Pöchtrager, Markus Alexander

A structural approach to vowel reduction

Problem. Eastern Catalan (EC; Wheeler 2005) and Brazilian Portuguese (BP; da Silva 1992) have seemingly identical 7-vowel systems, which, however, reduce differently in unstressed position, cf. (1) overleaf. Within Government Phonology (GP; Kaye, Lowenstamm & Vergnaud 1985, 1990), vowel reduction is understood as the loss of elements in unstressed position (Harris 1997, 2005, Harris & Lindsey 1995, 2000). This allows for the easy expression of the BP merger of [e] and [i] as [i]: In [e] the element I is head and A non-head, i.e. ({A}I), while in [i] the sole element I is head, i.e. ({}I). The merger is effected by loss of A. Despite the attractiveness of such an account, it remains unclear how a merger of BP [e] and $[\varepsilon]$ as $[\varepsilon]$ is effected: Two interpretations are conceivable for $[\varepsilon]$, ({I}A) or ({I,A}), the latter having no head. In order to go from one of the those two possibilities to [e], i.e. ({A}D). a rearrangement of elements is necessary, but no element is lost. Problem 1 (P1): Why do loss of an element and *rearrangement* of elements both "count" as the same, i.e. as reduction? (Nevins 2012 simply assumes that the unheaded version is weaker.) Furthermore (P2), it is not clear why BP $[e]/[\varepsilon]$ would merge as [e] and not as $[\varepsilon]$ (a different rearrangement), also a problem in Italian or Slovenian vowel reduction. Lastly (P3), why do BP [i]/[e]/[ɛ] merge as [i] in parallel to [u]/[o]/[o] as [u], cf. (1), while EC has an asymmetry with $[e]/[\varepsilon]$ going to [o]but [0]/[5] going to [u]? This presentation tries to address all three problems in one fell swoop.

Proposal. Building on GP 2.0 (Pöchtrager 2006, Živanovič & Pöchtrager 2010, Pöchtrager & Kaye 2013), in particular the idea that old A is reinterpreted as more (empty) structure (Pöchtrager 2010, 2013), I argue for the following internal structure of vowels: [i], GP's empty nucleus, is a simple nuclear head xN. [i/u/a] involve an adjunction to the head with I [i], U [u] or nothing [ρ]. [e/o/a] involve an additional projection up to N', [ϵ / σ] yet a further projection to N''. (The lack of a third vowel is yet unclear.) (2) illustrates this for $\left[\frac{u}{0}\right]$. Roughly, the more open a vowel, the more empty structure there is. Reduction can now be uniformly expressed as the loss of structure: BP [o] to [o] involves the loss of N'', [o] to [u] that of N'. EC simply combines both steps in one. P1 and P2 are solved in one go. P3 can be tackled in the following way: Assume that the element I sits high up in EC (3), while I sits in a lower position in BP (4). U is low in both languages. If tree pruning starts from the top, then EC I will be lost immediately, as the branch it sits on is cut off first. BP I, being low, is safe, as is U in both EC and BP. We derive the asymmetry in reduction patterns. Further evidence for the low position of I in BP comes from alveolar palatalisation (absent from EC, alas): BP [t/d] go to [t]/d3] before [i], but not before $[e/\varepsilon]$. All three vowels contain I, but in $[e/\varepsilon]$ it is buried deep in the structure and thus has no effect on what precedes. I in [i] is not shielded off by structure in the same way. In a similar vein, the following prediction can be made for Russian: In Russian, [i] consistently palatalises preceding consonants, while this does not hold exceptionlessly for [e]. This can be explained by assuming that in Russian [e] I is shielded off by empty structure, just like in BP. If that is the case, [e] should reduce to [i] in unstressed position, since the I is buried deep and will not be affected by tree-pruning. This prediction is correct.

