

Revisiting Kabardian Phonology: A Syllabic Analysis

Nimer Abusalim

Department of English Language and Literature, The University of Jordan, Amman, Jordan

Mohammad Rayyan*

Department of European Languages, The University of Jordan, Amman, Jordan

Sharif Alghazo

School of Foreign Languages, University of Sharjah, United Arab Emirates;
Department of English Language and Literature, The University of Jordan, Amman, Jordan

Mohd Nour Al Salem

Department of English Language and Literature, The University of Jordan, Amman, Jordan

Abstract—This paper provides an autosegmental analysis of phonological alternations in Kabardian, an Abkhaz-Adyghean language¹. It illustrates how several phonological re-write rules, postulated in Colarusso's (1992) phonological analysis of Kabardian which, in some cases, lacks adequate explanation, may be uniformly reinterpreted as instances of mapping between the segmental tier and the skeletal tier in an autosegmental approach. In doing so, this paper illustrates a case where the skeletal make-up of a language may be dominant over underlying segments and be crucial in determining the output forms of a language, a process which may be translated into high-ranking constraints under a constraint-based framework. This paper, therefore, provides a more economical and explanatorily adequate analysis of Kabardian phonological alternations.

Index Terms—Kabardian, autosegmental phonology, skeletal tier, phonology

I. INTRODUCTION

This paper advocates for a reexamination of Colarusso's (1992) Kabardian study. The autosegmental approach requires fewer assumptions and proves more effective in explaining diverse phonological alternations, aligning with the trend in linguistic theory favoring economy (Inkelas & Orgun, 1995; Gouskova, 2003; Clements, 2003; Beguš, 2020). The study explores the significant influence of skeletal formation on language output in non-linear phonology, presenting robust findings. The following sections cover Kabardian skeletal facts, a reanalysis of Colarusso's approach, skeletal mapping processes, and the dominance of the skeleton.

II. THE BASIC SKELETON FOR KABARDIAN

Kabardian falls under the Abkhaz-Adyghean (Northwest Caucasian) language family (Vamling, 2018). Kabardians are the easternmost Abkhaz-Adyghean people (Matasović, 2010, p. 6). Kabardian is rich with respect to its consonants; it has 48 consonants (Colarusso, 1992). In autosegmental phonology, features extending beyond individual segments are organized into separate tiers, with the crucial skeletal tier representing segment length and arrangement in a word (Goldsmith, 1976; Clements & Hume, 1995; Broselow, 1995). Our analysis for Kabardian identifies the skeletal structure as CV(C) in monosyllabic words and repeats unchanged in non-monosyllabic words (CVC + CVC = CVCCV(C)), with the final C slot being optional.

A. Word Initial and Word Final Skeletal Elements

All Kabardian Words Must Start with a Consonant

Kuipers (1960) boldly asserts that all Kabardian words begin with a consonant (c.f. Halle, 1970), challenging the apparent presence of vowel-initial words, particularly those starting with the sound /a/. Drawing on Troubetskoy's (1922) and Yakovlev's (1923) research, Kuipers posits that the initial long /a/ sound actually represents a sequence of the glide /h/ followed by the low vowel /i/ (i.e., /ha/). In sequences of two low vowels, it is /ah/, not a long vowel. Kuipers contends that all Kabardian syllables uniformly possess a consonantal initial (1960, p. 33). Matasović (2010, p. 9) supports this, specifying that only long [a:] occurs word-initially, analyzing it as /ha/ following Kuipers. According to Matasović, /a:/ is not a distinct phoneme but a sequence of the short [a] and glide /h/, except at a word's beginning, where it is analyzed

* Corresponding Author. Email: m_rayyan@ju.edu.jo

¹ Glottocode: Kaba1278 (glottolog.org)

as /ha/ (2010, p. 9). This necessitates filled onsets in all Kabardian words, extending beyond the initial syllables, as supported by Colarusso's 'Empty Initial Onset Filling' rule (1992, p. 34), responsible for realizing the long [a] word initially.

