and use this language".

https://doi.org/10.1016/j.lingua.2023.103612



Map 1. Location of Maaloula with respect to Damascus (60 km northeast of Damascus) (OpenStreetMap contributors, retrieved from https://www.openstreetmap.org).

2. PREVIOUS ACCOUNTS

2.1. Syllable structure and syllabification

According to Arnold (1990: 37–38), the syllable inventory of Maaloula Aramaic contains the following syllable types which are presented here in three lines in order of decreasing frequency:

(1) *Syllable inventory*

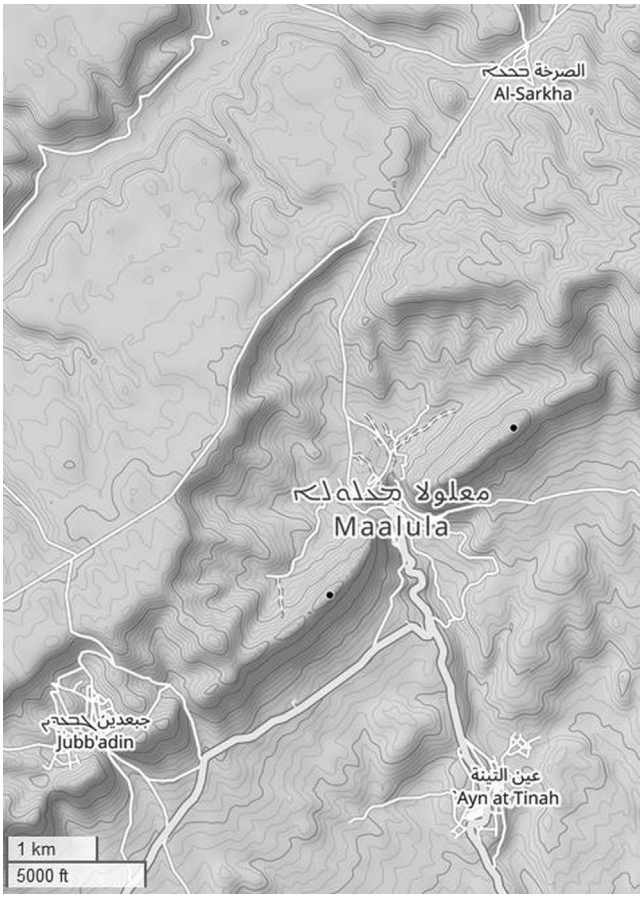
CV	CVC	CVCC	CVV	CVVC	CVVCC
CCV	CCVC	CCVCC	CCVV	CCVVC	CCVVCC
CCCV	CCCVC	CCCVCC	CCCVV	CCCVVC	CCCVVCC[2]

Arnold (1990: 39) proposes the following rule for the syllabification of word-medial consonant clusters in disyllabic and polysyllabic words.

(2) *Syllabification of word-medial consonant clusters*

The syllable boundary is placed between the two consonants in a two-consonant cluster (i.e. -C.C-), and after the second consonant in a three-consonant cluster (i.e. -CC.C-).

[2] All of these shapes will be illustrated in different examples in the paper, except for CCCVVCC which seems to be restricted to words which start with CCVVCC and are preceded by a one-consonant clitic (e.g., *lə-frīsčxun* 'for your (MASC PL) right' (Arnold, 1990: 39)).



Map 2. Location of Maaloula with respect to Jubbaadin and Bakhaa (Al-Sarkha) (OpenStreetMap contributors, retrieved from https://www.openstreetmap.org).

The following examples illustrate this rule[3]:

(3)	**-C.C-**			**-CC.C-**		
	ṯel.ka	'snow'	V.37[4]	*nošəḳ.ṯa*	'kiss'	V.37
	ġbeč.ča	'cheese'	V.38	*frīsč.xun*	'your (MASC PL) right'	V.38

[3] Throughout the paper, we adopt the transcription system used by Arnold (1991a, 1991b, 1990). Although this adopted system is meant to represent surface forms, the outputs of a few phonological processes are consistently absent from it. For example, the glottal stops that are inserted at the beginning of word-initial onsetless syllables are not represented (e.g. *imәṭ* 'they arrived' rather than *ʔimәṭ,* and *išən* rather than *ʔišən*), and the geminate consonants which undergo degemination in preconsonantal position are transcribed as geminates rather than singletons (e.g. *ṭa**šš**rīšən* 'you (FEM SG) left me' rather than *ṭa**š**rīšən*). In this paper, we have adopted the original transcription system without modifying it, but we have provided the actual surface representations in square brackets whenever a more accurate representation is needed.

[4] In order to cite the sources of the Aramaic examples, we use the Roman numbers (III, IV, V, and VI) to refer respectively to Arnold's volumes (1991a, 1991b, 1990, and 2019). We have chosen these numbers following his original numbering (see references). The Arabic numbers refer to the page number. For example, V.132 refers to Arnold (1990: 132). The examples marked 'FW' (as, e.g., in (13)) are from our native language consultant. For the Arabic examples, we use normal citation because they are taken from different sources.

Arnold (1990: 39) also shows that syllabification applies not only within word boundaries, as in (3), but also across word boundaries, as in (4).

(4) *loġəṯlə mšīḥa* [loġəṯ.ləm.šī.ḥa] 'the language of Christ' V.39

The principles which determine this syllabification, however, are not given. These principles would have to explain the tendency to have more consonants in the syllable coda than in the onset of the following syllable as the examples in (3) under -CC.C- show. In the absence of these principles, one can argue that an alternative syllabification, such as -.CCC- or -C.CC- (e.g. *frī.sčxun* or *frīs.čxun* instead of *frīsč.xun*), is also plausible. This alternative syllabification might also have consequences for the syllable inventory shown in (1).

In section 3, we will propose a different syllabification approach which will significantly reduce the syllable types listed in (1).

2.2. Vowel epenthesis

In Maaloula Aramaic, an epenthetic vowel is inserted to break up a consonant cluster. Arnold's (2011: 686, 1990: 20, 40) main points on this topic can be summarized as follows:

- The epenthetic vowel does not have a phonemic status.
- The epenthetic vowel does not play any role in the syllabification process (i.e. it cannot be a syllable nucleus). For example, Arnold syllabifies the word *nošəḵṯa* 'kiss' V.37 which contains the epenthetic vowel [ə] as *nošəḵ.ṯa*.
- In terms of vowel quality, Arnold (1990: 40) states rather vaguely that its realization can range between [e] and [i]. With regard to transcription, it is predominantly transcribed as [ə]. However, there are instances where it is variably transcribed as [ə] and [i] in Arnold's (1991a, 1991b) transcripts. This variable transcription is illustrated in (5). The epenthetic vowel is transcribed as [ə] in (5a) and as [i] in (5b). In these examples, the epenthetic vowel is inserted before the suffix *-l* which connects two nouns in the genitive construction (see Arnold, 1990: 301–302; Correll, 1978: 6).[5]

(5)	(a)	*mōrə**l** ġamla*	'the owner of the camel'	IV.230
		*maḵōmə**l** berəḵṯa*	'the shrine of Saint Thecla'	IV.222
		*bnōṯə**l** ḥōnax*	'the daughters of your brother'	IV.68
		*marōyə**l** ḏemseḵ*	'the people of Damascus'	IV.228
		*ffōyə**l** ṭefla*	'the child's face'	III.198
	(b)	*payṯ**il** ġabrōna*	'the man's house'	IV.8
		*yarḥ**il** iyyar*	'the month of May'	III.162
		*berč**il** malka*	'the king's daughter'	IV.184
		*axerč**il** yarḥa*	'the end of the month'	III.162
		*rayš**il** ʕarḵūba*	'the top of the mountain'	IV.10

Arnold (1990: 40) presents an algorithm which indicates the place of vowel epenthesis in Maaloula Aramaic:

(6) (a) Count the consonants in a consonant cluster from right to left.
(b) Insert an epenthetic vowel after every second consonant.
(c) In the case of two word-final consonants, the right word boundary is counted as a consonant.

[5] However, we do not know whether this variation reflects the actual pronunciation of these vowels, or whether it is based on transcription conventions rather than auditory facts. In any case, this variation does not fall within the scope of our paper. Future research can investigate the acoustic quality of the epenthetic vowel and verify whether this variation truly exists.

This algorithm works word-internally and across word boundaries as can be seen from the examples in (7). For the sake of clarity, we underline the epenthetic vowels throughout the paper.

(7)	(a)	-CəC#	*itər*	'two (MASC)'	V.40
			xutəp	'write (2 MASC SG) me!'	III.374
	(b)	-CəCC-	*taxəlṭa*	'a passageway'	V.40
			šabəkṭa	'net'	IV.58
	(c)	-CCəCC-	*sōblə blōta*	'the mayor of the village'	V.40
	(d)	-CəCCəCC-	*loġətlə mšīḥa*	'the language of Christ'	V.40

This algorithm can be expressed as a phonological rule:

(8) *Vowel epenthesis in Maaloula Aramaic*

$$\emptyset \rightarrow \text{ə} \; / \text{C}\_\_\text{C}\left\{ \begin{matrix} \# \\ \text{C} \end{matrix} \right\}$$

Although this rule predicts accurately where the epenthetic vowel is expected to occur, it leaves a number of unanswered questions which we will deal with individually in the next section.

2.3. Open questions

First, what do the two environments CCC and CC# have in common where epenthesis occurs? A number of phonologists (e.g. Blevins, 1995: 209; Hayes, 2009: 259, 264; Kahn, 1976: 23) have expressed their dissatisfaction with environments such as /C__C{#, C} because word boundaries (#) do not form a natural class with consonants (C).

Second, how can this rule be explained from a perspective which takes syllable structure into account? According to the epenthesis algorithm in (6), the insertion of the epenthetic vowel does not seem to be governed or affected by syllable structure. The following examples show that epenthesis can occur in onsets (9a) as well as codas (9b) if Arnold's syllabification scheme (explained in (2)) is applied.

(9)	(a)	*bə-spaʕ.ṭa*	'with a finger'	V.39
	(b)	*nošəḳ.ṭa*	'kiss'	V.37

Third, in Arnold's words, this epenthetic vowel is "functionally non-syllabic" (2011: 686), which can be interpreted as not being able to form a syllable nucleus. For example, this can be seen in the word *nošəḳṭa* 'kiss' in (9b), which Arnold considers disyllabic [nošəḳ.ṭa], rather than trisyllabic [no.šəḳ.ṭa], although it has the three potential nuclei [o], [ə], and [a]. This tendency to disregard the epenthetic schwa in syllabification is most probably due to the problem of syllable-stress interaction.

In Maaloula Aramaic, word stress falls on the final CVV(C_0) or CVCC syllable.[6] Otherwise, it falls on the penultimate syllable (Arnold, 1990: 40; Bergsträsser, 1915: xxi; Spitaler, 1938: 46). The epenthetic schwa seems to be considered non-syllabic because it is not visible to stress (see Bergsträsser, 1915: xix). For example, if, contrary to Arnold's syllabification, the epenthetic vowel in *nošəḳṭa* were considered syllabic (i.e. [no.šəḳ.ṭa]), then the penultimate syllable $[\text{šəḳ}]_\sigma$ would receive stress (see (10a)). Since in *ˈnošəḳṭa* the first syllable receives stress, this would not be the right analysis. Arnold's syllabification avoids the problem posed by this opaque interaction between the epenthetic vowel and stress. By disregarding the epenthetic vowel, [nošəḳ] would be considered the penultimate syllable that duly receives stress (see (10b)). However, such a solution which considers a sequence like [nošəḳ] as monosyllabic, rather than disyllabic, is not fully convincing either. An account is needed which can generate a syllabification such as [ˈno.šəḳ.ṭa] where $[\text{šəḳ}]_\sigma$ is a syllable that does not interact with stress (see (10c)):

[6] C_0 refers to any number of consonants including zero.

(10) (a) *nošəkṯa* → *[no.ˈšək.ṯa] The wrong account: [šək]$_\sigma$ is visible to stress
(b) *nošəkṯa* → [ˈnošək.ṯa] Arnold's account: [šək] is not a syllable
(c) *nošəkṯa* → [ˈno.šək.ṯa] The desired account: [šək]$_\sigma$ is not visible to stress

Fourth, why does Maaloula Aramaic seem to tolerate certain word-initial and word-medial CCC clusters where epenthesis is surprisingly ruled out? In the following examples, vowel epenthesis is not possible, contra Arnold's algorithm:

(11) (a) word-initial CCC clusters (i.e. #CCC-)

sčfī.tič	(and not *s*ə*čfī.tič*)	'you (MASC SG) benefitted'	V.39
sčfēt	(and not *s*ə*čfēt*)	'benefit!'	V.39

(b) word-medial CCC clusters (i.e. -CCC-)

sūsč.xen	(and not *sūsə*č.xen*)	'your (FEM PL) horse'	V.38
frīsč.xun	(and not *frīsə*č.xun*)	'your (MASC PL) right'	V.38

If the epenthesis algorithm presented in (6) applies to all CCC clusters, then why does it not apply to these cases? If these are exceptional cases, are there other exceptions, and is there anything in common among them? In order to answer these questions, we will present an alternative syllabification scheme which accounts for epenthesis from a syllable-based perspective.

