In the grey zone of the Sonority Hierarchy: A typology of syllabic consonants and their non-consonantal properties

Martin Krämer*
University of Tromsø

Syllabic consonants are often subject to severe phonotactic restrictions and, compared with vocalic nuclei, may be defective in a variety of ways. They may systematically lack either the onset, or the coda, or both; or may be confined to specific positions within words. In some cases, however, syllabic consonants are well integrated into the vowel system. We show here that this is a gradient phenomenon, ranging from highly restricted defective consonantal nuclei to their full vocalic functionality, including stressability, lengthening under stress, and participation in vocalic length and tone contrasts.

If we consider sonority as the most important criterion for syllabicity, we expect that languages make a cut somewhere on a universally fixed hierarchy, and admit in the syllable nucleus all segments above this line, while prohibiting in this position segments below this line. In the least controversial sonority hierarchy, obstruents (O) are lowest, nasals (N) higher than O and liquids (L) higher than N, and within L, rhotics (Rh) higher than laterals (La) (see references in Parker 2011). Accordingly, the consonants most likely to be syllabic and most likely to be integrated into vocalic systems are rhotics, followed by laterals, followed by nasals; while obstruents are the least likely. However, in a cross-linguistic survey of the syllabic status of consonants, we found a number of departures from this scenario. First, in languages such as Lendu not only members of the higher sonority classes, N and L, but also sibilants, can be syllabic and display a range of vocalic properties. Second, our findings on length contrast among syllabic consonants are inconsistent with the implicational hierarchy of geminate consonants, according to which voiceless stops are most likely to occur as contrastive geminates, followed by the other classes in the order they occupy in the sonority hierarchy (Taylor 1985, Morén 2001). However, syllabic consonants of higher sonority are most likely to display a length contrast. Yet length contrasts in consonants are standardly analyzed in moraic terms (Hayes 1989) and are expected to follow uniform principles, regardless of whether length is contrastive or can be attributed to Weight-by-Position, assigning a mora to coda consonants, which favors sonorants over obstruents (Zec 1989, Morén 2001).

We now turn to specific scenarios. In English, for example, liquids and nasals can be syllabic. However, only the rhotic can be stressed (e.g., American English *kernel* [ˈkʰɻ̩.nɬ̩]). While rhotics can serve as nuclei in monosyllables, as in *burn* [bɻ̩n], laterals cannot (cf. Hayes 1995). This implicational relation is of a more general nature. In Slovak, the liquids /r/ and /l/ can be syllabic, and are integrated into the vocalic system: they contrast in length and can be stressed. In Serbo-Croatian and Yurok (Robins 1958) only /r/ but not /l/ is syllabic. Yurok /r/ patterns as a consonant, participating in the plain vs. glottalized contrast restricted to consonants, and also patterns as a vowel, participating in the vocalic length contrast. Lendu (Tucker 1967) distinguishes a rhotic and a lateral liquid, but allows only the rhotic and a sibilant in the syllable nucleus. While nasals can carry tone in word-initial position when preceding a voiced stop and are thus at least moraic, no words with a stressed nasal have been reported. However, syllabic sibilants and rhotics can be stressed and also participate in length contrasts; and the sibilants can bear tone.

Likewise, in Senoufo (Mills 1984), syllabic nasals (the only syllabic consonants, even though the inventory includes lateral liquids) pattern with vowels by contrasting in length and being stressable. In Chiricahua Apache (Hoijer 1963), which has no rhotic, both the lateral and nasals are syllabic, but only the nasal is tone bearing and participates in a length contrast also found in vowels. However, in Nabak (Fabian & Fabian 1971, 1998), nasals are the only consonants that can be syllabic, yet these nasals are not quite integrated into the vowel system. Word-

* Joint work with Draga Zec (Cornell University)

initial stress falls both on vowels and word-initial syllabic nasals. Some Nabak speakers augment the forms with a stressed syllabic nasal with an epenthetic vowel, yet no epenthesis occurs after unstressed syllabic nasals.

Our comparison of syllabic consonants in selected languages suggests an OT analysis in terms of four markedness hierarchies interacting with faithfulness, one on nucleus compatibility, one on stressability, one on tone compatibility, and one on length compatibility in the nucleus, which deviate from the generally assumed sonority rankings. The variation in syllabicity suggests that, cross-linguistically, the sonority ranking may vary for nasals, rhotics and sibilants, but not for laterals, whose sonority is lower than generally expected. We propose that Kenstowicz' (1996) markedness hierarchy for quality sensitive stress, which includes only vowels, be extended to also include consonants, but with laterals of higher markedness than in the usual sonority ranking, and flexible markedness of stridents, rhotics and nasals. This is modelled with a partially stringent constraint set (for stringency see Prince 1998, de Lacy 2006, Merchant & Krämer 2018) rather than universally fixed rankings. The constraints in (1) are violated when a candidate has an obstruent or any of the other classes referred to in the respective constraint in a stressed nucleus. The typological preference of rhotics over laterals in this position is an effect of the relation between the two constraints in (1a), which render laterals more marked than rhotics regardless of the ranking of these two constraints.

(1) Constraints on quality-sensitive stress
   a. *ˈNuc(O), *ˈNuc(O, Lat), *ˈNuc(O, L)
   b. *ˈNuc(O, strident), *ˈNuc(O, N)
   c. *ˈNuc(C, high vowel), *ˈNuc(C, nonlow V)

The factorial typology of these constraints captures not only the potential of consonantal nuclei to bear stress, but more generally, their potential to be integrated into the vowel system. Together with the parallel less specific hierarchy on nuclei given in (2) (an adapted H-NUC hierarchy, Prince & Smolensky 1993) this captures the gradience effects in the typology of syllabic consonants, including the vowel-like behavior of rhotics but not laterals, as well as the restriction of vowel epenthesis in Nabak to stressed rather than all syllabic nasals.

(2) Constraints on syllabicity, H-Nuc revised
*Nuc(O), *Nuc(O, Lat), *Nuc(O, strdnt), *Nuc(O, N), *Nuc(O, L)

A third parallel constraint set on length accounts for the observations on length. Syllabic consonants can only be long if vowels can be long too.

(3) Constraints on length in the nucleus
*Nucμμ(O), *Nucμμ(O, Lat) ›› *Nucμμ(O, strdnt), *Nucμμ(O, N), *Nucμμ(O, L)

A consonant can only be stressed if it is allowed to be syllabic, i.e., constraint sets (1) and (2) are in a stringency relation, and it can only be long in a nucleus if it is legal there. This is accounted for by the stringent relation between (2) and (3). In addition, in many languages length in nuclei is restricted to stressed syllables. We expect the constraints on tone compatibility to be parallel to those on length. The constraint sets also account for the observation that obstruents are hardly ever syllabic and never to the exclusion of higher sonority classes.

In conclusion, rhotics, sibilants and nasals inhabit a grey zone in the Sonority Hierarchy between vowels and consonants where each of them can lean towards either major category, or both. No obstruents other than sibilants are found as the only consonant class admitted in the nucleus. In sum, three parallel sets of stringently related markedness constraints in conflict with faithfulness account for the gradient vocalic behavior of syllabic consonants observed cross-linguistically. The individual constraints within sets systematically target different segment classes of different sonority that are parallel in all constraint sets.