- (1) (Colarusso, 1992, p. 34 (R:16))
 /a-da/ → [aaddɛ] 'Someone's father'
 Inherent possession–father
- (2) Underlying Form as per Kuipers' (1960) Analysis of Word Initial /a/.
 /ha-da/ → [a:ddɛ] 'Someone's father'
 Inherent possession –father

Taking Colarusso's underlying form, the word /a-da/ 'someone's father' is pronounced as [aad.dɛ] with a pronunciation of a long /a:/ sound word initially. The perception of the long vowel in this case comes from the effect of copying the vowel in the nucleus to the onset (which would be accompanied by the switch from [+syllabic] to [-syllabic] in the vowels feature matrix to render it possible to be an onset which must only host non-syllabic segments). Below is Colarusso's (1992) illustration of the empty initial onset filling process. Considering the Maximal Onset Principle Kahn, 1976, a stronger generalization is proposed that all Kabardian onsets must be filled. The discussion anticipates evidence from a gemination process in word-medial positions, supporting the claim. Following Kuipers' (1960) analysis, /-ha-/ is treated as /-aa-/ making the leftmost vowel non-syllabic, and /-ah-/ represents a long vowel, akin to /-aa-/ in Kuipers and Colarusso's interpretation. Example (3) is an illustration.

- (3) /sahbəy/ → [sa:bÍ] 'baby' ([saʔbÍ] as per Colarusso, 1992, p. 33)

As our discussion will show, no difference in our analysis will arise due to which underlying form we choose to adopt for these sequences.

Word-Final C is Optional

In Kabardian, the skeletal structure is suggested to start with a consonant, i.e., CV, based on evidence indicating that V alone or VC configurations cannot exist. Examples like [psə] 'water,' [psə.sa] "story," and [dada] "very" suggest the optionality of word-final vowels. Additionally, words like bʒan 'goat' and wəps 'plane!/' 'shave!' illustrate the permissibility of word-final consonants or clusters, supporting the idea that the word-final skeleton may or may not include a final consonant (Kuipers, 1960).

B. Non-Monosyllabic Words

The basic skeleton in monosyllabic words is, thus, CV(C). Unless falsified by the data, we could make the claim that this skeleton pertains to the syllable in Kabardian, given that the previous monosyllabic examples represented single syllables. The question now is how stable this skeleton is in non-monosyllabic words. Will we find evidence that the skeleton actually pertains to the syllable, not the word? Also, will the optionality of the syllable final C slot remain?

Syllable Closure Rule (Colarusso's (1992: 29) R13)

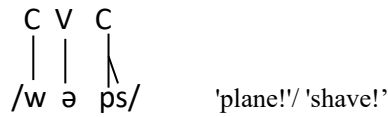
Colarusso's syllable closure rule provides evidence to the affirmative. In fact, the final C slot is only optional in word final position; it is obligatory word medially i.e. CVCCV(C). Matasović (2010) notes that many Kabardian speakers geminate the consonants preceded by an open syllable (a syllable with no coda). This is due to a typologically rare restriction on syllables that occur word-medially to be closed (the coda of the preceding syllable is filled/shared with the onset of the second syllable). For instance, the word *psəsa* "story" is pronounced as *psəssa*, and instead of *dada* "very" we get *dad.da*, a form of hetero-syllabic gemination. In fact, Colarusso (1992) suggests, in his analysis, a rule called the 'Syllable Closure' rule (Colarusso's Rule 13), which confirms this case. According to Colarusso (1992, p. 29), the 'Syllable Closure' rule applies when a syllable lacks a coda. It copies the onset of the following syllable to the right, as shown in the following example. The typologically rare restriction on forming word-medial syllables, leading to gemination in Kabardian (Matasović, 2010), supports our claim that the suggested CV(C) skeleton pertains to the syllable, not the word. Gemination implies a CC sequence word-medially, consistent with our proposed basic skeleton. This supports the idea that only the word-final C-slot is optional, aligning with Matasović's observation of a pervasive gemination phenomenon in Kabardian (Kuipers, 1960; Catford, 1942, p. 17). Kuipers adds that "both the voiceless and voiced consonants...sound somewhat emphatic in Kabardian, and when occurring alone (i.e. not in groups) they often make the impression of geminates" (1960, p. 19)².

III. THE SKELETAL MAPPING PROCESS

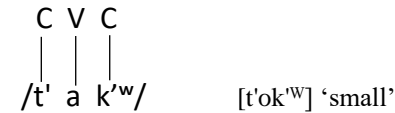
Contrary to Colarusso (1992), we propose an analysis based on the Skeletal Mapping approach. Our analysis of skeletal mapping suggests that every C-slot must map onto a consonant and every V-slot must map onto a vowel. We propose that the basic skeleton in monosyllabic Kabardian words is CV(C). Examples (4-5) below demonstrate application of the basic skeleton to a monosyllabic word with a final consonant, while (6) demonstrates skeletal mapping without a final consonant.

