Malagasy /nr/-strengthening within and across prosodic boundaries

Merina Malagasy (Western Austronesian, Madagascar) has been described as having a morpho-phonological process where /r/ is strengthened to the affricate [d͡r~d͡z] following the genitive morpheme /-n-/ (Paul, 1996; Pearson, 2005), as in (1).

(1) amy   -n-   rainy   =   ami**n'dr**ainy
    to   GEN   father   'to his father'

While Pearson (2005) describes this affrication as being generally a property of word-internal occurrences of /nr/, this has only been reported in the case of the genitive, as Malagasy's restriction on codas and complex onsets prohibits most instances of /nr/.

However, in recent years, a sound change involving the devoicing or deletion of some vowels has been reported (Pearson, 1994; Howe, 2019). In particular, unstressed /u/ and /i/ are most prone to deletion; when this occurs, it can create an environment where two consonants are now adjacent, where they otherwise would not be if the vowel had been present on the surface. This provides us with a good test case for whether strengthening of /nr/ is a property of word-internal instances of /nr/, as Pearson (2005) reports, or whether the domain of strengthening is more specific (i.e., to the genitive construction only) or more general (i.e., it can occur in domains larger than the prosodic word). Our research question, then, is as follows: What are the prosodic factors that determine the likelihood of /r/ affrication when following /n/?

Using data from two speakers of Merina Malagasy, we use a Maximum Entropy Harmonic Grammar (MaxEnt; Goldwater & Johnson 2003) to model speakers' production of /nr/. Data consisted of instances of surface /nr/ that emerged through the deletion of an intervening /i/ or /u/, either within a morpheme (2), across a root-affix boundary but within the same prosodic word (3), across two roots but within the same compound (4), across word boundaries but within the same phonological phrase (5)[1], or across phonological phrase boundaries (6).

(2) Ny   lehilahy   no   mire**nir**eny   lava
    DET   man   FOC   wander   always
    'It is the man who always wanders'
(3) Nitaraina   izy   fa   **ni-r**esadresakany   namany
    complained   he   COMP   Pst-chat   DET   his friends
    'He complained that his friends were chatting'
(4) Lafo   ny   ta**ni-r**avo
    expensive   DET   earth-happy
    'The chalk is expensive'
(5) Mahatofoka   ny   rono**no r**atsy
    disgusting   DET   milk   bad
    'The bad milk is disgusting'
(6) Mi**no** **R**abe   fa   mamy ny   ro
    think   Rabe   COMP   sweet DET   broth
    'Rabe thinks that the broth is sweet'

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[1] In Malagasy, the verb and its subject belong to different phonological phrases (Aziz, 2020).

In our dataset, we find that strengthening of /nr/ occurs even when not part of the genitive construction; thus, in our MaxEnt grammar, we assume that Malagasy penalizes instances of the surface sequence [nr], via a constraint *NR. The appearance of strengthening itself on an output form is achieved through the competition of that markedness constraint and a faithfulness constraint IDENT[SON], which disprefers the strengthening of /nr/.

Additionally, we added a number of constraints dispreferring strengthening across specific boundaries to test which factors contribute to the probability that /nr/ is strengthened in Merina Malagasy:

(7)   *STRENGTHENACROSSMORPHEME
        Incur a violation for each instance of strengthened /nr/ that crosses a morpheme boundary (as in (3) above).
     *STRENGTHENACROSSCOMPOUND
        Incur a violation for each instance of strengthened /nr/ that crosses the boundary of a compounding element within a compound word (as in (4) above).
     *STRENGTHENACROSSWORD
        Incur a violation for each instance of strengthened /nr/ that crosses a word boundary (as in (5) above).
     *STRENGTHENACROSSPHRASE
        Incur a violation for each instance of strengthened /nr/ that crosses a phonological phrase boundary (as in (6) above).

When added, *STRENGTHENACROSSMORPHEME, *STRENGTHENACROSSCOMPOUND, and *STRENGTHENACROSSWORD were not found to significantly improve the model fit. However, *STRENGHTENACROSSPHRASE was found to significantly contribute to the likelihood that /nr/ is strengthened, indicating that the strengthening process is most likely to occur within, not across, the phonological phrase.

This result contradicts previous mentions of the strengthening process described in the literature (Pearson, 2005) and instead suggests that it is sensitive to phrase boundaries, not word boundaries. In addition, this finding augments our understanding of Malagasy phonology and prosody more generally – whereas Aziz (2020) describes phonological phrases using intonational measures, this is the first study to use a segmental phonological process as a diagnostic of phonological phrasing in Malagasy.

References
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