Possible theoretical relevance of subphonemic vowel reduction in Hungarian

Hungarian has been a much discussed language in the literature due to its unique features among European languages, but there are several claims that have been assumed as valid for Hungarian without clearly checking the validity of the information. Such an assumption made on Hungarian closely related to the also controversial stress pattern of the language is that there is scarce centralization or reduction of (unstressed) vowels, as it is usual in syllable-timed languages (Roach 1982). Whereas this seems to be true phonemically, the extent of phonetic centralization has been scarcely researched. A commonplace claim (like that of Hungarian has a typical left-to-right trochaic stress system) is that there is no such, or at most very weak vowel reduction in Hungarian. The situation however seems to be more complicated.

To see whether the no-reduction claim is valid four environments were studied (/tɒz/, /ʃɒk/, /hoɟ/ and /kɛɟ/) in four stress conditions: stressed, unstressed and unstressed in function words in casual speech and stressed in careful speech with 7 native Hungarian speakers.

Results show that subphonemic centralization is an existing phenomenon in spoken casual Hungarian and its behavior is consistent across speakers and in multiple recordings. The quality of the underlying vowel affects the extent of reduction: /ɛ/ does not centralize its F2 formant, however its F1 formant is lowered to a quality around [e̞] in faster speech, regardless of the presence of stress; /o/ and /ɒ/ do centralize their formants towards the target of [ə] and the degree of this process is indeed related to stress as the more stressed the vowel is the less reduction it undergoes. For summary see the table below.

	/ʃɒk/	/tɒz/	/kɛɟ/	/hoɟ/
careful speech	[ɒ̟]	[ɒ̟]	[ɛ]	[o]
stressed	[ɐ̝]	[ɐ]	[e̞]	[o̞]
unstressed	[ɐ̝]	[ə̟]	[e̞]	[ə̲]
function word	[ə̝]	[ə̟]	[e̞]	[ə]

Table 1: Average vowel quality in examined environments

The arising question here is whether these phonetically measureable constistent reduction processes have any theoretical, or phonological relevance. The answer may be yes if there is a theoretical background that sees phonological patterns in languages as emergent from the nature of diachronic processes that have been so far explained as consequences of universal innate rules or constraints. Such theoretical analyses do exist, even in older literature (Ohala 1981) and in vast amount in recent years, mostly based on Evolutionary Phonology (Blevins 2004). If such analysis is accepted, than extra-phonological or subphonological explanations for sound patterns may even have "priority over competing phonological explanations unless independent evidence demonstrates that a purely phonological account is warranted" (Blevins 2006:124). Therefore it seems to be worth to take a closer look on several theories on their validity on the Hungarian data and on the extra-phonological groundedness they provide.

In standard Optimality Theory variation such as optional vowel reduction (Anttila 2007, Crosswhite 2004) is usually modeled as constraint re-ranking. In the account of Crosswhite (2004) the pattern seen in Hungarian belongs to the prominence reduction type. As thus, it can be analyzed using markedness constraints like e.g. UNSTRESSED/ɒ and faithfulness constraints of given vowel features like MAX[+BACK] that are ranked high, so in careful speech no reduction is present. These

faithfulness constraints are then re-ranked below certain markedness constraints in casual or faster speech, thus certain features are oppressed in the surface. This analysis however fails to answer why some faithfulness constraints are demoted and some are not, thus it might be problematic to adopt a plausible evolutionary reasoning on the pattern of certain vowel reduction types, including the pattern seen above in Hungarian.

The account of Harris (2004) handles vowel reduction as a loss of some elements of information (called (A), (I) and (U) for vowels) that define spectral properties of vowels provides a different analysis of the Hungarian phenomena. In this account, Hungarian reduction seems to be similar to the Catalan process cited in Harris (2004), but while Catalan suppresses the (A) and (I) elements while preserving the (U) element in unstressed environments; Hungarian seems to suppress (A) and (U) while preserving (I). This account can also provide some predictions for the reduction of vowels that are yet to be examined in future research, e.g. /y/ > [i] ∼ [ɪ] but /u/ > [ʊ] ∼ [ə].

Harris's analysis might be a synchronic theory, but it is easy to be adopted as a diachronical approach as these elements are based on phonetic information (Harris 2007) that lie on the ground on the Dispersion-Focalization Theory (Schwartz et al. 1997). This theory as an extra-phonological account can be able to provide the answer why certain diachronic processes exist, and what is the synchronic emergence of these patterns (Oudeyer 2006:57). This may mean that subphonemic processes like the one seen above may be worthwhile to be examined as they might emerge to a pattern of truly phonological nature in a later state of the language.

Another theoretical question might be that if consistent (however subphonemic) centralization is found in Hungarian, then the relation of syllable-timing and vowel reduction might have to be reconsidered.

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