² Peterson (2003) adds that this gemination phenomenon may form the basis for a minimality requirement analysis for Kabardian syllables.

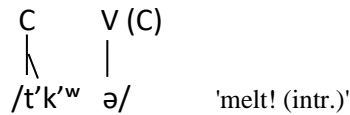
- (4) CVC (Illustrating how Clusters are one unit)



- (5) CVC (No Clusters)

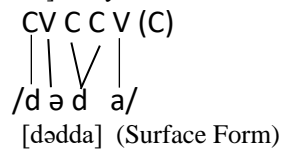


- (6) CV(C) (No final consonant)



If this environment does not exist, i.e. if a C-slot cannot find a consonant in the correct position to map onto, the empty C-slot maps onto a consonant that is already linked to another C-slot, causing gemination, as the following example illustrates.

- (7) /dədə/ → [dədə] 'very'



The direction of skeletal mapping in our analysis is from right to left. The following sections will illustrate greater evidence for this claim, but we can illustrate support for this claim with two phonological processes that Colarusso (1992) suggests for Kabardian; namely, 'Coda Filling by /a-a/ Nucleus' and 'Full Grades'.

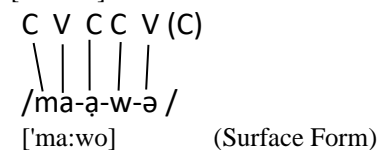
Coda Filling by a-a Nucleus (Colarusso's 1992:24 Rule 1)

This rule renders the rightmost vowel in an /-a-a-/ sequence non-syllabic and assigns it to the coda of the syllable to its right, essentially creating a long /a:/, surfacing as [-aə-]. This rule applies to morphemes which carry primary stress.

- (8) /ma-a-w-a/ → ['ma:wo] 'It is tumult. / It hurts.'
-
- 3-pres-strike-in

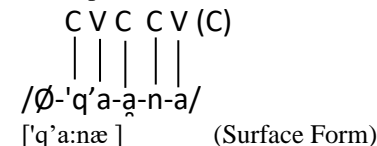
Under the skeletal approach, such an alternation can be accounted for based on the assumption that a C slot can map onto a vowel only if mapping does not result in the loss of the sole vowel available for the V slot and only when that morpheme carries primary stress.³ Examples (9-10) below illustrate how this reasoning accounts for Colarusso's 'Coda filling by /a-a/ nucleus' rule. For now, it suffices to point out that the C-slot takes a vowel as is permitted by the system we are building, given that the syllable is stressed, and there is another vowel to the left of the vowel in question.⁴ This renders the C mapped vowel [-syllabic].

- (9) /ma-a-w-a/ → ['ma:wo]



- (10) /Ø-'q'a-a-n-a/ → ['q'a:næ] 'Stay (in) here !'

You(imperative)-hor-imp-remain-in



As previously mentioned, this rule only applies with stressed syllables. This example illustrates that the direction of mapping must be from right-to-left, not the other way around⁵. If it were left-to-right, for instance, the surface form arrived

³ Kabardian is known for its stress placement system. Stress falls only on the last stem morpheme in nouns and pronouns (Colarusso, 1992, p. 16). For example, the Kabardian word for 'a girl' is *psaasa* where stress falls on the initial syllable *-psaa*. On the other hand, stress on verbs is recessive if the affixes have purely verbal character.

⁴ This suggests that the skeletal mapping process may have the power to see the end-product (the surface form) and perhaps the syllable structure and required stress assignment locations, however, as pointed out by a reviewer, this is highly unlikely. Future research may wish to pursue an OT analysis in explaining such a phenomenon.

⁵ As our present analysis is concerned with autosegmental approaches, we leave for future research the investigation of whether this direction of mapping may be an OT constraint.

at would include a geminate /-nn-/ and no long vowel, but that is not the case as shown in the surface form taken from Colarusso (1992).

-a-a- Reduction in Unstressed Syllables (Colarusso's (1992, p. 25) Rule 2)

If the morpheme is not stressed, the leftmost vowel is deleted in favor of the rightmost vowel (Colarusso, 1992, p. 24).

(11) /-a-a- Reduction in Unstressed Syllables (Colarusso's (1992) Rule 2)

$$aa \rightarrow a / \quad C \quad \text{---} \quad C \{ {}_2 \ V \ C \ {}_2 \}$$

$$\{ {}_1 \ [+C.P.] \ {}_1 \} \quad [-stress] \quad [-stress]$$

(' <1> ... <2>' = 'if 1, then 2')

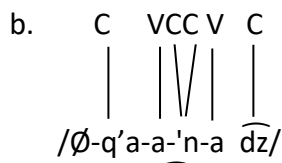
(Colarusso, 1992, p. 25)

The following is an illustration. Stress is indicated by the diacritic "˘" at the initial position of the stressed syllable; in the following example it is the second syllable which is accented.

