Syllabification and Schwa Epenthesis in Kabyle*

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SUMMARY

This paper deals with the phonology of Kabyle, a Berber language, in particular its syllabification and the status of schwa. By analyzing words elicited from a native speaker of Kabyle, I will show that the language tolerates complex onsets but not complex codas in monomorphemic words, and that the occurrences of complex codas in suffixed or cliticized words are restricted by certain phonological principles. In addition, by analyzing the distribution of schwa, I propose that all schwas are epenthesized to repair ill-formed consonant clusters.

RÉSUMÉ

Cet article aborde des questions de phonologie en Kabyle, une langue Berbère, en particulier, la syllabation et le statut de schwa. En analysant les mots recueillis d'une locatrice native de Kabyle, je démontrerai que cette langue permet les attaques ramifiées mais interdit les codas ramifiées, dans les mots formés par seulement un morphème. Je démontrerai aussi que les codas ramifiées dans les mots avec plus d'un morphème sont restreintes par certains principes phonologiques. De plus, en analysant la distribution de schwa, je propose que tous les schwas sont insérés pour séparer un groupe de consonnes.

1 INTRODUCTION

1.1 PREVIEW OF PUZZLES AND PROPOSALS

When syllabifying strings of segments in underlying representation, languages vary in their behaviors because they abide by different sets of principles and constraints. For example,

* Thanks to Sadia for sharing her knowledge about Kabyle and for her patient and tireless help in all of the elicitation sessions inside and outside of class.

McGill Working Papers in Linguistics, 26.1, 2020

languages like Chinese and Japanese strictly prohibit the formation of complex onsets and codas, whereas the same structure is well-formed in English and French. In addition, languages employ different strategies to repair ill-formed syllables. The epenthesis of vowels, particularly of schwa, is one commonly-used option to fix undesirable consonant clusters.

Kabyle, an Algerian Berber language, is worth-studying in these respects: earlier research shows that Kabyle is relatively tolerant in terms of constraints on syllabification compared to other languages (Hoff 2016), and that schwa epenthesis is used to avoid violations of syllable-building rules (Bader 1985). This paper attempts to address puzzles that remain in two aspects. Firstly, what are the possible syllables in Kabyle, and how are they restricted? Secondly, are all schwas in Kabyle epenthetic, and how does the constraints on syllabification regulate their distribution? In order to simplify the analysis, only monomorphemic words are considered in the analysis of schwa. It is logically possible for affixation and cliticization to occur before or after syllabification and schwa epenthesis, so these processes need to be treated separately.

The main proposals of this paper are as follows: regarding the first question, I propose that the syllable template in Kabyle is (C)(C)V(C) for monomorphemic words, and (C)(C)V(C)(C) for suffixed words, where elements in parentheses are optional. Furthermore, two constraints related to sonority are analyzed. The Sonority Sequencing Principle (Clements, 1990) (henceforth the SSG), with an entire syllable as its domain, requires that elements before the nucleus rise in sonority and those after it falls. It is proposed that in Kabyle, complex onsets do not need to obey the SSG, but complex codas in suffixed words must be falling or flat in sonority. The other constraint being analyzed is the Syllable Contact Law (Vennemann, 1988) (henceforth the SCL), which requires that coda-onset clusters have a falling sonority profile. It is proposed in this paper that Kabyle freely violates the SCL. As for the second question, it is proposed that all schwas emerge due to the phonological process of epenthesis, in order to repair ill-formed syllables.

1.2 IMPLICATIONS

The proposals of this paper lead to several important implications. First of all, Hoff (2016) observes that Kabyle, similar to many other neighbouring Berber and Arabic languages, abide to the SSP to a smaller degree than many of the world's languages. This paper demonstrates that Kabyle also freely violates the SCL, even when there exist alternative forms of syllabification that circumvent the violation. Therefore, one may arrive at the conclusion that Arabic and Berber languages are relatively free in their syllable-building processes compared to other languages of the world, at least in terms of sonority.

