

Khoekhoegowab tone sandhi and extended projections

Khoekhoegowab (Central Khoisan, Namibia) has a tone sandhi process consisting of opaque melodic substitution. Lexical items are underlyingly associated with one of 6 melodic contours; sandhi maps each ‘citation form’ contour onto an arbitrary ‘sandhi form’ contour:

(1) Sandhi forms:

Citation	Sandhi
SL-L	SL-L
SL H	L-SL
L H-SH	L
SH	H

In most syntactic contexts, sandhi affects all but the leftmost word in the XP; for example, within DPs only the leftmost word will surface with its citation melody, while all others will undergo sandhi (Haacke, 1999; Brugman, 2009). (In (2) and all following examples, words receiving citation melody are typeset in **bold face**; all other words undergo sandhi.)

- (2) a. **súúku**
pots
- b. |ápǎ sùùku
red pots
- c. **!nání** |àpa sùùku
six red pots
- d. ||náǎ !nàni |àpa sùùku
those six red pots

While the generalization stated above is correct for the nominal domain, the behavior of verbs is considerably more complex. Khoekhoegowab expresses tense, aspect, and polarity with enclitic particles. These particles come in two classes: Some clitics immediately follow the verb, while others instead encliticize to some preverbal XP. I hypothesize that the application of sandhi on the verb depends crucially on the position of tense marking: Verbs undergo sandhi when preceded by their tense marker.

To test this hypothesis, I conducted a prosodic production experiment. Pairs of sentences differing only in tense particle placement were constructed in a range of syntactic frames, including both matrix and embedded clause types; verbs were chosen only from the H and H-SH citation tone classes, in order to maximize distinctiveness between the citation and sandhi realizations. Four native Khoekhoegowab speakers were recorded reading each sentence twice, in random order. The verb was extracted from each recording in order to blind transcribers to the experiment; four phonetically-trained non-Khoekhoegowab-speaking transcribers were asked to classify each token as having undergone sandhi or not. A logistic regression model was used to evaluate the fixed effects of syntactic frame and tense-marker position on the likelihood of sandhi being transcribed.

The results of this experiment are consistent with the hypothesis that sandhi on the verb is triggered whenever a tense/aspect marker precedes the verb; so in (3-a) the imperfect marker *ra* conditions sandhi on the verb *ā* ‘cry’, while the postverbal negative nonfuture marker *tama* does not. Strikingly, this generalization is true even when the tense marker is separated from the verb by a considerable distance. For example, in VP-coordination structures the single preverbal tense marker may freely occur in either the first or the second conjunct. When it occurs in the second conjunct as in (4-a), only the second verb undergoes sandhi; when it occurs in the first conjunct as in (4-b), both verbs do. Put another way, it is not enough to be morphosyntactically associated with a tense marker from the preverbal class — the tense marker must actually precede the verb. This rules out any morphosyntactic analysis in which verb sandhi is simply a tonal morpheme encoding tense & aspect.

- (3) a. |Gǒâ-i ge ra àa. tama
 baby DECL IMPV cry. NEG.NONFUT
 “The baby is crying.” “The baby isn’t crying.”
- b. |Gǒâ-i ge áǎ
 baby DECL cry
- (4) a. Dandagob ge †khánísa ||ámǎ tsi né khòes go mà.
 D. DECL book buy and this woman PAST give
 “Dandago bought the book and gave it to this woman.”
- b. Dandagob ge †khánísa go ||àma tsi né khòes mà.
 D. DECL book PAST buy and this woman give
 “Dandago bought the book and gave it to this woman.”

I follow López (2009) in proposing that prosodic phrasing is subject to a constraint requiring that extended projections (Grimshaw, 1991) not be separated by prosodic boundaries. In Khoekhoegowab, this has the effect of requiring that the verb be phrased together with the tense marker, wherever it occurs. While in (4-b) this groups the verb *||ama* with the tense marker preceding it, in (4-a) this constraint will require an anomalous phrasing in which the verb forms a prosodic constituent with the second conjunct to the exclusion of the first. This leaves the verb at the left edge of the phonological phrase, allowing us to maintain the generalization that sandhi affects all but the leftmost word in each phrase.

If this analysis is correct, then prosodic structure must be sensitive to aspects of syntax beyond constituency; in particular, it must be able to see extended projection relationships. This lends support to recent proposals that prosody must be able to see head-argument relationships (Clemens, 2016).

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