(12) /∅-q˘'a-a-n-aʒə/ → [q˘'ɛn'nɛʒ] 'Stay (in) here again/for good!'

You (imperative)-hor-dat-remain-in-again/finally

a. Final schwa deletion → /∅-q˘'a-a-n-adʒ/



c. [q˘'ɛn'nɛdʒ] (Surface Form)

Though our analysis requires stress for the C slot to be able to map onto a vowel, it goes further to explain why in a [-stressed] syllable, geminate consonants are realized, as can be seen from the previous example. Because the C-slot may not take up a vowel, it must map onto the same consonant mapped by the previous C. This also explains the deletion of one vowel in a VV sequence.

Vowel Deletion in Verbs (Colarusso's (1992, p. 25) Rule 3)

Colarusso (1992) mentions that the low vowel /a/ is dominant, a phenomenon he refers to as 'the dominance of /a/', meaning if a sequence of two dissimilar vowels arise in verbal morphology, then the vowels are simplified in favor of the low vowel /a/ i.e. the low vowel /a/ remains, and the other vowel is deleted. Colarusso only cites one example for this rule, however, as we will see throughout the analysis, its effects are evident in other places. Essentially, it is the same phenomenon occurring in verbs and nouns which Colarusso's (1992) analysis requires two separate rules to explain.⁶ This is captured in the following rule.

(13) Vowel Deletion in Verbs (Colarusso's (1992, p. 25) Rule 3)

$$ə \rightarrow \emptyset / \% \text{---} a$$

(where '%' stands for 'before or after' and '-' refers to a morpheme boundary)

(14) /∅-y-ha-ə-ʃxə-aʒ-ɛ/ → [jɑːˈxɑɛ]

3 pl-non pres-eat-past-aff

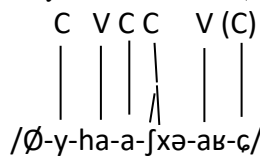
'They ate it.'

(15) /∅-y-ha-ə-ʃxə-aʒ-ɛ/ → [jɑːˈxɑɛ]

3 pl-non pres-eat-past-aff

'They ate it.'

a. /∅-y-ha-a-ʃxə-aʒ-ɛ/ (after Vowel Coloring, to be discussed)



b. [jɑːˈxɑɛ] (Surface Form)

The skeletal approach in Kabardian phonology, focusing on right-to-left mapping, is exemplified in the past tense morpheme /-aʒ-/. The mapping process prioritizes the skeletal structure, leaving unconnected codas like /-ʒ/ to not surface. Consonant clusters, such as /ʃx/, are treated as single consonants. Vowels become non-syllabic to fulfill C-slots, supporting the proposed skeletal model. When searching for a consonant in the morpheme /-ha-/, if not found, the glide /y/ at the periphery is considered.⁷ Reverse mapping yields incorrect surface forms, emphasizing the importance of right-to-left mapping.

Vowel Deletion in Nouns (Colarusso's (1992, p. 26) Rule 4)

⁶ See Arkadiev & Testelefs (2015) and Lander (2017) for more on nominals in Kabardian.

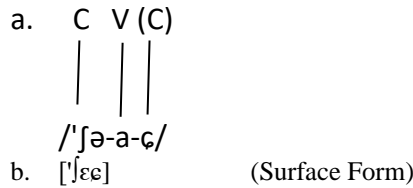
⁷ Considering it as /ha/ or /a-a/ underlyingly makes no difference for mapping in this situation. However, in what follows we will demonstrate that, in a word medial position, /-ha-/ is merely /-aa-/ underlyingly, except on the periphery as suggested in Section 2 above. We will return to a more detailed discussion of glides on the peripheries in the following section.

In nouns, Colarusso cites a rule that is responsible for vowel syncope in sequences of two vowels. In a sequence of two dissimilar vowels, the rightmost vowel is dominant, and the vowel to the left is deleted, as follows. Once again, the three main sources of Kabardian grammar (Kuipers, 1960; Colarusso, 1992; Matasović, 2010), all mention the fact that in sequences of two vowels, it is the rightmost vowel which is dominant, but none give an explanation to why this is the case.