Before doing so, a word on the variation in the application of vowel epenthesis and on the phonological status of this vowel is in order. It seems that vowel epenthesis is obligatory in some environments and optional in other environments. For example, the same words in (12) are attested with and without the epenthetic vowel although in all these words the conditions for vowel epenthesis are met.

(12)

variant with no epenthetic vowel			variant with an epenthetic vowel		
berkṯa	III.182	~	*berəkṯa*	III.180	'Saint Thecla'
aḳtriṯ	III.48	~	*aḳətriṯ*	III.56	'I was able (to)'
loʕpṯa	III.164	~	*loʕəpṯa*	IV.16	'game; toy'
mofčḥa[7]	IV.56	~	*mofəčḥa*	IV.70	'key'
ṯarč	IV.64	~	*ṯarəč*	III.104	'two (FEM)'
imṭ	III.172	~	*imət*	IV.116	'he/they arrived'

In addition to the words above, which can appear with and without the epenthetic vowel, there are words that are always attested with an epenthetic vowel. For example, there are a total of 58 tokens of the word type *išən* 'years (ENUM PL)' in III and IV. In all these instances, *išən* appears epenthesized. We are using the term 'optionality' to refer to all these cases where epenthesis can apply. Optionality does not refer to the cases in which epenthesis cannot apply, such as in the words *sčfītič* (*s*ə*čfītič*) and *frīsčxun* (*frīsə*čxun*) in (11).

We do not know the reasons for the optionality in the application of epenthesis. The literature on Maaloula Aramaic makes no reference to it. However, a number of studies on the surrounding Arabic dialects have shown that optionality may be dependent on sonority. Hall (2011: 1576), for example, generalizes that "epenthesis [in Lebanese Arabic] is more or less obligatory in coda clusters of an obstruent followed by a sonorant [. . .], and optional in most other clusters". Optionality might also be attributed to other factors. For example, Watson (2007: 345) argues that the epenthesized and non-epenthesized word forms in Libyan Tripoli Arabic "may well be stylistic variants".

[7] It appears as *mufčḥa* rather than *mofčḥa* in the original text, but our language consultant dismisses *mufčḥa* as incorrect.

Throughout the paper, whenever we refer to vowel epenthesis, we mean the cases where epenthesis *can* (or, in some cases, *must*) apply. The cases where epenthesis *cannot* apply, even if there is a consonant cluster, are dealt with in section 4.2.

With regard to the phonological status of this vowel, we have considered it to be an epenthetic vowel although two alternative analyses may seem plausible at first sight. The first analysis would be to consider this vowel a lexical (or underlying) vowel that undergoes deletion in a set of words. In order to compare the deletion analysis with the epenthesis analysis, we present two data sets, one in (13) and one in (14). In each data set, the surface forms are accounted for first by the epenthesis analysis and then by the deletion analysis.

The first data set, shown in (13), presents Ø ∼ *ə* alternations in pairs of words. Each pair represents the singular and plural forms of the same lexeme. This is why they have the same base. Analysis (13a) represents the epenthesis option, and analysis (13b) represents the deletion option. Analysis (13a) is more plausible because it assumes that a vowel is inserted to break up a CCC cluster, which is a marked structure cross-linguistically. In the word forms which do not have consonant clusters, epenthesis does not apply. By contrast, analysis (13b) is less convincing because the application of vowel deletion to some word forms (but not to other word forms) does not seem to be phonologically motivated (i.e., it does not repair an illicit structure of any type).

(13) *First data set: Two competing analyses to account for the same surface forms*

(a) [ə] Epenthesis analysis

/samk-T-a/[8]	→	[samə̲k̲t̲a]	‘fish (SG)’	III.278	(epenthesis applies)
/samk-ō-T-a/[9]	→	[samkō̲t̲a]	‘fish (PL)’	IV.140	
/šabk-T-a/	→	[šabə̲k̲t̲a]	‘net’	IV.58	(epenthesis applies)
/šabk-ō-T-a/[10]	→	[šapkō̲t̲a]	‘nets’	FW	

(b) /ə/ Deletion analysis

/samə̲k-T-a/	→	[samə̲k̲t̲a]	‘fish (SG)’	III.278	
/samə̲k-ō-T-a/	→	[samkō̲t̲a]	‘fish (PL)’	IV.140	(deletion applies)
/šabə̲k-T-a/	→	[šabə̲k̲t̲a]	‘net’	IV.58	
/šabə̲k-ō-T-a/	→	[šapkō̲t̲a]	‘nets’	FW	(deletion applies)

The second data set, shown in (14), presents variation in the position of [ə] with respect to the suffix *-l*. The vowel [ə] occurs before-*l* in some examples and after it in other examples. In each of the examples presented in (14), two nouns are connected in the genitive construction by the suffix *-l* (for the genitive construction in Maaloula Aramaic, see Arnold, 1990: 301–302; Correll, 1978: 6). Analysis (14a) proposes that in each example there is an underlying consonant cluster across word boundaries (i.e., CCCC and CCC), and [ə] is epenthesized to break up that cluster. The noticeable variation in the position of the epenthetic vowel is dependent on the cluster (i.e., CCə̲CC and Cə̲CC), regardless of the position of the suffix *-l*. This is why the same underlying structure /mōr-l/ ‘owner of’ surfaces as [mōrlə̲] if the cluster is CCCC and as [mōrə̲l] if the cluster is CCC (the same can be said about /ʕēḏ-l/ ‘feast of’).

Analysis (14b) proposes that there are two underlying schwas, one before and one after the suffix *-l,* and that one of them is deleted. This analysis has to be ruled out because it does not explain why only one schwa is deleted and one is left, and why the first schwa is deleted in some examples and the second is deleted in other examples.

[8] /T/ indicates the {FEMININE MARKER} morpheme that we intend to leave unspecified in underlying representations. At the surface level, this morpheme has the two allomorphs [č] and [t̲].

[9] Many of the presented examples which have /ō/ in their underlying representations should actually be transcribed with /ā/ instead of /ō/ (e.g. /samk-ā-T-a/). This /ā/ is realized as [ō] through a process which is not related to syllabification or vowel epenthesis. To avoid this irrelevant complication, we transcribed the underlying forms with /ō/ rather than /ā/ in these examples.

[10] The underlying /b/ undergoes devoicing and surfaces as [p] because it occurs before a voiceless consonant.

(14) *Second data set: Two competing analyses to account for the same surface forms*

(a) [ə] Epenthesis analysis

/mōr-l xṯōb-a/	→	[mōrlə xṯōba]	'the owner of the book'	IV.40
/mōr-l ġaml-a/	→	[mōrəl ġamla]	'the owner of the camel'	IV.230
/ʕēḏ-l ṣlīb-a/	→	[ʕēḏlə ṣlība]	'the Feast of the Cross'	IV.316
/ʕēḏ-l ʕanṣar-T-a/	→	[ʕēḏəl ʕanṣarča]	'(the Feast of the) Pentecost'	III.162

(b) /ə/ Deletion analysis

/mōr-ələ xṯōb-a/	→	[mōrlə xṯōba]	'the owner of the book'	IV.40
/mōr-ələ ġaml-a/	→	[mōrəl ġamla]	'the owner of the camel'	IV.230
/ʕēḏ-ələ ṣlīb-a/	→	[ʕēḏlə ṣlība]	'the Feast of the Cross'	IV.316
/ʕēḏ-ələ ʕanṣar-T-a/	→	[ʕēḏəl ʕanṣarča]	'(the Feast of the) Pentecost'	III.162

In defense of the deletion account, one could still argue that there might be a constraint on word size which militates against having more than three syllables in a word. As a result of this constraint, the underlying /ə/ is deleted in the offending words so that the number of syllables is reduced to three. However, the fact that the schwa is retained (not deleted) in the words in (15) shows that the deletion account is not the correct one.

(15)

matərsōṯa	'schools'	FW
bisənyōṯa	'girls'	III.376
muġərfīṯa	'hoe'	III.56
žawəhrōṯa	'gems'	IV.126
ḳaməsyōṯa[11]	'shirts'	III.272

Based on the discussion above, the deletion analysis has to be rejected.

The second alternative analysis would be to consider the Maaloula Aramaic schwa an intrusive (or excrescent) vowel, rather than an epenthetic vowel. Intrusive vowels "are actually phonetic transitions between consonants" (Hall, 2006: 387). To determine whether this vowel is intrusive or not, we will use Hall's (2006: 391) diagnostics for intrusive vowels. The Maaloula Aramaic vowel in question has two of the properties of intrusive vowels. Its quality is schwa, and it is inserted optionally. However, it differs from intrusive vowels in two important aspects.

First, whereas an intrusive vowel "generally occurs in heterorganic clusters" (Hall, 2006: 391), the Maaloula Aramaic schwa occurs freely in homorganic clusters. In the examples in (16), the vowel [ə] occurs between alveolar consonants.

(16) *The vowel* [ə] *occurring in homorganic clusters*

matərsōṯa	'schools'	FW
bisənyōṯa	'girls'	III.376
ʕisər	'twenty'	III.304
irəṣ	'he/they accepted'	IV.226
warəṯṯa	'rose; flower'	VI.890

Second, whereas the intrusive vowel "does not seem to have the function of repairing illicit structures" (Hall, 2006: 391), the Maaloula Aramaic schwa clearly has the function of repairing illicit or marked structures, such as consonant clusters. Notice that in the examples in (13) and (14) above, the schwa is inserted only when a consonant cluster is formed. This ability to repair a marked structure is a property of epenthetic (rather than intrusive) vowels, according to Hall (2006: 391). Based on these diagnostics, the intrusive (or excrescent) vowel analysis has to be ruled out.

[11] It is transcribed as *ḳaməṣyōṯa* in the original text.

3. SYLLABLE-BASED ANALYSIS

In this section, we put forward an alternative syllable inventory that differs completely from the one presented by Arnold (in section 2.1). We propose that Maaloula Aramaic allows only three syllable types: CV, CVV, and CVC. This proposal is inspired by the classification of syllable types in the Arabic dialects (Kiparsky, 2003; Watson, 2002).

The various Arabic dialects can be said to fall into three major groups primarily based on the position of the epenthetic vowel in a word-medial $C_1C_2C_3$ cluster. Adopting Kiparsky's (2003) terminology, we can refer to these groups as VC-dialects, CV-dialects, and C-dialects.[12] We use the oft-cited example 'I/you (MASC SG) said to him' to show the position of the epenthetic vowel in each of these groups (see, e.g., Broselow, 1992: 23–24; Itô, 1989: 241–251; Kiparsky, 2003: 150; Selkirk, 1981: 228–231). VC-dialects, such as Iraqi Arabic, epenthesize the vowel to the left of C_2 (i.e. $C_1\underline{V}C_2C_3$) (e.g. *gíl̪tla*). CV-dialects, such as Cairene Arabic, epenthesize the vowel to the right of C_2 (i.e. $C_1C_2\underline{V}C_3$) (e.g. *ʔultl̪u*). C-dialects, such as Moroccan Arabic, tolerate CCC sequences (e.g. *qəltlu*). The difference between these dialect groups is schematized in (17).

(17) *Vowel epenthesis in a CCC cluster in different Arabic dialect groups*

VC-dialects	**CV-dialects**	**C-dialects**	
(e.g. Iraqi)	(e.g. Cairene)	(e.g. Moroccan)	
/gi**l-t-l**-a/	/ʔu**l-t-l**-u/	/qə**l-t-l**-u/	underlying forms
$C_1VC_2C_3$	$C_1C_2VC_3$	$C_1C_2C_3$	
[gí**l** l̪ **t** **l**a]	[ʔu**l** **t** l̪ **l**u]	[qə**l** **t** **l**u]	surface forms

In addition to the difference in the position of the epenthetic vowel in a CCC cluster, these three Arabic dialect groups differ in a number of other properties pointed out in Kiparsky (2003: 149–150) (see also Watson, 2007). These properties include (among other things not directly related to our research questions) the tolerance of phrase-final CC clusters, phrase-initial onset CC clusters, word-initial geminates, and non-final CVVC syllables as well as the interaction between epenthesis and stress. These properties are summarized in (18).

(18) *Some properties of the Arabic dialect groups (based on Kiparsky, 2003: 149–150)*

	Arabic VC-dialects	Arabic CV-dialects	Arabic C-dialects
Phrase-final CC	not permitted/ permitted (only with falling sonority)	permitted	permitted
Phrase-initial CC	permitted (but may be broken up by a prosthetic vowel)	not permitted	permitted
Initial geminates	permitted (but may be broken up by a prosthetic vowel)	not permitted	permitted
Non-final CVVC	permitted	shortened	permitted
Epenthesis/stress interaction	opaque	not opaque	no epenthesis

The model of classification of Arabic dialects can be applied to other Semitic languages, such as Aramaic. The analysis presented in this paper will reveal that Maaloula Aramaic shows features of both VC- and C-dialects (see section 3.7).

Following Kiparsky (2003, 1982), we argue that the phonological processes apply on two distinct levels: the lexical level and the postlexical level. We assume that, like in other languages such as Greek or Latin (e.g. Nespor and Vogel,

[12] However, this is not the only available typology. Watson (2007) identified a fourth group which displays mixed epenthesis patterns (e.g. Central Urban Sudanese). She named this group *Cv-dialects*. Lindsay-Smith (2021) presented a different phonological typology, incorporating the variation across the Arabic dialects into two axes, namely TOLERANCE and REPAIR. TOLERANCE refers to the type of syllables that these dialects tolerate, and REPAIR refers to how these dialects deal with violations of syllable structure.