This paper also demonstrates that Kabyle uses schwa epenthesis to repair ill-formed or unpreferable syllables. Schwa epenthesis is a repair strategy that is widely employed by the world's languages, including many Berber languages and some modern Arabic dialects such as Maghreb (Lahrouchi 2018). Given that Berber and Arabic have been in strong and continual contact, the presence of schwa epenthesis in the two languages may be a sociolinguistic result of their mutual influences. The origin and direction of this influence, though, remain open for discussion.

Finally, data presented in this paper confirm the special phonological status of geminates: they cannot be analysed simply as two identical segments adjacent to each other. Geminates often behave differently from regular consonant clusters. For example, epenthesis into geminates is universally undesirable. In Kabyle, it will be shown that geminates are never epenthesized, and

that they may not be syllabified into different syllables.

1.3 ORGANIZATION

The rest of the paper will be structured as follows: in section 2, I present the puzzles that need to be clarified, by listing some data on syllabification and on the distribution of schwa that are collected during elicitation. The proposals for this paper and their theoretical motivations are also explained in more details, followed by specific predictions that stem from the proposals. In section 3, evidence is presented to support both of the main proposals. Section 4 provides a brief summary of the ideas in this paper. It compares the present account to those in earlier studies on the same topic, discusses limitations of this paper, and provides directions for future research.

2 EXPLANATION OF PROPOSALS

Data presented in this section serve to introduce relevant knowledge on Kabyle that we are already equipped with, and they lead to further puzzles that need to be resolved. The two major proposals and the predictions are discussed in detail.

2.1 THE CURRENT DATA

2.1.1 DATA ON SYLLABLE STRUCTURE

It is observed that complex onsets are permitted in Kabyle. Examples of words containing complex onsets and their glosses are provided in (1). These words all contain consonant clusters at word-initial positions, so the only option for syllabification is to form complex onsets.

In the data obtained from elicitation, complex codas are never found in monomorphemic words. However, they are permitted in words marked for the feminine gender or for person. Examples of such words containing complex codas are provided in (2). All of the words contain the feminine suffix [-θ], which becomes [-t] after [n] or [l].

(1) Examples of words with complex onsets
- a. [*tsq*aʃir] ‘socks’
- b. [*zð*ɛθ] ‘front’
- c. [*zn*əzja] ‘earthquake”
- d. [*ðˤsˤ*an] ‘They laughed.’ (m.)

(2) Examples of words with complex codas
- a. [θaqʃi*/θ*] “girl” (f.)
- b. [θaqəndˤo*rˤθ*] “dress” (f.)
- c. [θaxxa*mθ*] “room” (f.)
- d. [ðˤsˤa*nt*] ‘They laughed.’ (f.)

In sum, syllables in Kabyle have the form (C)(C)V(C)(C), but complex codas never occur in monomorphemic words. Furthermore, complex onsets and complex codas never occur in the same syllable simultaneously. The question that remains is by what rules are the syllables

restricted.

2.1.2 DATA ON THE DISTRIBUTION OF SCHWA

Most literature on Kabyle reports 3 phonemic vowels: /a/, /i/ and /u/. However, schwa also frequently appears in addition to the 3 vowels. The distribution of schwa is flexible: it may occur in word-initial, word-medial or word-final syllables. Examples of words containing schwa and their glosses are provided in (3).

(3) Examples of schwa in Kabyle
  a. [ijənni] 'sky'
  b. [ð*(ə)*ffir] 'back'
  c. [aarˤəz] 'wasp'
  d. [θiməs] 'fire'

Observing the frequent occurrence of schwa, two questions awaiting to be resolved arise: what are the rules for schwa epenthesis? Is phonemic schwa necessary to account for the distribution of schwa, or is schwa always epenthetic?