(16) *Vowel Deletion in Nouns*: $V \rightarrow \emptyset / ______ V$

This rule can easily be accommodated under the skeletal approach, assuming that a vowel that does not map onto the skeleton will not surface, as before. The skeletal operation proceeds as per the previous example. There will be no need for details. Note that the vowel in the surface form differs from that in the underlying form.⁸

(17) /'ǰə-a-ε/ → /'ǰ-a-ε/ → ['ǰεε]
 Horse –conn-shelter
 'Stable'



In summary, the discussion emphasizes the right-to-left direction of skeletal mapping in Kabardian, crucial for accurate surface forms, as per rules R1-R4 in Colarusso’s (1992) analysis. The proposed basic skeleton is CV(C) for monosyllabic and CVCCV(C) for bi-syllabic words, where mapping seeks required elements within morphemes, leaving unmapped content absent in surface forms, influencing gemination and vowel lengthening predictions.

IV. THE DOMINANCE OF THE SKELETON

As discussed in the introduction on autosegmental phonology above, a mapping operation takes place from the skeletal tier to the segmental tier. Our analysis of Kabardian from an autosegmental perspective reveals that the mapping operation has power to alter, skip, delete, and/or add segments to/from the segmental tier.

A. *Skeleton Can Alter Segments*

Mapping to the skeleton may alter features of a segment on the segmental tier in order to keep faithful to the skeleton. One example is the altering of the value of the [syllabic] feature of the low vowel in Kabardian.; [+syllabic] is realized as [-syllabic] (discussed in Section 3, above).

B. *Skeleton Can Skip/Delete Segments*

In summary, the skeletal tier’s dominance in Kabardian is highlighted, showing that a segment on the segmental tier may remain unexpressed if not mapped to the skeletal tier.

R5: Onset Filling with Past Tense Coda

Another similar phenomenon is worth mentioning in this regard. The following is an alternation mentioned in Colarusso (1992) affecting the past tense coda /-ακ-/. Colarusso’s (1992) analysis stipulates several rules to account for these alternations. Below are two examples which Colarusso (1992, p. 35) cites.

(18) /sə-q’a-k’wə-a-ακ -ǰ/ → [səq’q’ok’w’k’w’αǰ] ‘I came long ago.’

I-hor-move-intr-past-past-aff

(19) /sə-q’a-k’wə-α-ακ-ǰ/ → [səq’q’ok’w’k’w’αǰ] ‘I came.’

I-hor-move-intr-past-aff

To explain the alternation in the previous examples, Colarusso (1992) mentions the following Rules:

The 'Onset filling with past tense' (R5) (Colarusso, 1992, p. 35), illustrated below, operates only with the past-tense morpheme –ακ, whereby the empty onset is filled by copying the coda.

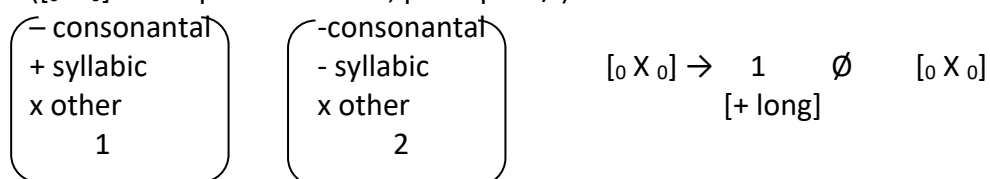
(20) **R6: Sonorization of Past Tense Coda**

Past tense coda is sonorized (across-the-board)

/κ/ → [ħ]

(21) **R18: Glide Coda Loss**

([o X o] = independent onset, perhaps = ∅)

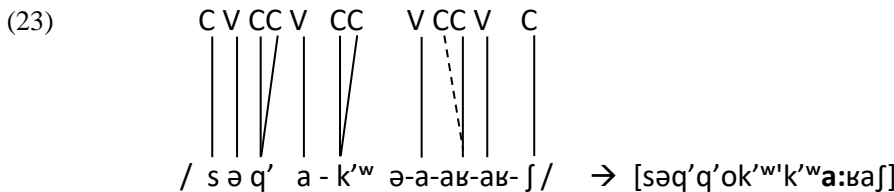


⁸ This is done by a vowel coloring operation that cannot be discussed here due to space restrictions.

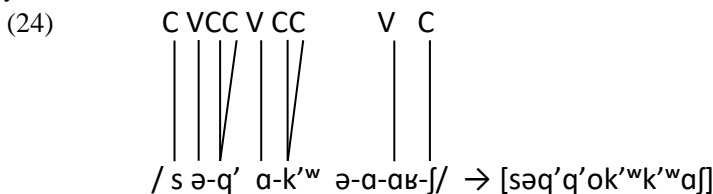
These rules will all need to apply under Colarusso’s analysis to account for the alternations as follows.