2007: 110ff) the phonological word and the syntactic word coincide in Maaloula Aramaic. The syntactic word is the smallest syntactic unit (including affixes) that has a syntactic category specification, i.e. part-of-speech ("the terminal element of the syntactic tree", Nespor and Vogel, 2007: 110). The phonological word in Maaloula Aramaic is coextensive with the syntactic word and constitutes the domain in which certain phonological processes do, or do not, apply (like stress assignment or epenthesis, see below).

According to these definitions, lexemes appearing in their citation forms, as in (19a), are considered words because each of them belongs to one part of speech and has one main stress. Inflectional word forms, such as the ones in (19b), are also considered words because they are syntactic units in the above sense. At the phonological level, the word is the domain for stress assignment (see section 3.5). Epenthesis, on the other hand is a postlexical process that can be used to illustrate the different behavior of words versus clitic groups. Words starting with a CCC cluster (#CCC) differ from clitic groups which start with the same cluster (C#CC), as shown in (18c). While we see epenthesis within the CCC cluster in the clitic group, epenthesis is ruled out within the word. This will be discussed in more detail in section 4.2.1.

(19)	(a)	*ṯarəc̱*	'two (FEM)'	III.104
		tabəkṯa	'dabke (a folk dance)'	III.184
	(b)	*ġabərnō*	'men'	III.364
		mašəphōš	'she looks like you (FEM)'	IV.176
	(c)	*bə-spaʕṯa*	'with a finger'	V.39
		lə-ʕrōba	'until the evening'	III.102

The postlexical level is where processes apply across word boundaries, within the phonological phrase. We argue that in Maaloula Aramaic, syllabification and stress assignment take place at the lexical level, whereas vowel epenthesis and resyllabification apply at the postlexical level. Put differently, we show that syllabification applies cyclically, and that epenthesis takes place between two syllabification cycles.

3.1. Data and method

In order to test our syllabification scheme empirically on as many words as possible, we compiled a word list from two sources (Arnold, 1991a, 1991b) which contain the transcriptions of tape-recorded narratives that Werner Arnold collected during his field research in Maaloula between 1985 and 1987.[13] The word list consists of more than 12,000 types. However, these types are word forms rather than lexemes. Many of them are the result of inflectional and derivational affixation. Sometimes the same word form appears in different orthographic representations. This is usually due to affix allomorphy. Due to these reasons, we decided to supply each word form with its lemma and root as they appear in Arnold's (2019) Aramaic-German dictionary. This aim was achieved with the help of a native language consultant.[14]

Using a spreadsheet (like the one shown in (20)), we syllabified all the word list types according to the predefined syllables: CV, CVC and CVV. The syllabification column represents syllabification at the lexical level, so if a word contains a schwa in its surface representation, this epenthetic vowel is ignored and not represented by a V.

(20) *Extract from the syllabification spreadsheet*

Root	Lemma	Word form	Syllabification
ḏwḏ	*ḏōḏa*	*ḏaḏō*	#CV.CVV#
ḏwḏ	*ḏōḏa*	*ḏaḏōye*	#CV.CVV.CV#
ḏḥḵ	*ḏaḥaḵōna*	*ḏaḥaḵōna*	#CV.CV.CVV.CV#
ḏhb	*ḏahba*	*ḏahba*	#CVC.CV#
ḏhb	*ḏahba*	*ḏahbō*	#CVC.CVV#

[13] A digitized version of Arnold's transcriptions and the word list ("MASC_dataframe.csv") are available as part of the Maaloula Aramaic Speech Corpus (MASC) (Eid et al., 2022b) at https://doi.org/10.5281/zenodo.6496714. For more details, see Eid et al. (2022a).

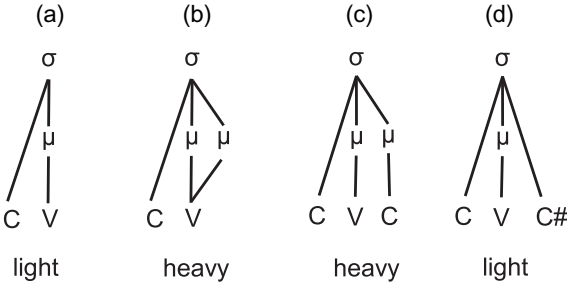
[14] Our native language consultant is a 37-year-old male who is bilingual in Maaloula Aramaic and Arabic, and also speaks English. He lived in Syria until 2018 and in Lebanon between 2018 and 2020, and has lived in Canada since 2020. He has a bachelor's degree in biology from Damascus University, and he worked as a biology teacher in Maaloula's High School before leaving his homeland. He also taught Maaloula Aramaic at the Aramaic Language Center in Maaloula and at the Higher Language Institute at Damascus University. He designed and published a textbook (Rihan, 2017) for the courses which he taught.

In addition to this word list, we conducted several elicitation sessions with the native speaker consultant.[15]

3.2. Syllable weight

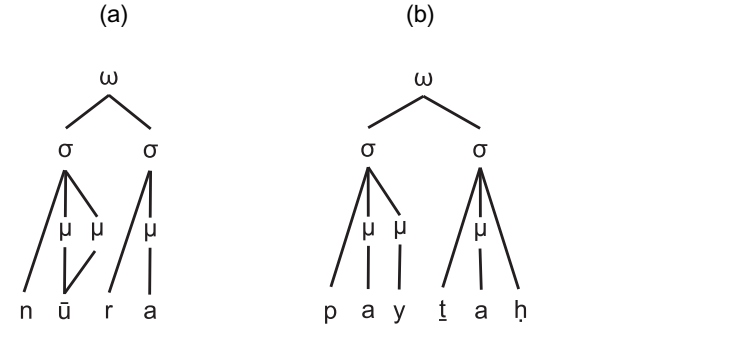
Like in Arabic, the weight of a syllable in Maaloula Aramaic plays an important role in determining the position of stress. The unit of syllable weight that we use is the mora (represented by μ). We adopt Hayes's (1989) version of moraic theory, according to which CV is considered a light syllable: its short vowel receives one mora (21a). CVV is heavy: its long vowel receives two moras (21b). CVC is heavy in a non-final position: its vowel receives one mora, and its coda consonant receives one mora through Weight-by-Position (21c). The Weight-by-Position rule is language-specific whereby CVC syllables are heavy in some languages and light in other languages (Hayes, 1989: 258). In word-final position, however, we follow Hayes (1995: 125) in assuming that CVC is light (21d). The reason for this assumption is that word-final CVC syllables would attract stress if phonologically heavy, which they don't (see section 3.5 for details on stress assignment).[16]

(21)



These three syllable types are shown in the two disyllabic words in (22). The word in (22b) consists of two CVC syllables, the first of which is heavy through Weight-by-Position while the second syllable is light because it is word-final. Throughout this paper, we mark morpheme boundaries with hyphens in the underlying representations.

(22)



[15] These elicitation sessions were held online because the authors are based in Germany and the native speaker consultant lives in Canada. In addition to these sessions, the first author and the native speaker consultant exchanged different forms of messages such as text, picture, and voice messages. These sessions and messages had the aim of generating inflectional forms which were not attested in Arnold's texts (see, e.g., the inflectional forms in Section 4.2.2) and of verifying whether the consultant will consider the variant with an epenthetic vowel to be acceptable or not.

[16] Hayes (1995: 125–129) assumes that word-final consonants are extrametrical in Palestinian Arabic. As a result of this consonant extrametricality, the coda consonant in a word-final CVC syllable is not assigned a mora. This renders word-final CVC syllables monomoraic or light.

3.3. Syllabification

Syllables in Maaloula Aramaic are formed according to the syllabification scheme in (23) which borrows elements from a number of interrelated analyses including Kahn (1976: 37–38), Clements (1990: 299), and Watson (2002: 63).

(23) *Syllabification scheme*

(a) **Nucleus formation:** Associate each [+syllabic] segment to a syllable node.

(b) **Onset formation:** Given P (an unsyllabified segment) preceding Q (a nucleus), adjoin P to the syllable containing Q.

(c) **Coda formation:** Given Q (a nucleus) followed by R (an unsyllabified segment), adjoin R to the syllable containing Q if Q is monomoraic.

The coda formation process (23c) is conditional in order to allow the formation of CVC syllables but block the formation of CVVC syllables.

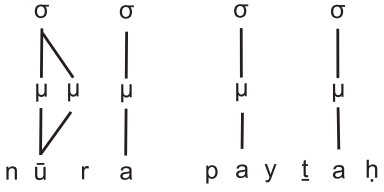
These three steps are illustrated in the syllabification of the two words *nūra* and *payṯaḥ* already introduced in (22):

(24) *Syllabification scheme exemplified*

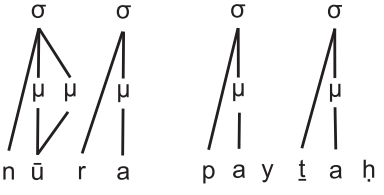
/nūr-a/ → [ˈnū.ra] ‘fire’ III.80

/payṯ-aḥ/ → [ˈpay.ṯaḥ] ‘our home’ III.60

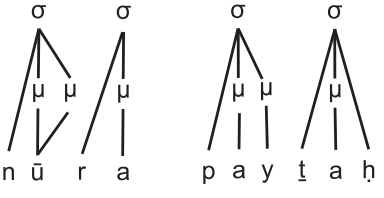
(a) Nucleus formation



(b) Onset formation



(c) Coda formation



3.4. Stray consonants

When the syllabification scheme applies, some consonants remain unsyllabified. As they are not part of syllables, they are called ‘stray consonants’ (e.g. Archangeli, 1991; Broselow, 1992; Itô, 1989; Selkirk, 1981). In Maaloula Aramaic, individual stray consonants are tolerated at the lexical level. Our data shows that these stray consonants can occur word-initially, word-medially, and word-finally as can be seen in (25). The stray consonants are given in angled brackets:

(25) *Stray consonants resulting from the application of the syllabification scheme*

(a) Word-initial stray consonants

underlying forms		lexical level		
/xt̲ōb-a/	→	[⟨x⟩.ˈt̲ō.ba]	‘book’	IV.36
/ʕṣofr-a/	→	[⟨ʕ⟩.ˈṣof.ra]	‘morning’	IV.256
/blōt-a/	→	[⟨b⟩.ˈlō.ta]	‘village’	IV.12
/mšīḥ-a/	→	[⟨m⟩.ˈšī.ḥa]	‘Christ’	III.154
/xšūr-a/	→	[⟨x⟩.ˈšū.ra]	‘wood’	IV.334

(b) Word-medial stray consonants

underlying forms		lexical level		
/nošḳ-T-a/	→	[ˈnoš.⟨ḳ⟩.t̲a]	‘kiss’	V.37
/berk-T-a/	→	[ˈber.⟨k⟩.t̲a]	‘Saint Thecla’	III.180
/ġabrn-ō/	→	[ġab.⟨r⟩.ˈnō]	‘men’	III.364
/ḥōl-T-a/	→	[ˈḥō.⟨l⟩.ča]	‘maternal aunt; stepmother’	IV.166
/ḳōḏy-a/	→	[ˈḳō.⟨ḏ⟩.ya]	‘judge’	IV.146

(c) Word-final stray consonants

underlying forms		lexical level		
/t̲arč/	→	[ˈt̲ar.⟨č⟩]	‘two (FEM)’	III.274
/ʕisr/	→	[ˈʕis.⟨r⟩]	‘twenty’	III.304
/yarḥ/	→	[ˈyar.⟨ḥ⟩]	‘months (ENUM PL)’	IV.142
/mōn/	→	[ˈmō.⟨n⟩]	‘who’	IV.296
/lōb/	→	[ˈlō.⟨b⟩]	‘if’	III.120

(d) Stray consonants in more than one position

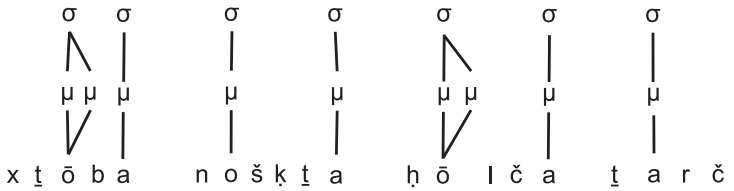
underlying forms		lexical level		
/sčafḳt-e/	→	[⟨s⟩.čaf.⟨ḳ⟩.te]	‘he checked up on him’	IV.214
/klēsy-a/	→	[⟨k⟩.ˈlē.⟨s⟩.ya]	‘church’	III.166
/t̲lēt̲/	→	[⟨t̲⟩.ˈlē.⟨t̲⟩]	‘thirty’	IV.262

In terms of moraic analysis, we follow Kiparsky (2003) in assuming that a stray consonant is associated with one mora which is adjoined not to a syllable node but to the node of a higher phonological domain (usually the phonological word).[17] This assumption is exemplified in the syllabification of four words (taken from (25)) in which the stray consonants occur in word-initial, word-medial, and word-final positions:

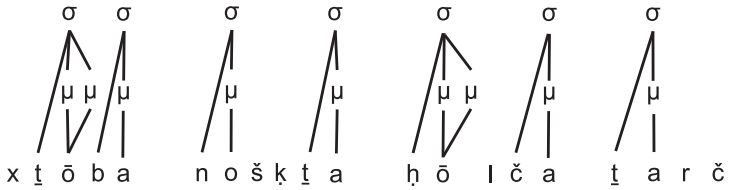
[17] Kiparsky refers to the consonants directly adjoined to the word node as *semisyllables*. However, we will keep referring to them as *stray consonants* throughout the paper.

