A CASE OF GROUNDED COMPENSATORY LENGTHENING IN HUNGARIAN

Hungarian evidences a number of variable or optional compensatory lengthening (CL) processes, whereby in casual speech a consonant in the coda position of a syllable is deleted and, as a result, a preceding short vowel is lengthened (Siptár & Törkenczy 2000). In this paper we will be concerned with only those cases where CL is induced by the loss of /n/, as in the following examples: *nagyon furcsa* 'very odd' [nɒɟõːfurʧɒ] (/onf/ → [õːf]), *szenved* 'suffers' [sɛ̃ːvɛd] (/ɛnv/ → [ɛ̃ːv]); *impotens* 'impotent' [impotɛ̃ːʃ] (/ɛnʃ/ → [ɛ̃ːʃ]). Two important characteristics of CL induced by the loss of /n/ are: (1) the loss of /n/ is accompanied by both the lengthening and prominent nasalization of the preceding vowel (underlying long vowels only show the effect of nasalization, i.e. they are not lengthened), and (2) /n/ must be followed by a continuant consonant. The following examples demonstrate that /n/ is retained, hence CL-cum-nasalization is obviated, before a stop or affricate: *negyven perc* 'forty minutes' [nɛɟvɛmpɛrʦ] (*[nɛɟvɛ̃ːpɛrʦ]); *kuncog* 'chuckle' [kunʦog] (*[kũːʦog]); *tinta* 'ink' [tintɒ] (*[tĩːtɒ]).

Recent phonological treatments of CL phenomena involving the loss of a consonant in the coda position of a syllable have postulated that the consonant is associated with a mora, the basic unit of phonological weight. Though this consonant is absent phonetically, its mora unit is preserved by being realized on the preceding vowel, which becomes long by virtue of it being bimoraic (one of its morae is inherent, the other is received from the coda consonant).

In classic moraic theory, CL is a two-step process (Hayes 1989): the consonant in coda position is deleted, leaving behind its mora unit; the unaffiliated mora is reassociated to the preceding vowel.

But what about the fact that CL is triggered only by a following continuant consonant? In this regard, the moraic phonology treatment lacks explanatory force: it must stipulate that /n/ is deleted precisely before the class of continuant consonants.

In the constraint-based approach of classic optimality theory and its successor versions (McCarthy 2002, 2007), choosing the output candidate [sɛ̃ːvɛd] as optimal from the input /sɛnvɛd/ entails minimally the following: (1) the highly ranked markedness constraint *n CONT (/n/ cannot be followed by a continuant consonant) can be respected in a number ways, including, but not limited to: (a) deleting /n/; (b) inserting a vowel between /n/ and the continuant consonant; (c) deleting the continuant consonant. Of the competing output candidates, option (a) is flagged as optimal by proper constraint ranking; (2) /n/ is moraic, and both its mora unit and [nasal] feature must be preserved in the most harmonic output (mora and [nasal] faithfulness); (3) an empty (unassociated) mora is filled (associated) with the features of a preceding vowel, which becomes long by virtue of its bimoraic status.

The optimality theoretic analysis, which crucially relies on the markedness constraint * n CONT, is just as stipulative as the rule based analysis, unless this constraint can be shown to have phonetic motivation.

The purpose of the present work is to argue that the loss of /n/ before continuants and vowel lengthening, the two integral components of CL under consideration, are in fact phonetically grounded. We base our claims in part on articulatory phonetics, and in part on the results of an acoustic phonetic experiment we conducted.

Eight native Hungarian speakers read isolated words and phrases in a sound-proofed chamber. The data consisted of Hungarian words and phrases that contain the dento-alveolar nasal /n/ followed by either a fricative or a stop / affricate consonant; these represent the possible and impossible CL contexts, respectively. There were four vowels used in the material: two front (*i* [i], *e* [ɛ]) and two back (*o* [o], *a* [ɒ]). The data were recorded and digitalized up to 44,000 Hz. Acoustic phonetic analysis (measurements of duration and formant frequencies) was carried out by Praat software, statistical evaluation by ANOVA and regression analysis.

There are two principal aspects of the CL facts involving /n/ that require explanation. The first question is: why does /n/ drop out before continuants but not before non-continuants (stops and affricates)? The explanation lies in the basic difference between the articulation of /n/ plus continuant clusters vs. /n/ plus non-continuant clusters. If /n/ is followed by a non-continuant, the entire cluster shares the same place of articulation (e.g., /n/ is pronounced as bilabial [m] before the bilabials [p], [b], or [m] -- the lips make a single closure for [mp], [mb], and [mm]). In all of these cases, the closure gesture is shared by the nasal consonant and the following consonant. The air must flow through the nasal cavity, since the oral cavity is closed. If the closure were for some reason eliminated, the stop or the affricate consonant could not be pronounced. So to maintain the stability of the quintessential consonant articulation, blockage of airflow, /n/ is co-articulated with a flowing stop or affricate.

The case with /n/ followed by continuants is totally different. The nasal consonant does not need to have a closure, anticipating the lack of closure in the articulation of the following consonant. Nasality can be accomplished by augmenting the lowering of the velum in terms of narrowing the channel bounded by the speech organs at the opposite end. As a result, the air flows through both the oral and the nasal cavities. Most typically (in 94.5% of the cases in our data), the consequence of this articulation is that the nasal consonant is realized as a transitional phase and the preceding vowel is nasalized to various degrees.

The second question is: in cases where /n/ is not pronounced, why is a preceding short vowel realized as long? Our study revealed that the lengthening of the vowel before an unpronounced /n/ is 100% correlated with nasalization: the vowel that is the reflex of /n/ is both long and nasalized. And therein lies the clue to understanding the CL phenomenon of Hungarian involving /n/. As argued above, there are good articulatory reasons for /n/ not to be realized in the shape of a nasal consonant before continuant consonants. An extreme, one might say immediate, resolution of this pressure is to drop the nasal consonant lock stock and barrel, without any residue; in our study, this happened in circa 5.5% of the time. But more commonly, the dissolution of /n/ is not as sudden. With the nasal cavity opened up by a lowered velum, the tongue fails to make a closure in the oral cavity, bringing about an articulatory time span which is characterized as having nasal airflow but lacking oral gesture. This unarticulated nasal phase can not exist in a vacuum; it most naturally settles on and becomes part of the preceding vowel. It is this extra nasal span that gives the host vowel its newfound nasality and expanded space.

Our experimental study lends acoustic / phonetic basis to the phonologically based claim by Siptár & Törkenczy (2000) that the facts of CL involving the loss of /n/ are to be accounted for in the post-lexical stratum of phonology.