- (22) /sə-q’a-k’wə-a- aɤ - aɤ - ʃ/ → [səq’q’ok’w’k’w’a:ka] ‘I came long ago.’
 I-hor-move-intr-past-past-aff
- a. /sə-q’a-k’w-a- aɤ - aɤ - ʃ/ (by R5)
 - b. /sə-q’a-k’w-a- a fi - a fi - ʃ/ (by R6)
 - c. /sə-q’a-k’w-a-a- ʃ/ (by R1, R3, and R18)
 - d. [səq’q’ok’w’k’w’a:ka] (Surface Form)

Under our analysis, however, we can arrive at the surface forms without any further stipulations/rules, as follows.



The boldfaced vowel is rendered [-syllabic] (with vowel coloring as an independent operation) as per our analysis so far. This is possible, since it is stressed, as discussed previously. Colarusso (1992, p. 36) states that stress is recessive in verbs. It falls before the last filled coda of purely verbal suffixes (no plural or participial endings). They are basically stressed as if /a/ ended in a glide or consonant, as in our previous discussion of /-ah/ following Kuipers (1960). The second example, likewise, follows our analysis as is. No further stipulations are required and the two rules required by Colarusso’s analysis are hence rendered redundant.



In summary, the analysis reveals that the skeleton's influence is evident in surface forms through segmental alterations, deletions, and additions. Six rules from Colarusso (1992) are found unnecessary, with a total of 18 out of 24 rules becoming redundant as the analysis progresses. The next section will explore instances where the skeleton adds or replaces segments to maintain fidelity, further underscoring its dominance.

Operations Independent of the Skeleton

We start by discussing some rules given in Colarusso’s (1992) analysis that operate independent of the skeleton. These rules will be necessary to understand the operations that will be discussed in the next section. In particular, Colarusso cites two rules that are responsible for schwa-deletion in verbs and nouns, and two rules responsible for alternations regarding the glides.

- (25) *Final /ə/-deletion in long verbal forms* (Colarusso’s 1992, p. 42 Rule 21)
 ə → ∅ / ∑ ∑ C ___ # (Where ∑ = sonorant syllable)

This rule is responsible for omitting a final /ə/ of a verb if the original form would have been longer than two syllables. According to Colarusso, this rule applies optionally. A second rule deletes the final schwa in nouns and adjectives to produce monosyllabic words, as follows.

- (26) *Final /ə/-Deletion in Nouns and Adjectives* (Colarusso’s 1992, p. 43 Rule 22)
 ə → ∅ / ∑ C ___ # (Where ∑ = sonorant syllable)

These two rules are responsible for the omitted final schwa in the following examples.

- (27) In Verbs
 /∅-q’a-s-a-w-ʃçə/ → [q’ezzyç] * [q’ezzyçə] ‘I always eat it.’ Or ‘I am eating it (my food).’
 3-hor-I-pres-prog-eat
- (28) In Nouns and Adjectives
- a. /na-p’ts’ə/ → /na-p’ts’/ → [nɛp’ts’]
 eye-falsehood
 ‘false’
 - b. /na-g’wə/ → /nag’w/ → [nog’w] ‘face (around the eyes)’
 eye-zone

In summary, the rules discussed will be universally applicable without additional stipulations, operating consistently across various environments and crucially preceding skeletal mapping. This approach is essential to prevent potential discrepancies, such as incorrect gemination of final consonants, that could arise if mapping were conducted prior to final-schwa deletion, as indicated by surface forms in Colarusso (1992). For instance, if skeletal mapping applies to /na-p’ts’ə/ before final schwa deletion, we would be forced to geminate (represent twice) the consonant cluster /p’ts’/ to arrive at a surface form as in *[na-p’ts’p’ts’], which is not the correct surface form and obviously does not fit the skeleton we postulated for Kabardian. No example from the data presented in Colarusso (1992) or Kuipers (1960) indicate a geminate consonant followed by a word final schwa. Moreover, Colarusso’s analysis includes two rules pertaining to the glides