(26) *Syllabification scheme: stray consonants involved*

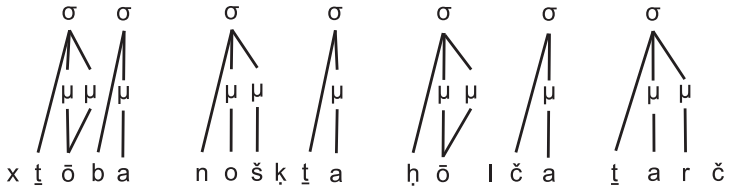
(a) Nucleus formation



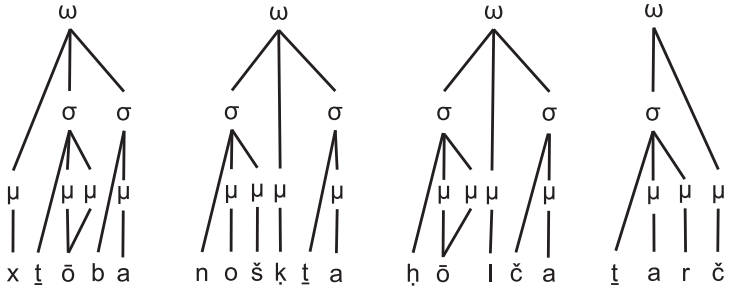
(b) Onset formation



(c) Coda formation: the remaining segments are stray consonants



(d) Association of stray consonants to word nodes



3.5. Vowel epenthesis and resyllabification

Inspired by Kiparsky's (2003: 156–157) analysis, we propose the following account of vowel epenthesis in Maaloula Aramaic. Vowel epenthesis

(a) occurs between a syllabified consonant and a following stray consonant,
(b) is a postlexical process,
(c) and occurs within and across word boundaries.

(a) Vowel epenthesis occurs between a syllabified consonant and a following stray consonant.

We saw in section 3.4 that some consonants remain extrasyllabic or stray. At the postlexical level, an epenthetic [ə] is inserted between a syllabified consonant (represented by $C]_{\sigma}$) and a following stray consonant (represented by C′). In (27), we show the difference between the rule based on consonant counting ((27a) originally introduced in (8)) and the alternative rule based on syllable structure (27b) (for a similar evaluation of Yawelmani epenthesis rules see Hayes, 2009: 264–266).

(27) *Vowel epenthesis in Maaloula Aramaic*

(a) consonant-based rule: $\emptyset \rightarrow$ ə /C__C$\left\{ \begin{matrix} \# \\ C \end{matrix} \right\}$

(b) syllable-based rule: $\emptyset \rightarrow$ ə / C]$_\sigma$___C′

Rule (27b) has many advantages over (27a), one of which is that it answers the question of what the two environments CCC and CC# have in common (the first question in section 2.3). Rule (27b) does not consider word-boundaries and focuses instead on the syllable boundary and the stray consonants remaining outside it. This also means that (27b) provides an adequate answer to the second question, which problematized the role of the syllable in the epenthesis process.

Vowel epenthesis triggers a resyllabification process in which the coda of the previous syllable becomes the onset of a new syllable whose nucleus is the epenthetic vowel and whose coda is the stray consonant. In (28), we show how epenthesis and resyllabification apply, using the same examples from (25). It can be noticed that in many words in (28) (e.g. (28a)) epenthesis does not apply even when there is a stray consonant in the word. This is because the existence of a stray consonant is not the only component of the environment C]$_\sigma$___C′. For epenthesis to take place, the stray consonant has to be preceded by a syllabified consonant.

(28) *Epenthesis and resyllabification in the environment C]$_\sigma$___C′*

(a) Word-initial stray consonants

underlying forms		lexical level		postlexical level		
/x̱ṯōb-a/	→	[⟨x⟩.ˈṯō.ba]	→	[⟨x⟩.ˈṯō.ba]	‘book’	IV.36
/ʕṣofr-a/	→	[⟨ʕ⟩.ˈṣof.ra]	→	[⟨ʕ⟩.ˈṣof.ra]	‘morning’	IV.256
/blōt-a/	→	[⟨b⟩.ˈlō.ta]	→	[⟨b⟩.ˈlō.ta]	‘village’	IV.12
/mšīḥ-a/	→	[⟨m⟩.ˈšī.ḥa]	→	[⟨m⟩.ˈšī.ḥa]	‘Christ’	III.154
/xšūr-a/	→	[⟨x⟩.ˈšū.ra]	→	[⟨x⟩.ˈšū.ra]	‘wood’	IV.334

(b) Word-medial stray consonants

underlying forms		lexical level		postlexical level		
/nošḵ-T-a/	→	[ˈnoš.⟨ḵ⟩.ṯa]	→	[ˈno.šə̱ḵ.ṯa]	‘kiss’	V.37
/berk-T-a/	→	[ˈber.⟨k⟩.ṯa]	→	[ˈbe.rə̱k.ṯa]	‘Saint Thecla’	III.180
/ġabrn-ō/	→	[ġab.⟨r⟩.ˈnō]	→	[ġa.bə̱r.ˈnō]	‘men’	III.364
/ḥōl-T-a/	→	[ˈḥō.⟨l⟩.ča]	→	[ˈḥō.⟨l⟩.ča]	‘maternal aunt’	IV.166
/ḵōḏy-a/	→	[ˈḵō.⟨ḏ̱⟩.ya]	→	[ˈḵō.⟨ḏ̱⟩.ya]	‘judge’	IV.146

(c) Word-final stray consonants

underlying forms		lexical level		postlexical level		
/ṯarč/	→	[ˈṯar.⟨č⟩]	→	[ˈṯa.rə̱č]	‘two (FEM)’	III.274
/ʕisr/	→	[ˈʕis.⟨r⟩]	→	[ˈʕi.sə̱r]	‘twenty’	III.304
/yarḥ/	→	[ˈyar.⟨ḥ⟩]	→	[ˈya.rə̱ḥ]	‘months (ENUM PL)’	IV.142
/mōn/	→	[ˈmō.⟨n⟩]	→	[ˈmō.⟨n⟩]	‘who’	IV.296
/lōb/	→	[ˈlō.⟨b⟩]	→	[ˈlō.⟨b⟩]	‘if’	III.120

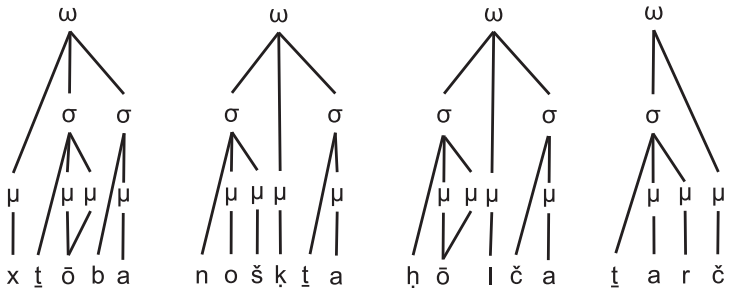
(d) Stray consonants in more than one position

underlying forms		lexical level		postlexical level		
/sčafḵt-e/	→	[⟨s⟩.čaf.⟨ḵ⟩.te]	→	[⟨s⟩.ča.fə̱ḵ.te]	‘he checked up on him’	IV.214
/klēsy-a/	→	[⟨k⟩.ˈlē.⟨s⟩.ya]	→	[⟨k⟩.ˈlē.⟨s⟩.ya]	‘church’	III.166
/ṯlēṯ/	→	[⟨ṯ⟩.ˈlē.⟨ṯ⟩]	→	[⟨ṯ⟩.ˈlē.⟨ṯ⟩]	‘thirty’	IV.262

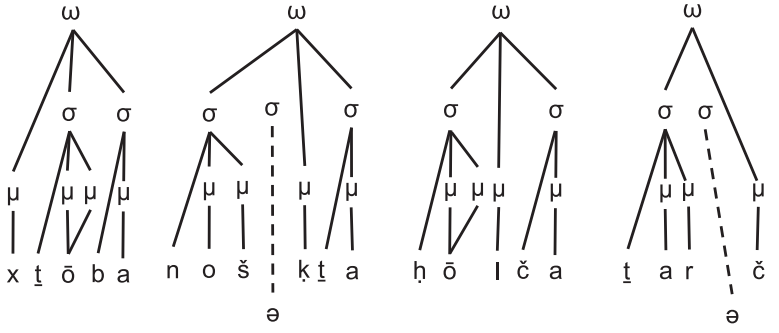
The account of epenthesis we propose is illustrated in (29) by showing the resyllabification of the same four words whose lexical syllabification has been shown in (26). In these words, the stray consonants occur in word-initial, word-medial, and word-final positions:

(29) *Epenthesis and resyllabification illustrated*

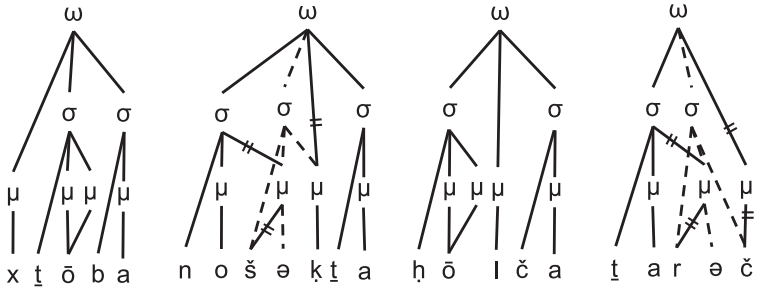
(a) Input (lexical level)



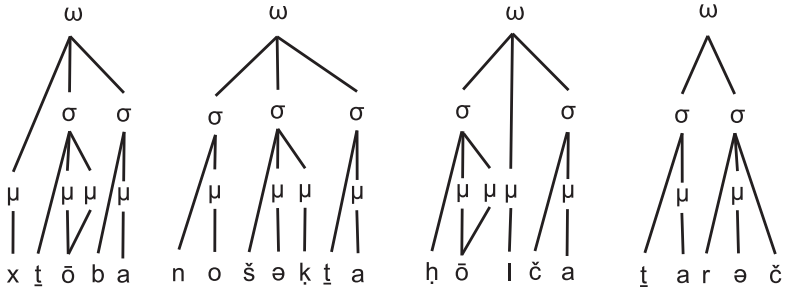
(b) Vowel epenthesis



(c) Resyllabification



(d) Output (postlexical level)



(b) Vowel epenthesis is a postlexical process.

The assumption that syllabification and stress assignment are lexical processes while epenthesis and resyllabification are postlexical processes solves the problem posed by the opaque relation between epenthesis and stress (the third question in section 2.3). The postlexically formed syllables, whose nuclei are the epenthetic vowel [ə], are not visible to stress because stress assignment applies earlier, taking only the available lexical syllables into account. In (30), for example, the postlexical syllable [šə̲ḵ]$_\sigma$ is formed too late to interact with stress.

(30)	/nošḵ-T-a/ 'kiss' V.37	underlying form
	[noš.⟨ḵ⟩.t̲a]	syllabification
	[ˈ**noš**.⟨ḵ⟩.t̲a]	**stress assignment**
	[ˈnoš.⟨ḵ⟩.t̲a]	lexical output
	[ˈnošə̲⟨ḵ⟩.t̲a]	**epenthesis**
	[ˈno.**šə̲ḵ**.t̲a]	**resyllabification**
	[ˈno.šə̲ḵ.t̲a]	postlexical output

If epenthesis and resyllabification were to apply lexically (as in (31)), then the penultimate syllable [šə̲ḵ]$_\sigma$ would be eligible for stress, and the resulting word would be *[no.ˈšə̲ḵ.t̲a].

(31)	/nošḵ-T-a/ 'kiss' V.37	underlying form
	[noš.⟨ḵ⟩.t̲a]	syllabification
	[nošə̲⟨ḵ⟩.t̲a]	**epenthesis**
	[no.**šə̲ḵ**.t̲a]	**resyllabification**
	*[no.ˈ**šə̲ḵ**.t̲a]	**stress assignment**
	*[no.ˈšə̲ḵ.t̲a]	surface form

This syllable-based analysis provides deeper insight into word stress in Maaloula Aramaic. On the one hand, it comprehensively explains the interaction between stress and syllabification, and on the other hand, it is capable of providing a stress algorithm for the language in moraic terms.[18]

(32) *Maaloula Aramaic stress algorithm (moraic version)*

(a) Stress the final syllable if it is bimoraic:

/ġabrn-ō/	→	[μμ μ μμ / ġab. ⟨r⟩. ˈnō]	'men'	III.364
/rayš-ay-n/	→	[μμ μμ μ / ray. ˈšay. ⟨n⟩]	'their heads'	III.350

(b) Otherwise stress the penultimate syllable if it is bimoraic:

/t̲arʕ-a/	→	[μμ μ / ˈt̲ar. ʕa]	'door'	IV.68
/bisnī-T-a/	→	[μμ μμ μ / bis. ˈnī. t̲a]	'girl'	IV.32
/t̲inaġel-T-a/	→	[μ μ μμ μ / t̲i. na. ˈġel. ča]	'hen'	IV.124

[18] We added (c) to the original algorithm to accommodate the polysyllabic words treated in the literature as exceptions to the stress rule (see Arnold, 1990: 41). We do not consider them exceptions since they systematically adhere to (c).

