Phonological Processes

In this chapter, we describe the segmental processes in Moro, those that affect vowels, consonants or the interaction between them.

Consonant-vowel interaction

Palatalization Palatalization describes the process whereby consonants are articulated with a palatal off glide [j] (ex. kj), or shift their articulation to the palatal region, often with a change in manner of articulation.

The vowel /e/ triggers palatalization of a preceding consonant, adding an off-glide. This affects all consonants except /w/ and /j/. This is an automatic process and will not be indicated in further transcriptions.

tabular[t]lll ele [elje] feather

The dental stops /t/ and /d/ are palatalized when followed by the causative suffix -i, the passive suffix -n, and the benefactive applicative suffix -t, as shown in tab:ch5:pal. Verbs which exceptionally do not show palatalization are given in tab:ch5:nopal. All three suffixes also trigger vowel harmony. No other schwas or [i] trigger palatalization in the language, so this is a lexical process.

table tabular[t]llllll Perfective Causative perf. Passive perf. Applicative perf.

table Exceptions with no palatalizationtab:ch5:nopal tabular[t]llllll Perfective Causative perf. Passive perf. Applicative perf.

If the passive suffix follows the applicative, it can trigger palatalization of the applicative: k-nd-i-in-u it was caught for.

Other sequences of [t] or [d] followed by [i] do not show palatalization:

tabular[t]llll rti anus umtin co-wife

The proximal subordinate suffix i (a raised version of /-e/) does not palatalize a preceding dental stop, whether that stop is root-final, or is in the applicative affix (c).

tabular[t]llll Perfective Subordinate

The proximal imperfective diphthong suffix -i, which occurs with roots with high vowels, also does not condition palatalization:

tabular[t]llll a. kturti s/he is waiting

The consecutive imperfective complementizer prefix t- occurs word-initially and is also never palatalized, even when followed by the 1st person subject prefix i-:

tabular[t]llll a. t-i-vi-u and I vomited

In addition to vowels affecting consonants, palatal consonants can also affect vowels. Before the alveopalatal affricates [t] and [d], /a/ is articulated with a palatal off-glide [j]:

tabular[t]lll labato [labajto] they lifted

Rounding The short central vowels [] and [] are rounded when followed by a labialized consonant, but not in all cases. Consider the following verb paradigms. The labialization of the final root consonant is suppressed before an -o or -u suffix, but appears to transfer to the vowel of the root in the imperative (9)a-f. However, if there is no labialized consonant, no rounding occurs (9)g-h.

tabular[t]llllll imperfective perfective imperative

tabular[t]llllll imperfective perfective imperative

This also accounts for the alternation between [ui] man/woman (Elyasirs pronunciation) and [wdi] woman (Angelos pronunciation).

The vowel // is rounded to [] following and preceding labialized consonants. Phonologically it is transcribed as /w/ (see above), but phonetically, it is pronounced [w].

Vowels In this section, we outline vowel hiatus resolution and vowel harmony.

Vowel hiatus resolutionsec:ch5:hiatus When two vowels become adjacent due to morpheme concatenation or across word boundaries, the sequence is repaired by deletion, glide formation, or fusion. Across word boundaries and in the verb/adjective morphology, the first vowel is deleted. In nominal morphology, deletion, glide formation and fusion occurs depending on the nature of the vowels.

Vowel deletion Vowel deletion will be addressed first, beginning with sentences. No matter the quality of the two vowels, the first vowel is always deleted and the second one maintained: Subject + Verb Verb + Adverb tabular[t]lll kadao aten [kadaaten] he was quiet

Verb + Postposition/particle

Verb + Noun tabular[t]llll a. k-a-waat-o evla [kawaat evla] he found the wild cat

Word-internally, the same effect is observed. In examples a-f, the root clause markers a-/-, e-/i- delete in favor of the first vowel of the root. In examples g-h, the vowel of the object marker is deleted.

tabular[t]llllll a. k-a-erl-o /a-e/ [e] [kerlo] he walked

Glide formation The locative affix ano triggers glide formation if the first vowel is peripheral /i e u o/ (15)a-d, but vowel deletion if it is central / a/ (15)e-g.

tabular[t]llllll a. ugi-ano /i-a / [ja] [ugjano] inside the plank

Vowel fusion The demonstrative suffix -iCi (C = noun class concord consonant) shows reduction to [] with peripheral vowels (16)a-d or vowel fusion with central vowels (16)e-f.

tabular[t]llllll a. ugi-ii /i-i/ [] [ugi] this plank

It is hard to tell which vowel has been deleted since all peripheral vowels may reduce to [] (Gibbard et al 2009). When V1 is central, however, vowel fusion appears to take place, producing a central, but raised [].

Vowel reductionsec:ch5:vreduction The high vowels /i u/ centralize and reduce to [] and the mid vowels /e o/ may reduce to []; they are both transcribed here as []. Vowel reduction is variable, but occurs between consonants. It is often triggered by the addition of affixes, but may also occur across words, particularly in the verb - object configuration.

Between words tabular[t]ll kano awa → [kan awa] s/he swallowed water

Singular forms that begin with one of the vowels /i e u o/ show reduction to [] with the addition of a plural prefix /n-/:

tabular[t]llll singular plural

Reduction occurs after the progressive prefix v- in (19)a, and locative prefix ek-/ik- in (19)b,c. The object marker e causes reduction of the preceding vowel /o/ when attached as a suffix in (19)d, but it reduces itself when attached as a prefix in (19)e.

Affixes tabular[t]llll a. gili g̃vli s/he is buying

Epenthesisepenthesis The vowel [] (or [] under harmony) is inserted to break up consonant sequences, and to aid in the pronunciation of initial geminates. Some verb roots begin with geminate consonants. When they occur in the imperative with no prefixes, [] is inserted before obstruent geminates. There are also some nouns that appear to have epenthetic vowels.

tabular[t]llll Verbs Nouns

The other case of initial [] involves consonant sequences with initial liquids: /rl/ /rm/ /t/ /ln/, /lt/, /lt/ and /ld/. These sometimes alternate with CC. They may be considered epenthesis or metathesis (switching of and the first consonant).

tabular[t]lll CC CC

Epenthesis also occurs between consonant sequences that arise through morpheme concatenation.

Vowel harmonysection:vharmony Thetogovela Moro has a vowel harmony system that is productive, even applying to loanwords. The lower set of vowels /e a o/ raise to the higher counterparts /i u/ respectively. In addition, phonetic evidence suggests that there are two kinds of schwa, a lower // which patterns with /e a o/, and its alternate, a higher // that groups with /i u/ according to harmony (see Ritchart & Rose to appear for more details).

Unlike other Kordofanian languages, such as Tocho (REF) or Acheron (REF), there are no contrastive distinctions within the same height category, such as /e/ and // or /i/ and //, contrasts which are assumed to involve the feature Advanced Tongue Root (ATR).

Vowel height can be measured acoustically by using the first formant. A low first formant (F1) corresponds to a higher vowel, whereas a high F1 corresponds to lower vowel. Vowel backness corresponds to the second formant, or F2; low F2 corresponds to a backer vowel. The mean F1 and F2 values of the vowels for one male speaker (Elyasir Julima) are given below, plotted in a chart. The higher vowels [i] and [u] have a lower F1 than their lower counterparts [e] and [o]. The same is true for the peripheral vowels [] and [] versus [a] and [].

table tabular[t]llllll Vowel Mean F1 Standard Deviation Mean F2 Standard Deviation

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