- (46) / \emptyset -q'ə-s-a-y-ə-tə-ak-ε/
 3-hor-me-dat-3-nonpres-give-past-aff
 a. / \emptyset -q'ə-z-a-y-ə-t-af-ε/ (by R3, R6, R24 (Voice Assimilation))
 b. / \emptyset -q'ə-z-y-ə-t-af-ε/ (by R7)
 c. / \emptyset -q'ə-z-ə-y-t-af-ε/ (by R10)
 d. [q'izzitt^has] (by R14 and R18) 'He gave it to me.'
- (47) / \emptyset -q'ə-y-a-s-tə-ak-ε/
 3-hor-3-dat-I-give-past-aff
 a. / \emptyset -q'ə-y-a-s-t-af-ε/ (by R3 and R6)
 b. / \emptyset -q'-y-a-s-t-af-ε/ (by R7)
 c. / \emptyset -q'-a-y-s-t-af-ε/ (by R10)
 d. [q'est^hæ] (by R14 and R19) 'I lent it to him.'

In addressing the absence of the glide /y/ and the issue of /r/-intercalation, we identified Rule 7, which deletes vowels before a glide onset. We proposed that this rule occurs before skeletal mapping, as the glide /y/ is not connected to the skeleton. Ordering Colarusso's (1992) rules, independent of skeletal mapping, becomes crucial for understanding these phenomena, a task to be tackled in the next section.

Vowel-Deletion Before /r/-Intercalation

We return now to the suggestion we made in the previous section that R7 must apply before skeletal mapping and more specifically, before /r/-intercalation mapping. The previous example is repeated here, which we will use to illustrate the justification for this particular order under Colarusso's (1992) terminology and analysis.

- (48) / \emptyset -q'ə-y-a-s-tə-ak-ε/
 3-hor-3-dat-I-give-past-aff
 'I lent it to him.'
 a. / \emptyset -q'ə-y-a-s-t-af-ε/ (by R3 and R6)
 b. / \emptyset -q'-y-a-s-t-af-ε/ (by R7)
 c. / \emptyset -q'-a-y-s-t-af-ε/ (by R10)
 d. [q'est^hæ] (by R14 and R19)

In the terms set forth by our analysis, skeletal mapping would proceed as follows. Mapping begins from right to left, as usual. We reach a glide /y/ where the skeleton would expect a consonant. The glide /y/ is not part of a closed morpheme (one including a mapped vowel with the glide, which would prevent /r/-intercalation from replacing the glide and force mapping to search in the next morpheme for a consonant). Therefore, our version of /r/-intercalation must now take place and continue with the mapping process till the end. As a reminder, /r/-intercalation will need a vowel to the left of the targeted glide to apply, which is the case we have here. If it was a consonant, then there would be no need for /r/-intercalation in the first place; the glide is merely skipped over to connect to the available consonant to the left of it. Below is an illustration of applying our skeletal mapping without applying R7 first.

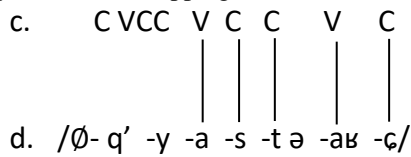
- (49)
- | | | | | | | | |
|-----------------|-----|----|----|----|-----|-----|-----|
| C | V | CC | V | C | C | V | C |
| | | | | | | | |
| / \emptyset - | q'ə | -y | -a | -s | -tə | -ak | -ε/ |

- (50)
- | | | | | | | | |
|-----------------|-----|----|----|----|-----|-----|-----|
| C | V | CC | V | C | C | V | C |
| | | | | | | | |
| / \emptyset - | q'ə | -r | -a | -s | -tə | -ak | -ε/ |

- (51) Illicit Surface Form = *[q'ə-rr-a-s-t-a-ε] (not correct surface form mentioned in Colarusso (1992, p. 38))

If Vowel deletion before glide onset (R7) does not take place first, then by virtue of our /r/-intercalation mapping process, we will end up with /r/ in the surface form, and that should not be the case. The correct order of application, however, does give way to the desired surface form.

- (52) Step 1: Apply R7 (Vowel Deletion Before Glide Onset)
 a. C V CC V CC V C
 b. / \emptyset -q' -y -a -s -tə -ak -ε/

(53) Step 2: Skeletal Mapping⁹

The next step is to search for a consonant. We skip the glide /y/ as usual and search for a consonant (note: /r/-intercalation occurs when the search leftward reached a vowel before finding a consonant. The mapping process, in such case, returns and applies /r/-intercalation where it left off). The first consonant, without a vowel intervening, happens to be the final consonant in the word. The original skeleton does not allow for gemination at the periphery (recall CV(C) is the original skeleton which reiterates). Therefore, the C-slot in line maps onto the consonant /q'/ and ends the process there.