(c) If neither the final nor the penultimate syllable is bimoraic, stress the penultimate syllable in disyllabic words and stress the antepenultimate syllable in polysyllabic words:

Penultimate stress in disyllabic words:

/baḥar/	→	[μ μ ˈba. ḥar]	‘a lot; very’	III.146
/aḏab/	→	[μ μ ˈʔa. ḏab]	‘it (MASC) melted’	III.32

Antepenultimate stress in polysyllabic words:

/ʕarabeṯ/	→	[μ μ μ ˈʕa. ra. beṯ]	‘Arabic’	III.184
/ʕaly-T-a/	→	[μ μ μ ˈʕa. li. ṯa]	‘leaf’	III.154
/mi-č-rattit-in/	→	[μμ μμ μ μ mič. ˈrat. ti. tin]	‘they visit frequently’	III.260

(c) Vowel epenthesis occurs within as well as across word boundaries.

The domain of postlexical resyllabification is the phonological phrase, rather than the phonological word. Therefore, epenthesis applies whenever a stray consonant is preceded by a coda consonant even when they are separated by a word boundary, as the examples below show.

(33)

underlying form		lexical level		postlexical level	
/ex ḥmīr-a/	→	[ˈʔex#⟨ḥ⟩.ˈmī.ra]	→	[ˈʔe.xə̲ḥ.ˈmī.ra]	
				‘like dough’	III.28
/ḳalles ḏlūḳ-a/	→	[ˈḳal.les#⟨ḏ⟩.ˈlū.ḳa]	→	[ˈḳal.le.sə̲ḏ.ˈlū.ḳa]	
				‘some firewood’	IV.108
/balleš ṣyūḥ-a/	→	[ˈbal.leš#⟨ṣ⟩.ˈyū.ḥa]	→	[ˈbal.le.šə̲ṣ.ˈyū.ḥa]	
				‘he started shouting’	III.354

This assumption is also in line with the available literature on both Maaloula Aramaic and Arabic which clearly shows that word boundaries and syllable boundaries do not necessarily match (see Arnold, 1990: 39 for Maaloula Aramaic and Broselow, 2017: 36 for Arabic).

3.6. Vowel epenthesis and gemination

Maaloula Aramaic geminates occur in word-initial, word-medial, and word-final position (Arnold, 1990: 17). One important property of geminates is that they cannot be split by an epenthetic vowel. This property is called “integrity” by Hayes (1986) (see also Davis, 2011). When an underlying geminate is followed by a consonant, the sequence /GGC/ does not undergo vowel epenthesis (i.e., *[Gə̲GC]), in contrast to the sequence /CCC/ which surfaces as [Cə̲CC]. What happens instead, in Maaloula Aramaic, is that the geminate consonant /GG/ is degeminated (i.e., is realized as [C]) when it occurs in preconsonantal position (Arnold, 1990: 17), as in (34). This phenomenon is also known in other Semitic languages (see, e.g., Cowell, 1964: 27 for Damascus Arabic; Jastrow, 1993: 17 for Turoyo; Watson, 2002: 210 for San’ani Arabic).

(34) *Preconsonantal degemination*

/ḏo**kk**-T-a/	→	[ˈḏo**k**.ṯa]	‘place’	IV.306
/mʕa**rr**-T-a/	→	[⟨m⟩.ˈʕa**r**.ṯa]	‘cave’	III.368
/ša**tt**r-e/	→	[ˈša**t**.re]	‘he sent him’	IV.104
/ġa**rr**b-ičč-un/	→	[ġa**r**.ˈbič.čun]	‘I tried them (MASC)’	III.80

When geminates are at word edges (i.e., in word-initial or word-final position), the outer part of the geminate behaves as a stray consonant with regard to vowel epenthesis and resyllabification, as the examples in (35) show.

(35) *ṯarč* ***+ppō****ban* [ˈṯar.⟨č⟩# ˈ**p͡pō**.ban] → [ˈṯar.č**ə̲p**.ˈ**p**ō.ban] ‘two loaves’ III.128
*xu****ll*** *+ blatō* [ˈxu**l͡l#** ⟨**b**⟩**.**ˈ**la.tō]** → [ˈxu**l.lə̲**b.ˈla.tō] ‘all villages’ III.172

3.7. A cross-linguistic perspective

Although Maaloula Aramaic is not a variety of Arabic, it bears similarities with the surrounding Arabic dialects. This should come as no surprise, given the fact that they are all Semitic varieties, and given that Aramaic has been in contact with Arabic over many centuries. Maaloula Aramaic is more similar to VC-dialects than to CV-dialects. For example, in both Maaloula Aramaic and Damascus Arabic, the epenthetic vowel is inserted before the stray consonant (see (36)). Moreover, the relation between stress and epenthesis is opaque in both varieties because epenthesis applies postlexically (see Kiparsky, 2003: 150, 156–157).

(36)	underlying forms		lexical level		postlexical level		
Maaloula Aramaic	/ṯarč/	→	[ˈṯar.⟨č⟩]	→	[ˈṯa.rə̲č]	‘two (FEM)’	III.274
Damascus Arabic	/daras-t/	→	[da.ˈras.⟨t⟩]	→	[da.ˈra.sə̲t]	‘I studied’	(Cowell, 1964: 19)

However, in Cairene Arabic, according to Kiparsky (2003: 157) and as example (37) shows, the epenthetic vowel [i] is inserted at the lexical level immediately after the consonant that would otherwise be left unsyllabified. This is because stray consonants are not allowed to surface either lexically or postlexically. That epenthesis applies lexically makes all syllables, including the one which contains the epenthetic vowel, equally visible to stress.

(37) *Epenthesis and syllabification in Cairene Arabic (a CV-dialect)*

underlying form		surface form (lexical and postlexical)		
/bint-na/	→	[bin.ˈṯi̲.na]	‘our daughter’	(Kiparsky, 2003: 150)

On the other hand, the ability of Maaloula Aramaic to tolerate CCC sequences word-medially and word-initially (as seen in (11) above) makes it similar to the C-dialects of Arabic (see Hellmuth, 2013: 56). Since Maaloula Aramaic shows features of both VC- and C-dialects (as illustrated in (38)), we propose to call it a vC-dialect to distinguish it from VC- and C-dialects. Future research will have to determine whether further Semitic varieties belong to this category.

(38) *Maaloula Aramaic compared to the different Arabic dialect groups*

	Maaloula Aramaic	Arabic VC-dialects	Arabic CV-dialects	Arabic C-dialects
Medial CCC	surfaces as CV̲CC / CCC	surfaces as CV̲CC	surfaces as CCV̲C	surface as CCC
Phrase-final CC	variation in the application of vowel epenthesis	not permitted/ permitted (only with falling sonority)	permitted	permitted
Phrase-initial CC	permitted	permitted (but may be broken up by a prosthetic vowel)	not permitted	permitted
Initial geminates	permitted	permitted (but may be broken up by a prosthetic vowel)	not permitted	permitted
Non-final CVVC	permitted	permitted	shortened	permitted
Epenthesis/stress interaction	opaque	opaque	not opaque	no epenthesis

4. TWO ADJACENT STRAY CONSONANTS

So far, we have investigated the words which contain single stray consonants. In this section, we turn to the words which contain two adjacent stray consonants (hereafter C′C′).

Most of the words containing C′C′ in our word list are the result of morphosyntactic processes. Nearly all of the attested words are word-forms (or morphosyntactic words) rather than lexemes that can be listed as dictionary entries. This can be easily verified by checking Arnold's (2019) dictionary, in which only three of the attested words appear as lemmas. These three words are shown in (39).

(39)

underlying forms		surface forms (lexical and postlexical)		
/bōyk-T-a/	→	[ˈbō.⟨y⟩⟨k⟩.t̲a]	‘stable (for animals)’	III.366
/ṭōyf-T-a/	→	[ˈṭō.⟨y⟩⟨f⟩.t̲a][19]	‘(religious) denomination’	III.260
/mōyt-T-a/	→	[ˈmō.⟨y⟩⟨t̲⟩.t̲a][20]	‘altar table; dining table’	III.234

Apart from these three words, all the other attested words are word-forms that result from morphosyntactic processes, such as suffixation (40a-b), formation of the enumerative plural (40c), root-and-pattern morphology (e.g. inflected verbs which belong to specific verb forms, such as form I_8 (see Arnold, 1990: 93) and form I_{10} (see Arnold, 1990: 96)) (40d), and the concatenation of words in connected speech (40e).

(40) *Morphosyntactic processes leading to C′C′*

(a) **C′C′ resulting from the suffixation of *-l*[21]**

mōr-l *ḥaḳl-a* [ˈmō.⟨**r**⟩⟨**l**⟩# ˈḥaḳ.la] → [ˈmō.r̲əl.ˈḥaḳ.la]

owner-CST field-NE

‘owner of the field’ III.94

(b) **C′C′ resulting from the suffixation of *-xun* ‘your (MASC PL)’**

bawwōp-č-xun [baw.ˈwō.⟨**p**⟩⟨**č**⟩.xun]

gate-F-2M.PL

‘your (MASC PL) gate’ III.306

(c) **C′C′ resulting from enumerative plural formation**[22]

šōht-Ø [ˈšō.⟨**h**⟩⟨**t**⟩] → [ˈšō.h̲ət]

witness-EPL

‘witnesses (ENUM PL)’ III.372

(d) **C′C′ resulting from root-and-pattern morphology**[23]

nčḳ-al-l-e [⟨**n**⟩⟨**č**⟩.ˈḳal.le]

meet.PRET-3F.SG-OM-3M.SG

‘she met him’ IV.154

(e) **C′C′ resulting from the concatenation of words in connected speech**

t̲arč *d̲rōʕ-Ø* [ˈt̲ar.⟨**č**⟩**#**⟨**d̲**⟩.ˈrō.⟨ʕ⟩] → [ˈt̲ar.č**ə**d̲.ˈrō.⟨ʕ⟩]

two.F cubit-EPL

‘two cubits’ III.110

---

[19] In the original reference, it is spelled as *tōyft̲a*.

[20] This word appears as *mōyt̲t̲a* in Arnold's transcription of the narrative (III.234) but as *mayt̲t̲a* ∼ *mayt̲t̲a* in Arnold's (2019: 582) dictionary. In the example above, we cite the former. The underlying /t/ assimilates to the following [t̲].

[21] The suffix *-l* can be attached to nouns, verbs, and prepositions, connecting them to a following noun (Arnold, 1990: 19).

[22] The enumerative plural is the plural form used after numerals (Arnold, 1990: 289).

[23] Arnold (1990: 53–54) classifies Maaloula Aramaic verbs into eleven forms: I, II, III, IV, I_2, II_2, III_2, IV_2, I_7, I_8, and I_{10}. In the verbal form I_8, the infix *-č-* is inserted after the first radical (Arnold, 1990: 65). In certain inflectional forms, however, such as *nčḳalle* ‘she met him’ (whose root is *nḳy* (Arnold, 2019: 617)), the infix *-č-* is inserted after the first radical *n* and immediately before the second radical *ḳ*, resulting in a #CCC sequence. From a cross-linguistic perspective, the Maaloula Aramaic verbal form I_8 corresponds to the Arabic verbal form VIII, and the Maaloula Aramaic infix *-č-* corresponds to the Arabic infix *-t-* (see, e.g., Watson, 2002: 134).

4.1. Epenthesis in the case of C′C′

As can be seen from examples (40a, c, e) above, these C′C′ clusters rarely surface because an epenthetic vowel is usually inserted between them. This generalization can be expressed as a phonological rule:

(41) *Vowel epenthesis in case of C′C′*
Ø→ ə / C′___C′

The following words provide further examples of this rule:

(42) *Epenthesis in the environment C′___C′*

ṭaššr-īš-n-Ø	[ṭaš.ˈrī.⟨š⟩⟨n⟩] → [ṭaš.ˈrī.šn̲][24]
leave.PRET-2F.SG-LM-1SG	
‘you (FEM SG) left me’	IV.320
ẓx-īč-n-Ø	[⟨ẓ⟩.ˈxī.⟨č⟩⟨n⟩] → [⟨ẓ⟩.ˈxī.čn̲]
defeat.PRET-2M.SG-LM-1SG	
‘you (MASC SG) defeated me’	IV.138
līṭr-Ø[25]	[ˈlī.⟨ṭ⟩⟨r⟩] → [ˈlī.tə̲r]
rotl-EPL	
‘rotls (ENUM PL)’	III.274
ḥōl-č-Ø	[ˈḥō.⟨l⟩⟨č⟩] → [ˈḥō.lə̲č]
uncle-F-1SG	
‘my maternal aunt’	IV.130

Epenthesis in the environment C′___C′ can also apply across word-boundaries. This can be seen in example (40e) which is repeated below for convenience:

(43)

ṯarč	*ḏrōʕ-Ø*	[ˈṯar.⟨č⟩#⟨ḏ⟩.ˈrō.⟨ʕ⟩] → [ˈṯar.čə̲ḏ.ˈrō.⟨ʕ⟩]
two.F	cubit-EPL	
‘two cubits’		III.110

Example (43) reveals another similarity between Maaloula Aramaic and Damascus Arabic. In both varieties, if the C′C′ sequence results from the concatenation of two words in connected speech, an epenthetic vowel is inserted between them, and the two stray consonants are resyllabified around the epenthetic vowel at the postlexical level (see (44) for a Damascus Arabic example).