2.2 PROPOSALS AND MOTIVATIONS

This paper makes several proposals about restrictions on syllabification and about the epenthesis of schwa. The sonority scale is assumed to be as follows, which is consistent with the tendency observed in most languages:

(4) Sonority Scale
  vcl stops < vcd stops < vcl fricatives < vcd fricatives < nasals < liquids < glides < vowels

First of all, regarding syllabification, it is proposed that complex onsets are permitted, and they may freely violate the SSG. On the contrary, complex codas are much more restricted. They are permitted only in clusters resulting from suffixation or cliticization. They may occasionally violate the SSG by having 2 consonants of identical sonority, but complex codas with rising sonority are strictly prohibited. One motivation for this proposal is that it fits the universal tendency for codas to be more constrained than onsets. Codas are inherently more marked than onsets: there are languages that require obligatory onsets and/or prohibit codas, but there does not exist a language that forbids onsets or requires codas (Jakobson, 1962). Therefore, segments in coda positions often need to respect more constraints compared to those in onsets.

At syllable boundaries, it is proposed that the SCL may be freely violated. Hoff (2016) observes that many languages with Berber or Arabic roots abide by the SSG to a smaller degree than many of the world's languages. It is natural that the languages are also more tolerant of violations of the SCL, which is also a constraint related to sonority.

Secondly, it is proposed that in Kabyle, schwa is epenthesized to repair syllables with ill-formed sonority profiles, and to separate three or more consonants in a row for the ease of articulation. All schwas are epenthetic, so it is not present in the phoneme inventory or in underlying representations. Violations of SSG in complex onsets are tolerated, so schwa never

epenthesize into CC in onset position. However, CC as complex coda is prohibited, so a schwa is epenthesized to the middle. When three consonants are in a row, they are repaired by epenthesizing a schwa to the middle of the first two consonants by default, even when they are in different syllables.

2.3 PREDICTIONS

Based on the proposals, several predictions of the data can be made. Complex onsets and coda-onset clusters should be of a variety of profiles because restrictions on sonority do not apply. Complex codas never occur in monomorphemic words. When they occur in other words, they are always falling or flat in sonority.

For the distribution of schwa, roughly two types of condition for epenthesis are predicted to be observed. Schwa may be epenthesized between 2 segments in coda position, such that CC becomes CəC, in order to prevent the formation of complex codas in monomorphemic words; they may also be epenthesized within a sequence of 3 consecutive consonants, such that CCC becomes CəCC.

3 SUPPORTING EVIDENCE

Data presented in this section demonstrate syllabification and schwa epenthesis in Kabyle. They are used to test the predictions made in the previous section, that stem from the two major proposals of this paper. The syllabification and well-formedness judgment of all forms are based on the intuition of a native speaker of Kabyle.

3.1 SUPPORTING EVIDENCE 1: SYLLABIFICATION

Complex onsets in Kabyle may be of any sonority profile. Examples of clusters in onset position with rising, flat and falling sonority are provided in (5). Thus, complex onsets in Kabyle do not need to obey the SSG.

(5) Complex onsets of different sonority profiles
- a. Rising sonority: [θɛ.mu.sni]
- b. Flat sonority: [zðɛθ] ‘front’
- c. Falling sonority: [tsqa.ʃir] ‘socks’

Complex codas are rare in Kabyle. In observed words that contains complex codas, there are always markings for person (in verbs) or for the feminine gender (in nouns). Most of the complex codas respect the SSG, but occasionally violate it by having flat sonority. Examples in (2) are provided again in (6):

(6) Complex codas of different sonority profiles
- a. Flat sonority: [θaqʃiʃθ] “girl” (f.)
- b. Falling sonority: [θaqəndˤorˤθ] “dress” (f.), [ðˤsˤant] ‘They laughed.’ (f.)

Coda-onset clusters show a variety of sonority profiles. Clusters with rising, flat and falling

sonority are all permitted, so Kabyle does not strive to obey the SCL. Examples of different coda-onset clusters are shown in (7).

(7) Coda-onset clusters of different sonority profiles
  a. Rising sonority: [af.rˤoχ] ‘bird’, [θif.ðənt] ‘toe’, [aq.ʒun] ‘dog’
  b. Flat sonority: [ɛç.sum] ‘meat’, [θɛts.fɛħθ] ‘apple’
  c. Falling sonority: [zən.zja] ‘earthquake’ (or [znə.zja]), [am.zˤoʁ] ‘ear’

Geminates may form both onsets and codas, even though complex codas are prohibited in monomorphemic words. In addition, word-medial geminates are always syllabified together, based on the intuition of the native speaker informant. Examples of geminates in different positions are shown in (8).