(54) Illustration



The skeletal tier will delete extra skeletal material if the basic skeleton is not violated i.e. if the final skeleton is permissible as a licit skeleton, then all extra skeletal material on the periphery can be deleted.¹⁰

(55) Illustration of deletion in skeletal tier



Vowels which are not attached to the skeleton are omitted from the surface form, as usual. Also, glides which are not part of a morpheme which includes one segment that is attached to the skeleton will not surface.

(56) Correct Surface Form Achieved = [q'est^has]

It is clear, then, that vowel deletion before glide onset (R7) must occur across-the-board before skeletal mapping. This is certainly the case. However, the following example illustrates that, in some cases, we require a rule to replace the deleted vowel. Recall the following example from the previous section.

(57) /∅-ya-yə-tə-aʁ-s/ → [yirrit'as] ' (He/she) gave it to him/her.'

3-3-dat-3-nonpres-give-past-aff

Our skeletal analysis for this example had no problems above. However, we now have a rule which was confirmed in the previous example to apply before skeletal mapping; namely, the vowel deletion before glide onset rule (R7)¹¹. If this rule is applied, then we will lose the leftmost vowel. Colarusso's analysis using his rules is repeated below.

(58) /∅-y-a-y-ə-tə-a ʁ -ç/

3-3-dat-3-non pres-give-past-aff

'He/she gave it to him/her.'

- /∅-y-a-y-ə-t-aʁ-ç/ by Vowel deletion in Verbs and sonorization of past tense coda
- /∅-y-y-ə-t-aʁ-ç/ by Vowel deletion before glide onset
- /∅-y-r-y-ə-t-aʁ-ç/ by r-intercalation
- /∅-y-r- ə-y-t-aʁ-ç/ by Glide-Vowel Metathesis
- [yirrit^haɛ] by (R11), Vowel Coloring (R14), and Glide Coda Loss (R18)

In this analysis, Colarusso (1992) makes use of a rule called the Schwa-Epenthesis for Initial Glide (R11), a rule needed for Colarusso due to the fact that his analysis applies the Glide-Vowel Metathesis rule and therefore, another epenthesis rule is needed to reverse the effects of losing the leftmost vowel in its original position, which is needed to arrive at the correct surface form. As stated, we also find ourselves in a similar predicament. Our analysis must now reverse the effects of the Vowel-deletion before glide onset in one particular place, the left edge, to arrive at the correct surface form. Below is an illustration.

⁹ /-s-/ followed by /-t-/ is not a cluster due in part to the fact that they are separate morphemes, but /-st/ is a cluster. See Kuipers (1960) and Colarusso (1992) for a discussion of what is and what is not considered a cluster. This is important because if the sequence /-s-t-/ were considered a cluster then we would end up with a geminate i.e. /st-st/ in the surface form, which is not correct.

¹⁰ Another suggestion is to have the skeleton determine at first how many reiterations of the basic CVC are required. This will be a difficult task to imagine since the only possible way the skeleton will predict this is by counting vowels/syllables. However, as our analysis has shown so far, Kabardian vowels are not so stable. Therefore, it makes sense that the process of adding another reiteration of the basic skeleton to the left is an online process which adds a CVC group to the left as mapping proceeds leftward if there remains a vowel to the left of the last connected vowel.

¹¹ This 'ordering' may be due to different levels of morphology being added on par with lexical phonology or Stratal Optimality Theory. As this is out of the scope of this research, we leave such investigations for future research.

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Nimer Abusalim is an Associate Professor of Linguistics – Semantics at the University of Jordan. He graduated with a PhD in Linguistics from the University of Delaware in 2016. His research interests include Semantics, Pragmatics, Syntax and Phonology.

Mohammad Rayyan is an Associate Professor of Linguistics at the University of Jordan. He graduated with PhD in Linguistics from the University of Granada in 2015. His research interests include Sociolinguistics, Phraseology, Semantics, Pragmatics and Syntax.

Sharif Alghazo is an Associate Professor of Applied Linguistics in the Department of English Language and Literature at the University of Jordan. He received his MA and PhD degrees in Applied Linguistics from the University of Technology Sydney (UTS), Australia. His research interests include Semantics, Pragmatics, Sociolinguistics and Phonology.

Mohd Nour Al Salem is an Associate Professor of Translation at the University of Jordan. He graduated with PhD in Translation from the University of Leeds in 2014. His research interests include Translation, Sociolinguistics, Phraseology, Semantics and Pragmatics.