(44)

bənt	*ẓġīr-e*	[ˈbən.⟨t⟩#⟨ẓ⟩.ˈġī.re] → [ˈbən.tə̲ẓ.ˈġī.re]
girl	little-F	
‘a little girl’		(Cowell, 1964: 29)

Not only is the phrase *ṯarč ḏrōʕ*, given in (43), an example of epenthesis that applies across word-boundaries, but it is also an interesting case that would meet the conditions of both epenthesis rules which have been introduced in (27b)

[24] The underlying geminate /šš/ surfaces as [š] because geminates are realized as singletons in preconsonantal position (see Arnold, 1990: 17).
[25] *lītər* in the original text.

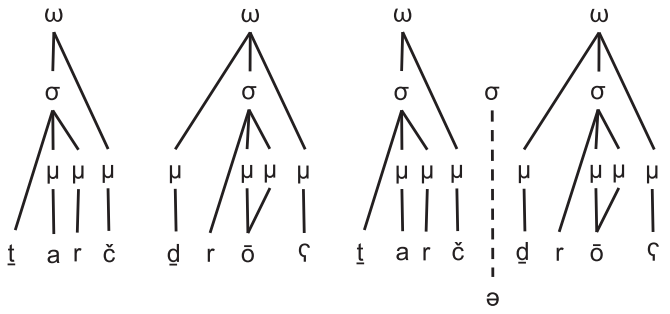
(i.e., Ø → ə / C]$_{\sigma}$___C′) and (41) (i.e., Ø → ə / C′___C′). This raises the question of why (41) is applied, and not (27b). We propose that directionality is responsible for this. According to Itô's (1989) notion of directionality, syllabification can go either from left to right in some languages (e.g. Cairene Arabic) or from right to left in other languages (e.g. Iraqi Arabic).

In Maaloula Aramaic, we clearly distinguish between lexical syllabification and postlexical resyllabification. In section 3.3, we showed that in lexical syllabification, the nucleus is formed first, then the onset, and then the coda. In other words, lexical syllabification seems to spread from the center (the nucleus) to the left (the onset) and then to the right (the coda). This means that it goes neither exclusively from left to right, nor exclusively from right to left.

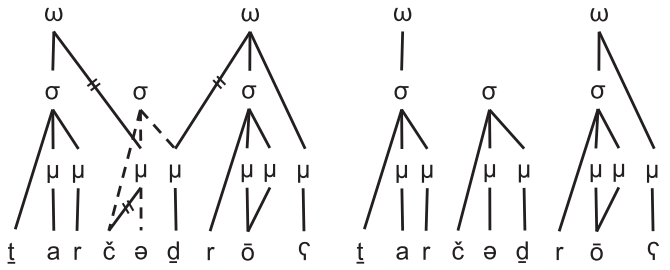
In contrast, postlexical epenthesis and resyllabification have a clear direction: right-to-left. As can be seen in (45b), the epenthetic vowel is inserted before the right stray consonant [d̲], and not before the left stray consonant [č]. The resyllabification, shown in (45c), preempts (or bleeds) the epenthesis rule in the C]$_{\sigma}$___C′ environment because [č] is no longer a stray consonant. Thus, (41) bleeds (27b).

(45) *Right-to-left resyllabification in Maaloula Aramaic*

(a) Input (lexical level) (b) Vowel epenthesis



(c) Resyllabification (d) Output (postlexical level)



4.2. C′C′ yet no epenthesis

The rule Ø → ə / C′___C′ applies to many words in Maaloula Aramaic, as the examples in the previous section show. However, this rule is blocked in certain words in which C′C′ are immediately followed by an onset consonant within the same word (i.e. #..C′C′σ..#). It is this specific environment that the four attested words in (11), repeated here as (46), have in common. These data had prompted the question as to why epenthesis is not permissible even though there is a consonant cluster (the fourth question in section 2.3):

(46) (a) word-initial CCC clusters (i.e. #CCC-)

sčfītič	(and not **sə̲čfītič*)	'you (MASC SG) benefitted'	V.39
sčfēt	(and not **sə̲čfēt*)	'benefit!'	V.39

(b) word-medial CCC clusters (i.e. -CCC-)

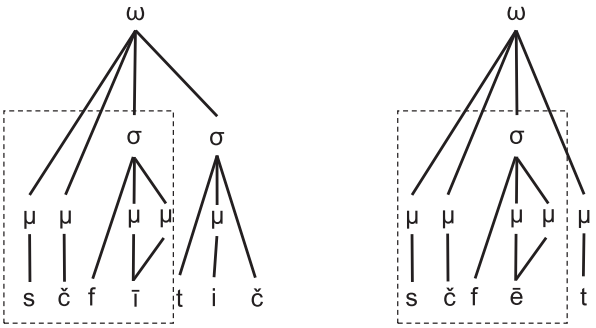
sūsčxen	(and not **sūsə̲čxen*)	'your (FEM PL) horse'	V.38
frīsčxun	(and not **frīsə̲čxun*)	'your (MASC PL) right'	V.38

By applying the syllabification scheme presented in this paper to the words in (46), one can notice the presence of the #..C′C′σ..# environment (see (47)). In these CCC clusters, C_1 and C_2 are two adjacent stray consonants, and C_3 is an onset consonant of the following syllable:

(47) *Syllabification of the words in (46)*

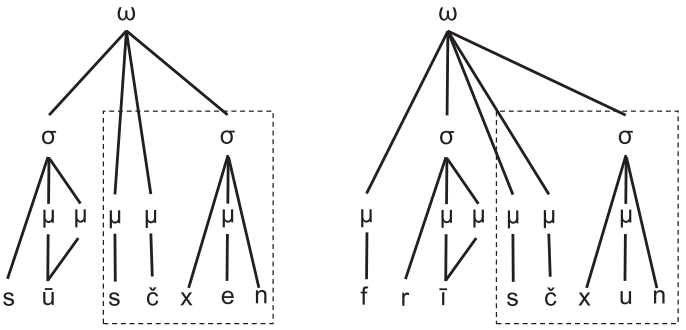
(a) word-initial CCC clusters (i.e. #CCC-)

underlying forms		lexical and postlexical forms	ungrammatical forms
/sčfīt-ič/	→	[⟨s⟩⟨č⟩.ˈfī.tič]	*[sə̲č.ˈfī.tič]
/sčfēt/	→	[⟨s⟩⟨č⟩.ˈfēt]	*[sə̲č.ˈfēt]



(b) word-medial CCC clusters (i.e. -CCC-)

underlying forms		lexical and postlexical forms	ungrammatical forms
/sūs-T-xen/	→	[ˈsū.⟨s⟩⟨č⟩.xen]	*[ˈsū.sə̲č.xen]
/frīs-T-xun/	→	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun]	*[⟨f⟩.ˈrī.sə̲č.xun]



These four examples are not the only words with the environment #..C′C′σ..# in Maaloula Aramaic. Our word list provides further examples of this epenthesis-blocking environment. A careful examination of these examples shows that they are not random exceptions as they share interesting structural properties. To lay out these properties, we will classify these words into two groups according to the position of C′C′ inside them (i.e. words with initial C′C′ and words with medial C′C′).

4.2.1. Words with initial C′C′

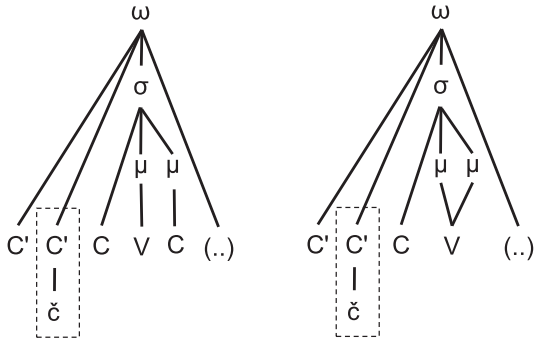
Our dataset includes 24 words with initial C′C′, in all of which C'_2 = [č]. These words are inflected forms of only seven different verbs. The words in (48) represent one example from each verb.

(48) *Structural analysis of the words with initial C′C′*

(a)	*nčḳ-al-l-e*	[⟨n⟩⟨**č**⟩.ˈḳal.le]	(*[nə̲č.ˈḳal.le])
	meet.PRET-3F.SG-OM-3M.SG		
	‘she met him’	IV.154	
(b)	*sčfēt*	[⟨s⟩⟨**č**⟩.ˈfē⟨t⟩]	(*[sə̲č.ˈfēt])
	benefit.IMP.2M.SG		
	‘benefit!’	V.39	
(c)	*sčliḳ-Ø-n-e*[26]	[⟨s⟩⟨**č**⟩.ˈliḳ.ne]	(*[sə̲č.ˈliḳ.ne])
	catch.PRET-3M.SG-LM-3M.SG		
	‘he caught it/him’	IV.240	
(d)	*ščḥ-ačč-e*	[⟨š⟩⟨**č**⟩.ˈḥač.če]	(*[šə̲č.ˈḥač.če])
	find.PRET-3F.SG-3M.SG		
	‘she found him’	IV.252	
(e)	*ščġel-l-ax*	[⟨š⟩⟨**č**⟩.ˈġel.lax]	(*[šə̲č.ˈġel.lax])
	work.IMP-OM-2M.SG		
	‘work!’	IV.108	
(f)	*xčlīf-in*	[⟨x⟩⟨**č**⟩.ˈlī.fin]	(*[xə̲č.ˈlī.fin])
	argue.PRF-M.PL		
	‘they [were/have been] arguing’		IV.86
(g)	*žčmīʕ-in*	[⟨ž⟩⟨**č**⟩.ˈmī.ʕin]	(*[žə̲č.ˈmī.ʕin])
	gather.PRF-M.PL		
	‘gathered together’		III.252

The templates in (49) represent the syllable structure of these words.

(49) *Templates of words with initial C′C′*



If this generalization is compared with what the literature says about Damascus Arabic, another similarity can be drawn. Cowell (1964: 25) indicates that word-initial CCC clusters are attested in Damascus Arabic but only in few words beginning with [st] (see (50)).

(50)

underlying forms		surface forms (lexical and postlexical)		
/strīḥ/	→	[⟨s⟩⟨t⟩.ˈrīḥ]	‘rest!’	(Cowell, 1964: 25)
/stfīd/	→	[⟨s⟩⟨t⟩.ˈfīd]	‘benefit!’	(Cowell, 1964: 25)

[26] Incorrectly written as *sčlīḳle* in the original text.

It seems that the words that begin in #C′C′ are not many in either variety, and that the segments filling the C'_2 slot are strictly limited to one specific consonant in each variety ([č] in Maaloula Aramaic and [t] in Damascus Arabic). With regard to the segments filling the C'_1 slot, they are more varied in Maaloula Aramaic than in Damascus Arabic.

4.2.2. Words with medial C′C′

The attested words with medial C′C′ are more numerous and can be further divided into two groups. The first group is the result of a productive suffixation process whereby the suffixes *-xun* 'your (MASC PL)' and *-xen* 'your (FEM PL)' are attached to base words of a specific structure. These base words are feminine nouns marked by the feminine morpheme /T/, and they have a long vowel (e.g. [ī], [ō], [ū]) in the last syllable of the base. The suffixation process concatenates C′C′ between the long vowel of the base and the consonant-initial suffix *-xun* or *-xen*. The C'_2 position is always occupied by an allomorph of the feminine morpheme /T/ (either [č] or [t̲]). The words in (51) exemplify this group.[27]

(51)	underlying forms		surface forms (lexical and postlexical)		
	/sūs-T-xen/	→	[ˈsū.⟨s⟩⟨č⟩.xen]	'your (FEM PL) horse'	V.38
	/frīs-T-xun/	→	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun]	'your (MASC PL) right'	V.38
	/bawwōb-T-xun/	→	[baw.ˈwō.⟨p⟩⟨č⟩.xun][28]	'your (MASC PL) gate'	III.306
	/ḥōl-T-xen/	→	[ˈḥō.⟨l⟩⟨č⟩.xen]	'your (FEM PL) aunt'	FW
	/ġmōʕ-T-xun/	→	[ˈ⟨ġ⟩.mō.⟨ʕ⟩⟨č⟩.xun]	'your (MASC PL) group'	FW
	/ḏōr-T-xun/	→	[ˈḏō.⟨r⟩⟨č⟩.xun]	'your (MASC PL) house'	FW
	/mḏīn-T-xun/	→	[⟨m⟩.ˈḏī.⟨n⟩⟨č⟩.xun]	'your (MASC PL) city'	FW
	/mrōy-T-xen/	→	[⟨m⟩.ˈrō.⟨y⟩⟨t̲⟩.xen]	'your (FEM PL) mirror'	FW
	/ṭulṭōy-T-xun/	→	[ṭul.ˈṭō.⟨y⟩⟨t̲⟩.xun]	'your (MASC PL) jar'	FW
	/šičwōy-T-xun/	→	[šič.ˈwō.⟨y⟩⟨t̲⟩.xun]	'your (MASC PL) winter'	FW
	/ṣayfōy-T-xun/	→	[ṣay.ˈfō.⟨y⟩⟨t̲⟩.xun]	'your (MASC PL) summer'	FW

The reason why one only finds inflectional forms with the suffixes *-xun* and *-xen*, and not with other suffixes, is that *-xun* and *-xen* are the only pronominal suffixes which begin with a consonant (see Arnold, 1990: 43 for a complete list of the pronominal suffixes). The suffixation to any other personal pronouns would not concatenate word-medial C′C′ as is shown in (52).