(8) Geminates in different positions
  a. Word-initial (onset): [ssɛr] ‘charm’, [aqʒun nni] ‘that dog’
  b. Word-final (coda): [ɛss] ‘day’, [ətʧ] ‘Eat.’ (imperative, 2nd person singular)
  c. Word-medial: [θaqq.raːts] or [θa.qqraːts] ‘bottle’

3.2 SUPPORTING EVIDENCE 2: SCHWA EPENTHESIS

There are roughly two conditions when schwa may be epenthesized into an underlying form in Kabyle. Firstly, because complex coda is forbidden in monomorphemic words, schwa is epenthesized to a consonant cluster CC in coda position. Examples of schwa epenthesis under this condition are shown in (9). The hypothetical underlying representations are also provided, but the alternation of the other vowels is ignored for simplicity.

(9) CC becomes CəC in coda
  a. [saħɪjt i.çətʃ] ‘thank you’ (UR: /saħɪjt içtʃ/)
  b. [u.ðəm] ‘face’ (UR: /uðm/)
  c. [θɛ.jəts] ‘shoulder’ (UR: /θɛjts/)
  d. [θi.məs] ‘fire’ (UR: /θims/)
  e. [aa.rˤəz] ‘wasp’ (UR: /aarˤz/)

Secondly, when there are three consonants immediately adjacent to each other, a schwa is inserted between the first two of them by default. The consonant cluster may be either in word-initial or word-medial position. Examples of schwa epenthesis under this condition are provided in (10).

(10) Coda-onset clusters of different sonority profiles
  a. CCC word-initially:
    i. [ð(ə)ffir] ‘back’
    ii. [zən.zja] ‘earthquake’
    iii. [tˤəʒrˤa] ‘tree’
    iv. [səksu] ‘couscous’
    v. [jəhna] ‘peace’

b. CCC word-medially:
   i. [θifəðnin] ‘toes’
   ii. [içəsmɛn] ‘meats’
   iii. [iɟənni] ‘sky’
   iv. [ɛnəlmɛð] ‘student’
   v. [aqʃiʃ aməʃtˤoħ] ‘small boy’

Interestingly, the epenthesis of schwa into well-formed consonant clusters, for example CC as complex onset or coda-onset cluster, is judged to be ill-formed by the informant. Examples of illicit schwa epenthesis are shown in (11).

(11) Illicit schwa epenthesis into CC

a.	[*tsq*aʃir]	*[tsəqaʃir]	‘socks’
b.	[*zð*ɛθ]	*[zəðɛθ]	‘front’
c.	[zə*n.z*ja]	*[zənə.zja]	‘earthquake’
d.	[jə*hn*a]	*[jəhəna]	‘peace’
e.	[θɛmus*n*i]	*[θɛmusəni]	‘knowledge’

Again, the behavior of geminates is different from regular consonant clusters. A cluster of a geminate with another consonant may be permitted word-initially and word-medially, without triggering schwa epenthesis (examples a and b in 12). Even when schwa epenthesis applies, geminates are never broken up. In example c of (12), instead of the default option CəCC, schwa is epenthesized after the geminate, forming CCəC.

(12) Geminates
   a. [ð(ə)ffir] ‘back’ (schwa is optional)
   b. [θaqqraːts] ‘bottle’
   c. [θammətˤoθ] *[θaməmtˤoθ] ‘woman’

4 DISCUSSION AND SUMMARY

In summary, this paper involves proposals in two important aspects of Kabyle phonology. Firstly, a syllable in Kabyle can be (C)(C)V(C)(C), but complex codas do not occur in monomorphemic words. Complex onsets do not need to obey the SSG, whereas complex codas do; word-medial coda-onset clusters do not need to obey the SCL. Secondly, an analysis where all schwas are epenthetic for the repair of ill-formed consonant clusters is possible, and the ill-formedness may result from either complex codas in monomorphemic words or from strings of more than two consonants. In the following sections, other studies on related topics are discussed. In addition, limitations of the present study and remaining puzzles are outlined.

