

## Crazy metrical rules: Revisiting quantity adjustments in Menominee

Noam Faust & Francesc Torres-Tamarit

The emphasis on naturalness in synchronic phonological theory is challenged by the existence of *crazy rules*, as termed by Bach and Harms (1972). Rules are crazy when they are phonetically unnatural. Such rules are often the result of a series of independently motivated diachronic processes that end up producing an (apparently) implausible synchronic scenario.

Most crazy rules we are aware of are segmental. Odden (2011) writes that “closed syllable lengthening or open syllable shortening appear to be unattested”. Along the same lines, Scheer (2015) claims that “there are crazy segmental rules, but no crazy syllable-related processes (such as open syllable shortening)”. However, closed syllable lengthening (CSL) and open syllable shortening (OSS) have both been reported for the Algonquian language Menominee (Bloomfield 1962, Pesetsky 1979, Hayes 1995, Buckley 2000, Milligan 2005).

Menominee is a rightward iambic language with final consonant extrametricality that displays CSL and OSS in heads of non-initial disyllabic feet, as illustrated respectively in (1a) and (1b). Italicized sequences correspond to foot heads.

- (1) a. Closed syllable lengthening
- |                                 |   |                                |                      |
|---------------------------------|---|--------------------------------|----------------------|
| $k\varepsilon:mewah-k-en$       | → | $(k\varepsilon:)(mewa:h)ke<n>$ | ‘whenever it rains’  |
| <i>cf.</i> $k\varepsilon:mewah$ | → | $(k\varepsilon:)(mewa)<h>$     | ‘when it rained’     |
| $payo:se-yahken$                | → | $(payo:)(seya:h)ke<n>$         | ‘whenever we embark’ |
| <i>cf.</i> $payo:se-yan-en$     | → | $(payo:)(seya)ne<n>$           | ‘whenever I embark’  |
- b. Open syllable shortening
- |  |   |                                      |                          |
|--|---|--------------------------------------|--------------------------|
| $ne-natom-a:w$                             | → | $(nena:)(toma)<w>$                   | ‘I call him’             |
| <i>cf.</i> $natom-a:w$                     | → | $(nato:)(ma:)<w>$                    | ‘he is called’           |
| $n\varepsilon:kan-\varepsilon:k$           | → | $(n\varepsilon:)(kan\varepsilon)<k>$ | ‘when you-pl. left him’  |
| <i>cf.</i> $n\varepsilonkan-\varepsilon:k$ | → | $(neka:)(n\varepsilon:)<k>$          | ‘when you-pl. leave him’ |

Hayes (1995) proposes a possible historic explanation of the Menominee facts. At a first stage, short vowels in all syllabic positions lengthened in foot head position. At a second stage, in non-initial feet vowel length was reduced and vowels surfaced with an intermediate length. At a third stage, speakers assigned a phonological category, short or long, to such vowels with intermediate length. Because vowels in open syllables are intrinsically longer (Maddieson 1985), intermediate length in an open syllable was recategorized as a short vowel displaying phonetic lengthening. Inversely, intermediate length in a closed syllable was recategorized as a long vowel. At a fourth stage, the restructured categories were grammaticalized and then a new rule derived long vowels when parsed into closed syllables and short vowels when parsed into open syllables.

Our intention in this paper is to try to translate Hayes’s (1995) diachronic conjecture into Boersma and Hamann’s BiPhon model (several publications), a modular model of phonology that assumes a non-universal, bidirectional mapping between phonological surface representations and auditory forms, and between auditory forms and articulatory forms. Let us suppose that Menominee has iambic lengthening in both open and closed syllables (where coda consonants are not weight-contributing), a typologically unremarkable phenomenon. Iambic lengthening produces the phonological surface form  $/(\sigma CV:)/$ . This phonological surface form is then mapped onto an auditory form that also contains a long vowel  $[(\sigma CV:)]$ . This mapping is regulated by cue constraints that assign each weight unit specific length. The auditory form is then mapped onto an articulatory form. This mapping is regulated by sensorimotor constraints, which express universal tendencies. For OSS we could postulate a sensorimotor constraint that takes into account that if one hears a long vowel in an open syllable in a prominent position, this length does not need to be transmitted to the articulatory form. This is so because length can be recovered acoustically, due to the universal bias favoring longer vowels in open syllables. In the case of closed syllables, in contrast, iambic lengthening is not expected to be blocked: length in closed syllables cannot be obviated on acoustic grounds.

Our claim is that (i) apparently crazy metrical rules exist; (ii) like crazy melodic rules, they can be the result of a synchronic model of phonology, specifically one that includes perception as part of the theory, and that (iii) asymmetries between perception and production might exist due to recoverability effects based on universal tendencies.