(52)	underlying forms		surface forms (lexical and postlexical)		
	/frīs-T-e/	→	[⟨f⟩.ˈrī.⟨s⟩.če]	'his right'	FW
	/frīs-T-a/	→	[⟨f⟩.ˈrī.⟨s⟩.ča]	'her right'	FW
	/frīs-T-un/	→	[⟨f⟩.ˈrī.⟨s⟩.čun]	'their (MASC) right'	FW
	/frīs-T-en/	→	[⟨f⟩.ˈrī.⟨s⟩.čen]	'their (FEM) right'	FW
	/frīs-T-ax/	→	[⟨f⟩.ˈrī.⟨s⟩.čax]	'your (MASC SG) right'	FW
	/frīs-T-iš/	→	[⟨f⟩.ˈrī.⟨s⟩.čiš]	'your (FEM SG) right'	FW
	/frīs-T-i/	→	[⟨f⟩.ˈrī.⟨s⟩.či]	'my right'	FW
	/frīs-T-aḥ/	→	[⟨f⟩.ˈrī.⟨s⟩.čaḥ]	'our right'	FW
	but				
	/frīs-T-xun/	→	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun]	'your (MASC PL) right'	V.38
	/frīs-T-xen/	→	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xen]	'your (FEM PL) right'	FW

The second group of words with medial C′C′ includes three feminine nouns that were originally introduced in (39) and are repeated here as (53). Unlike the words in the first group, these words are lexemes (i.e. no inflectional processes are

[27] Only three examples were found in the word list. The rest were elicited from our language consultant. Since this is a productive suffixation process, more word forms can still be generated.

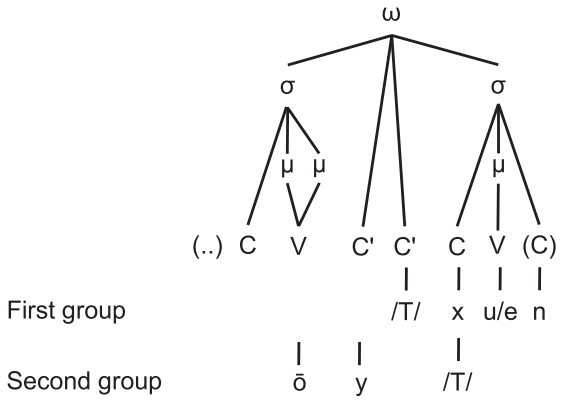
[28] /b/ is realized as [p] because it occurs before a voiceless consonant.

involved in their formation). All three words are structurally similar in that they have the long vowel [ō], C′$_1$ = [y], and the feminine marker occupies the position of the onset consonant following C′$_2$.

(53)	underlying forms		surface forms (lexical and postlexical)		
	/bōyk-T-a/	→	[ˈbō.⟨y⟩⟨k⟩.t̲a]	‘stable (for animals)’	III.366
	/ṭōyf-T-a/	→	[ˈṭō.⟨y⟩⟨f⟩.t̲a]	‘(religious) denomination’	III.260
	/mōyt-T-a/	→	[ˈmō.⟨y⟩⟨t̲⟩.t̲a]	‘altar table; dining table’	III.234

The structure of these two groups can be summarized by the template shown in (54).

(54) *Template of words with medial C′C′*



From a comparative perspective, this is where Maaloula Aramaic differs completely from Damascus Arabic (see the examples in (55)). In Damascus Arabic, an epenthetic vowel is inserted between two potential word-medial stray consonants (e.g. between [t] and [l] in [ka.tab.ˈtəl.ha] and in [⟨f⟩.ḍī.ˈtəl.kon]). The first example (i.e. [ka.tab.ˈtəl.ha]) is from Broselow (1992: 41) and Kiparsky (2003: 164), and the second example (i.e. [⟨f⟩.ḍī.ˈtəl.kon]) is from the authors. As Kiparsky (2003: 163) explains, this epenthesis must apply lexically, which explains why in these examples the syllable [tə̲l]$_σ$ receives primary stress. If epenthesis applied postlexically (as it does in the case of single stray consonants), then this syllable would be invisible to stress, but this is obviously not the case. Maaloula Aramaic, however, does not seem to allow lexical epenthesis, which also means that it does not allow any interaction between epenthesis and stress. Nor does it allow postlexical epenthesis in the #..C′C′σ..# environment. Therefore, /frīs-T-xun/ surfaces as [⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun] at the lexical and postlexical levels.

(55)	underlying forms		surface forms (lexical and postlexical)	
Damascus Arabic	/katab-t-l-ha/	→	[ka.tab.ˈtəl.ha] *[ka.tab.⟨t⟩⟨l⟩.ha]	‘I wrote to her’
	/fḍī-t-l-kon/	→	[⟨f⟩.ḍī.ˈtəl.kon] *[⟨f⟩.ḍī.⟨t⟩⟨l⟩.kon]	‘(now) I have time for you (PL)’[29]
Maaloula Aramaic	/frīs-T-xun/	→	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun] *[⟨f⟩.rī.ˈsə̲č.xun]	‘your (MASC PL) right’ V.38

5. SUMMARY AND DISCUSSION

The main goal of this paper was to examine syllable structure and syllabification in Maaloula Aramaic from a cross-linguistic perspective. We have proposed a syllable-based analysis that draws on previous analyses of similar phonological processes in Arabic. Our analysis successfully addresses most of the gaps and shortcomings of previous anal-

[29] Literally: ‘I’ve become free (of my obligations) to deal with you / attend to you.’

yses. It highlights the role of the syllable and syllabic structure, rather than that of the segment or of the word boundary, in the vowel epenthesis process and also accounts for the opaque relation between epenthesis and stress.

The proposed approach can be summarized as follows. Maaloula Aramaic allows only three syllable types: CV, CVV, and CVC. These three syllable types are the result of a syllabification process which takes place at the lexical level. The unsyllabified consonants, called 'stray consonants', are tolerated at the lexical level. At the postlexical level, an epenthetic vowel [ə ∼ i] is inserted between a stray consonant (C′) and the preceding coda consonant. Epenthesis triggers a resyllabification process in which the coda of the preceding syllable becomes the onset of a new syllable, the epenthetic vowel becomes the nucleus, and the stray consonant becomes the coda. These postlexically formed syllables are not visible to stress because stress rules are lexical.

If a morphosyntactic process leads to the concatenation of two stray consonants (C′C′), an epenthetic vowel is usually inserted between them. This epenthesis is blocked, however, in words with specific structural properties in which C′C′ are followed by an onset consonant within the same word (i.e., when the C′C′ sequence is in non-final position).

In summary, vowel epenthesis in Maaloula Aramaic applies according to the following rules:

Ø → ə / C]$_{\sigma}$___C′
Ø → ə / C′___C′ (exceptions are attested, but they are not random)
Insert an epenthetic vowel between a stray consonant and a preceding coda consonant, or between two stray consonants, except in words with specific structural properties in which the C′C′ sequence is in non-final position.

These rules are exemplified in (56):

(56) *Syllabification, epenthesis, and resyllabification exemplified*

/nūr-a/	/nošk̠-T-a/	/t̲arč # d̲rōʕ/	/frīs-T-xun/	underlying forms
'fire' III.80	'kiss' V.37	'two cubits' III.110	'your right' V.38	
[nū.ra]	[noš.⟨k̠⟩.t̲a]	[t̲ar.⟨č⟩#⟨d̲⟩.rō.⟨ʕ⟩]	[⟨f⟩.rī.⟨s⟩⟨č⟩.xun]	syllabification
[ˈnū.ra]	[ˈnoš.⟨k̠⟩.t̲a]	[ˈt̲ar.⟨č⟩#⟨d̲⟩.ˈrō.⟨ʕ⟩]	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun]	stress assignment
[ˈnū.ra]	[ˈnoš.⟨k̠⟩.t̲a]	[ˈt̲ar.⟨č⟩#⟨d̲⟩.ˈrō.⟨ʕ⟩]	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun]	lexical forms
–	[ˈnošə̲⟨k̠⟩.t̲a]	[ˈt̲ar.⟨č⟩#ə̲⟨d̲⟩.ˈrō.⟨ʕ⟩]	–	epenthesis
–	[ˈno.šə̲k̠.t̲a]	[ˈt̲ar.čə̲d̲.ˈrō.⟨ʕ⟩]	–	resyllabification
[ˈnū.ra]	[ˈno.šə̲k̠.t̲a]	[ˈt̲ar.čə̲d̲.ˈrō.⟨ʕ⟩]	[⟨f⟩.ˈrī.⟨s⟩⟨č⟩.xun]	postlexical forms

This derivation shows that a word-medial CCC sequence can either show epenthesis, or not. For instance, in the word /nošk̠-T-a/ 'kiss' epenthesis applies, while in /frīs-T-xun/ 'your right' epenthesis is blocked. What is responsible for this variation? In both words, C_3 is syllabified as an onset and C_2 remains unsyllabified (i.e., a stray consonant). However, the two words differ in the syllabification of C_1, which is a coda in [no**š**.⟨k̠⟩.t̲a] and a stray consonant in [⟨f⟩.rī.⟨**s**⟩⟨č⟩.xun]. In [noš.⟨k̠⟩.t̲a], since C_2 is a stray consonants preceded by a coda consonant, epenthesis can apply. In [⟨f⟩.rī.⟨s⟩⟨č⟩.xun], C_1 and C_2 are stray consonants, but since both of them are in non-final position, epenthesis is blocked.

There is another interesting problem concerning the status of [č] as C'_2. The examples presented so far in which epenthesis is blocked may suggest that it is enough to have a C′C′ sequence in which C'_2 is [č] to block epenthesis. But this is not true. Rather, even if C'_2 is [č], epenthesis is blocked only in the #..$C'_1C'_2\sigma$..# environment. In other words, for epenthesis to be blocked, neither C'_1 nor C'_2 may occur in word-final position. For example, epenthesis is not blocked in the examples in (57) although they have the sequence $C'_1C'_2$ and C'_2 is [č]. It is not blocked because C'_1 is in word-final position in (57a), and because C'_2 is in word-final position in (57b). Note that clitic groups (i.e. clitics and their hosts, such as the first example) are treated as two separate words in this work (see the rationale in the introduction of section 3).

(57) *Vowel epenthesis although C′$_2$ is* [č]

(a) C′$_1$ in word-final position

b=čbōr-ṯ *ṯarʕ-a* [⟨**b**⟩#⟨**č**⟩.ˈbō.⟨r⟩⟨l⟩#ˈṯar.ʕa] → [**bə̲č**.ˈbō.rɪ̯ṯ ˈṯar.ʕa][30]

with=breaking-CST door-NE

'by breaking the door' (Arnold, 2002: 32)

y-īb-Ø *č-naḥḥeč-Ø* [ˈyī.⟨**b**⟩#⟨**č**⟩.ˈnaḥ.ḥeč] → [ˈyī.**bə̲č**.ˈnaḥ.ḥeč]

3-be.SBJV-M.SG 2-go down.PRF-M.SG

'then you (MASC SG) must be going down' IV.250

(b) C′$_2$ in word-final position

ḥōl-č-Ø [ˈḥō.⟨**l**⟩⟨**č**⟩] → [ˈḥō.**lə̲č**]

uncle-F-1SG

'my maternal aunt' IV.130

frīs-č-Ø [⟨f⟩ˈrī.⟨**s**⟩⟨**č**⟩] → [⟨f⟩ˈrī.**sə̲č**]

right-F-1SG

'my right' FW

6. IMPLICATIONS

From a typological perspective, we can say that Maaloula Aramaic and Damascus Arabic (a VC-dialect of Arabic) are similar in their treatment of single C′s, of two adjacent C′C′ resulting from the concatenation of words in connected speech, and (to some extent) of word-initial C′C′. They are also similar with respect to the relation between epenthesis and stress. However, in the words containing word-medial C′C′, Maaloula Aramaic and Damascus Arabic exhibit major dissimilarities in terms of epenthesis and epenthesis-stress interaction.

This study has implications for the areas of syllable structure and vowel epenthesis in phonological theory. Our results support syllable-based accounts of epenthesis (e.g. Broselow, 1992; Itô, 1989; Kiparsky, 2003; Selkirk, 1981; Watson, 2007, 2002), and they challenge accounts which claim that epenthesis can be accounted for purely by sequential constraints (e.g. Côté, 2000) or by segmental constraints. For example, vowel epenthesis, in Maaloula Aramaic, does not apply to prohibit two identical or similar segments from being adjacent, which would be expected according to the Obligatory Contour Principle (OCP) (see Goldsmith, 1976; Leben, 1973; McCarthy, 1986, 1979). If this were the case, then the epenthetic vowel would be inserted whenever any two similar segments are adjacent (regardless of their position in the syllable) and not strictly in the C]$_\sigma$___C′ and C′___C′ environments. For instance, the epenthetic vowel would be inserted in the C′___[$_\sigma$C environment if the conditions were met, but this is clearly not the case. Having said that, we are not arguing that segmental effects do not exist or do not play any role in vowel epenthesis. Their effect has been shown on two occasions in this paper. First, we have noted in section 2.3 that segmental constraints (especially sonority) may be responsible for the optionality in the application of vowel epenthesis. Second, we have shown that the words which resist epenthesis share structural and segmental properties.