4.1 LITERATURE ON KABYLE AND SCHWA EPENTHESIS

To date, much literature has been devoted to the distribution of schwa in Kabyle. Most Berberists contend that all schwas are epenthesized by rules, because their occurrence is largely predictable, and because native speakers have strong intuitions about where schwas should or should not

occur. In this respect, the present paper holds the same position.

One early account for Kabyle schwa is proposed by Bader (1985). In his paper, Bader argues that Kabyle syllabifies underlying representations by a series of rules. First of all, all vowels are assigned to the rhyme position, and each consonant immediately preceding the vowel is assigned to the onset position. Then, for each string of remaining consonants, the segments are assigned to rhyme and onset positions alternatingly, starting from the right edge. Finally, in order to repair the syllables which have only consonants as rhyme, additional rhyme positions are inserted, which are realized as schwas. The strength of this account is that it integrates syllabification and schwa epenthesis, and that it successfully explains the occurrence of schwa in CVC syllables. However, it fails to explain the formation of complex onsets, as well as the occurrence of schwa in CV syllables.

In 2016, Hoff studied syllabification in Kabyle, and arrives at conclusions that are similar to those in the present paper. It was also observed that complex codas but not complex onsets abide by the SSG. She also contends that schwas are epenthesized to repair illicit CCC clusters, but the default option in her account is CCəC, and CəCC is predicted to occur only if the latter two consonants have falling sonority. The present paper, however, demonstrates that sonority does not play a role in this manner except for coda consonants. For example, [tˤəʒrˤa] 'tree' is perfectly well-formed even though the cluster [ʒrˤ] is rising in sonority. Therefore, CəCC should be the default way of epenthesis, and CCəC occurs only to prevent the separation of geminates.

Lahrouchi (2018) observes that the epenthesis of schwa to split consonant clusters is a strategy utilized by a variety of Berber languages, as well as many modern dialects of Arabic. An exception is Tashlhiyt Berber, which has an extensive use of consonant clusters without vowel epenthesis. Nevertheless, syllabic consonants occur in Tashlhiyt, and their patterns mirror those of schwas in other Berber languages.

4.2 LIMITATIONS

This paper has a few apparent limitations that may be avoided in future research. Firstly, the amount of data is limited, with elicitation sessions spanning only a term. Thus, the lack of a particular type of data does not necessarily proves its absence in the language. Also, most of the elicitation sessions are not specifically targeted towards the presence or absence of schwa, so there may be occasional errors in the data. Secondly, this paper relies heavily on the intuition of the native speaker informant. However, intuition often does not match the true phonological representation. Finally, the scope of this paper is still limited. The majority of the forms analyzed are monomorphemic nouns or nouns with the feminine marker.

4.3 DIRECTIONS FOR FUTURE RESEARCH

The present paper leaves several remaining puzzles unresolved, that may be explored in future studies. Firstly, how are affixes and clitics syllabified, and do they trigger schwa epenthesis? Based on preliminary analysis, affixation processes apply after syllabification, and they do not trigger schwa analysis. For example, as shown by many forms in this paper, a schwa is never epenthesized into a word-final coda and a feminine suffix, even though complex codas do not occur in monomorphemic words. However, the status of schwa in personal subject and personal object markers remains unclear, and more detailed investigation is required.

Secondly, syllabification is often different in connected speech and in formal or slow speech. For example, in French "liaison", an entire phrase is considered in syllabification, rather than individual words. During the analysis, it is observed that a similar process may be operating in Kabyle. A schwa may be epenthesized into a consonant cluster, even when the consonants belong to different words. An example is provided in (13).

(13) Schwa epenthesis in conneted speech
[ɛð (ə) ðˤsˤɑʁ]
FUT. laugh-1st
'I will laugh.'

Finally, this paper focuses on sonority constraints during syllabification, but does not look at place restrictions. Kabyle is a language that employs a wide range of different consonants. It would be interesting to see how complex onsets and codas are restricted in terms of place of articulation.

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