Our study also calls into question two cross-linguistic assumptions about stray (or extrasyllabic) consonants by Kiparsky (2003: 156). Kiparsky claimed that stray consonants (or "semisyllables" in his terms) have a "restricted segmental inventory" (Kiparsky, 2003: 156). Although this may be true for a number of languages, such as English (see, e.g., Giegerich, 1992, chap. 6) and German (see, e.g., Wiese, 1992), this is not a property of Maaloula Aramaic stray

[30] The suffix *-l* in /čbōr-**l**/ assimilates completely to the following coronal consonant /ṯ/ in /ṯarʕ–a/ (see Arnold, 1990: 19; Spitaler, 1938: 34–35).

consonants. In Maaloula Aramaic, the segments that may occur as stray consonants do not belong to a specific subset of consonants, as the examples in (58) illustrate.

(58) *Some of the segments that may occur as stray consonants in Maaloula Aramaic*

(a)	Labials:		
	loʕəptə	'game; toy'	IV.16
	soləftə[31]	'story'	IV.140
	zaləmtə	'man'	IV.142
(b)	Coronals:		
	akətrit	'I was able (to)'	III.56
	imət	'he arrived'	IV.116
	irəṣ	'he accepted'	IV.226
	mofəčḥa	'key'	IV.70
	bisənyōtə	'girls'	III.376
	ʕisər	'twenty'	III.304
(c)	Dorsals:		
	šabəktə	'net'	IV.58
	sčafəḳte	'he checked up on him'	IV.214
(d)	Pharyngeals:		
	yarəḥ	'months (ENUM PL)'	IV.142
	ačəʕbat	'she felt tired'[32]	IV.24
(e)	Glottals:		
	iṣəh	'he felt thirsty'	III.360
	žawəhrōtə	'gems; jewels'	IV.126

The other cross-linguistic assumption made by Kiparsky states that stray consonants are "sometimes restricted to peripheral position (typically word edges)" (Kiparsky, 2003: 156). Although many of the stray consonants in our data can be analyzed as domain-peripheral (i.e., word-peripheral or morpheme-peripheral), there are many other examples of words with word-internal or even morpheme-internal stray consonants, as the ones shown in (59). We believe that stray consonants in Maaloula Aramaic are the result of syllabification and not the result of any alignment constraint which would align stray consonants with word or morpheme edges (for such constraints see, e.g., Cho and King, 2003).

(59) *Words with morpheme-internal stray consonants*

y-aḥšm-un [ˈyaḥ.⟨š⟩.mun] → [ˈya.ḥəš.mun]
3-have dinner.SBJV-M.PL
'(that) they (MASC) have dinner' III.258

Ø-m-ašph-ō-š [ˈmaš.⟨p⟩.hō.⟨š⟩] → [ˈma.šəp.hō.⟨š⟩]
3-PRS-resemble-F.SG-2F.SG
'she looks like you (FEM SG)' IV.176

In addition to these typological and theoretical aspects, the present study represents a detailed case study of an under-researched language using corpus data, empirical methodology, and universal frameworks, such as moraic phonology. Such theoretically informed case studies involving large amounts of data are necessary to enhance our typological and theoretical understanding of vowel epenthesis cross-linguistically.

[31] It is transcribed as *sōləftə* in the original text.
[32] This is the literal meaning. In the narrative, the intended (figurative) meaning was that the situation 'has become bad'.

7. ABBREVIATIONS

ENUM PL	enumerative plural
FEM	feminine
MASC	masculine

8. GLOSS LABELS

1	first person
2	second person
3	third person
Ø	zero morpheme
CST	construct state
EPL	enumerative plural
F	feminine
IMP	imperative
LM	linking morpheme
M	masculine
NE	nominal ending
OM	object marking
PL	plural
PRET	preterit
PRF	perfect
PRS	present
SBJV	subjunctive
SG	singular

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability

Data will be made available on request.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ACKNOWLEDGEMENTS

We would like to thank our colleagues at Heinrich-Heine-Universität Düsseldorf, especially Christian Uffmann and Ruben van de Vijver, for their constructive feedback. We would also like to thank the editor-in-chief, Marta Dynel, and the two anonymous reviewers for their comments and suggestions on previous versions of this paper. We are grateful to the audience at the 26th Central European Summer School in Generative Grammar, Wroclaw, 29 July – 9 August 2019, especially David Odden, to the audience at the Phonetik und Phonologie Tagung, Düsseldorf, 25–27 September 2019, especially Emily Lindsay-Smith, and to the audience at the 28th Manchester Phonology Meeting, 26–28 May

2021. We are also grateful to our native language consultant, Emad Rihan, for his help with the data and elicitation sessions.

References

Archangeli, D., 1991. Syllabification and prosodic templates in Yawelmani. Nat. Lang. Linguist. Theory 9, 231–283.
Arnold, W., 1990. Das Neuwestaramäische: V. Grammatik. Otto Harrassowitz, Wiesbaden.
Arnold, W., 1991a. Das Neuwestaramäische: III. Volkskundliche Texte aus Maʿlūla. Otto Harrassowitz, Wiesbaden.
Arnold, W., 1991b. Das Neuwestaramäische: IV. Orale Literatur aus Maʿlūla. Otto Harrassowitz, Wiesbaden.
Arnold, W., 2002. Neue Lieder aus Maʿlūla. In: Arnold, W., Bobzin, H. (Eds.), „Sprich Doch Mit Deinen Knechten Aramäisch, Wir Verstehen Es!" 60 Beiträge Zur Semitistik. Festschrift Für Otto Jastrow Zum 60. Geburtstag. Harrassowitz, Wiesbaden, pp. 31–52.
Arnold, W., 2011. Western Neo-Aramaic. In: Weninger, S., Khan, G., Streck, M.P., Watson, J.C.E. (Eds.), The Semitic Languages. An International Handbook. De Gruyter Mouton, Berlin, Boston, pp. 685–696.
Arnold, W., 2019. Das Neuwestaramäische: VI. Wörterbuch. Harrassowitz, Wiesbaden.
Bergsträsser, G., 1915. Neuaramäische Märchen und andere Texte aus Maʿlūla. F.A. Brockhaus, Leipzig.
Blevins, J., 1995. The syllable in phonological theory. In: Goldsmith, J.A. (Ed.), The Handbook of Phonological Theory. Blackwell, Oxford, pp. 206–244.
Broselow, E., 1992. Parametric variation in Arabic dialect phonology. In: Broselow, E., Eid, M., McCarthy, J. (Eds.), Perspectives on Arabic Linguistics IV. John Benjamins, Amsterdam, pp. 7–45.
Broselow, E., 2017. Syllable structure in the dialects of Arabic. In: Benmamoun, E., Bassiouney, R. (Eds.), The Routledge Handbook of Arabic Linguistics. Routledge, pp. 32–47.
Cho, Y.Y., King, T.H., 2003. Semisyllables and universal syllabification. In: Féry, C., van de Vijver, R. (Eds.), The Syllable in Optimality Theory. Cambridge University Press, Cambridge, pp. 183–212.
Clements, G.N., 1990. The role of the sonority cycle in core syllabification. In: Kingston, J., Beckman, M.E. (Eds.), Papers in Laboratory Phonology 1: Between the Grammar and Physics of Speech. Cambridge University Press, Cambridge, pp. 283–333.
Correll, C., 1978. Untersuchungen zur Syntax der neuwestaramäischen Dialekte des Antilibanon: (Maʿlūla, Baḫʿa, Ǧubbʿadīn); mit besonderer Berücksichtigung der Auswirkungen arabischen Adstrateinflusses; nebst zwei Anhängen zum neuaramäischen Dialekt von Ǧubbʿadīn., Abhandlungen für die Kunde des Morgenlandes. Steiner, Wiesbaden.
Côté, M.-H., 2000. Consonant cluster phonotactics: A perceptual approach (Doctoral dissertation). MIT, Cambridge, Massachusetts.
Cowell, M.W., 1964. A reference grammar of Syrian Arabic. Georgetown University Press, Washington, DC.
Davis, S., 2011. Geminates. In: van Oostendorp, M., Ewen, C.J., Hume, E., Rice, K. (Eds.), The Blackwell Companion to Phonology. Wiley-Blackwell, Malden, MA & Oxford, pp. 873–897.
Eberhard, D.M., Simons, G.F., Fennig, C.D. (Eds.), 2023. Ethnologue: Languages of the world. 26th ed. SIL International, Dallas, Texas.
Eid, G., Seyffarth, E., Plag, I., 2022a. The Maaloula Aramaic Speech Corpus (MASC): From printed material to a lemmatized and time-aligned corpus. In: Proceedings of the 13th Conference on Language Resources and Evaluation (LREC 2022). Marseille, pp. 6513–6520.
Eid, G., Seyffarth, E., Rihan, E., Arnold, W., Plag, I., 2022b. The Maaloula Aramaic Speech Corpus (MASC).
Giegerich, H.J., 1992. English Phonology: An Introduction. Cambridge University Press, Cambridge.
Goldsmith, J.A., 1976. Autosegmental Phonology (Doctoral dissertation). MIT, Cambridge, Massachusetts.
Hall, N., 2006. Cross-linguistic patterns of vowel intrusion. Phonology 23, 387–429.
Hall, N., 2011. Vowel epenthesis. In: van Oostendorp, M., Ewen, C.J., Hume, E., Rice, K. (Eds.), The Blackwell Companion to Phonology. Wiley-Blackwell, Malden, MA & Oxford, pp. 1576–1596.
Hayes, B., 1986. Inalterability in CV phonology. Language 62, 321–351.
Hayes, B., 1989. Compensatory lengthening in moraic phonology. Ling. Inq. 20, 253–306.
Hayes, B., 1995. Metrical Stress Theory: Principles and Case Studies. University of Chicago Press, Chicago.
Hayes, B., 2009. Introductory Phonology. Wiley-Blackwell, Malden, MA.
Heinrichs, W., 1990. Introduction. In: Heinrichs, W. (Ed.), Studies in Neo-Aramaic. Scholars Press, Atlanta, Georgia, pp. ix–xvii.
Hellmuth, S., 2013. Phonology. In: Owens, J. (Ed.), The Oxford Handbook of Arabic Linguistics. Oxford University Press, Oxford, pp. 45–70.
Itô, J., 1989. A prosodic theory of epenthesis. Nat. Lang. Linguist. Theory 7, 217–259.
Jastrow, O., 1993. Laut- und Formenlehre des neuaramäischen Dialekts von Mīdin im Ṭūr ʿAbdīn. Harrassowitz, Wiesbaden.
Kahn, D., 1976. Syllable-based Generalizations in English Phonology (Doctoral dissertation). MIT, Cambridge, Massachusetts.
Kiparsky, P., 1982. Lexical morphology and phonology. In: Yang, I.-S. (Ed.), Linguistics in the Morning Calm. Hanshin, Seoul, pp. 3–91.
Kiparsky, P., 2003. Syllables and moras in Arabic. In: Féry, C., van de Vijver, R. (Eds.), The Syllable in Optimality Theory. Cambridge University Press, Cambridge, pp. 147–182.
Leben, W.R., 1973. Suprasegmental Phonology (Doctoral dissertation). MIT, Cambridge, Massachusetts.

Lindsay-Smith, E., 2021. A Phonological Typology of Modern Arabic Varieties. University of Oxford, Doctoral dissertation)..
McCarthy, J.J., 1979. Formal Problems in Semitic Phonology and Morphology (Doctoral dissertation). MIT, Cambridge, Massachusetts.
McCarthy, J.J., 1986. OCP effects: Gemination and antigemination. Ling. Inq. 17, 207–263.
Nespor, M., Vogel, I., 2007. Prosodic Phonology. Walter de Gruyter, Berlin, New York.
Rihan, E., 2017. Aramiyyat Maaloula al-muqaddasa: Al-aramiyya al-gharbiyya al-haditha [The holy Aramaic language of Maaloula: Western Neo-Aramaic]. Muassasat Maaloula, Damascus.
Selkirk, E., 1981. Epenthesis and degenerate syllables in Cairene Arabic. In: Borer, H., Aoun, Y. (Eds.), Theoretical Issues in the Grammar of Semitic Languages. MIT, Cambridge, Massachusetts.
Spitaler, A., 1938. Grammatik des neuaramäischen Dialekts von Maʿlūla (Antilibanon). Leipzig, F.A, Brockhaus.
Watson, J.C.E., 2002. The Phonology and Morphology of Arabic. Oxford University Press, Oxford.
Watson, J.C.E., 2007. Syllabification patterns in Arabic dialects: long segments and mora sharing. Phonology 24, 335–356.
Wiese, R., 1992. Was ist extrasilbisch im Deutschen und warum? In: Ramers, K.-H., Wiese, R. (Eds.), Prosodische Phonologie, Zeitschrift Für Sprachwissenschaft. Vandenhoeck und Ruprecht, Göttingen, pp. 112–133.