Further issues. The microvariation between EC and BP is only a start, but the proposal leads further: **1.** Lowenstamm (1996) claims that in the templatic language Chaha [ϑ] acts as the smaller version of [a]. This follows as a corollary from my proposal. **2.** (Old) **A** has been claimed to underlie alveolars, too (Broadbent 1991). If **A** is replaced by more empty structure, then alveolars must be bigger than consonants of other places of articulation and should be more susceptible to lenition. This serves to explain why d/t are lenited (tapping) in English rather than velars/labials. **3.** The last point also raises the more general question whether *all*

lenitions are about structure. In GP 2.0, A is replaced by structure, but so are the old elements **?** (stop) and **H** (voicelessness), albeit by somewhat different types of structure. Certainly stopness is a lenition target (Spanish: Harris 1969, Catalan: Wheeler 2005, Danish: Basbøll 2005) and so is voicelessness (Danish: Basbøll 2005).

(1)					(2)		(3)		(4)
					[u]	[0]	[၁]	EC [ε]	BP [ε]
tonic	i	eε	a	o u			N "	N "	N"
Brazilian Portuguese							/ \	/ \	/ \
pre-tonic	i	е	a	o u		N '	N' X	N' X	N' X
post-tonic/	i		ə	u		/ \	/ \	/ \ 1	/ \
final					/ \	×IN × / \	XNX / \	/ \	×IN × / \
Eastern Catalan					xN x	xN x	xN x	xN x	xN x
atonic	i ə		u	υ	U	U		I	

References

Basbøll, Hans. 2005. The Phonology of Danish. Oxford: Oxford University Press.

Broadbent, Judith M. 1991. Linking and Intrusive r in English. UCL Working Papers in Linguistics **3**. 281–301.

da Silva, Thaïs Cristófaro Alves. 1992. *Nuclear Phenomena in Brazilian Portuguese*. Ph.D. thesis, School of Oriental and African Studies, University of London.

Harris, James W. 1969. Spanish Phonology. Cambridge, Mass. & London: MIT Press.

Harris, John. 1997. Licensing Inheritance: an integrated theory of neutralisation. *Phonology* **14**. 315–370.

Harris, John. 2005. Vowel reduction as information loss. In Philip Carr, Jacques Durand & Colin J. Ewen (eds.) *Headhood, elements, specification and contrastivity*. Amsterdam: Benjamins. 119–132.

Harris, John & Geoff Lindsey. 1995. The elements of phonological representation. In Jacques Durand & Francis Katamba (eds.) *Frontiers of Phonology: Atoms, Structures, Derivations*. London, New York: Longman. 34–79.

Harris, John & Geoff Lindsey. 2000. Vowel patterns in mind and sound. In Noel Burton-Roberts, Philip Carr & Gerry Docherty (eds.) *Phonological knowledge: conceptual and empirical issues*. Oxford: Oxford University Press. 185–205.

Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. 1985. The internal structure of phonological elements: a theory of charm and government. *Phonology Yearbook* **2**. 303–328.

Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud. 1990. Constituent structure and government in phonology. *Phonology* **7:2**. 193–231.

Lowenstamm, Jean. 1996. CV as the only syllable type. In Jacques Durand & Bernard Laks (eds.) *Current Trends in Phonology: Models and Methods*. Salford, Manchester: European Studies Research Institute (ESRI). Vol. II. 419–441.

Nevins, Andrew. 2012. Vowel lenition and fortition in Brazilian Portuguese. Letras de Hoje **47: 3.** 228–233.

Pöchtrager, Markus A. 2006. The Structure of Length. Phd dissertation, University of Vienna.

Pöchtrager, Markus A. 2010. *Dial A for Adjunction*. Paper at the Old World Conference in Phonology 7, 28–30 January, Nice.

Pöchtrager, Markus A. 2013. *Alveolars, size and lenition*. Paper at the 21st Manchester Phonology Meeting, 23–25 May, Manchester.

Pöchtrager, Markus A. & Jonathan Kaye. 2013. GP 2.0. *SOAS Working Papers in Linguistics* **16**. 51–64.

Wheeler, Max M. 2005. The Phonology of Catalan. Oxford: Oxford University Press.

Živanovič, Sašo & Markus A. Pöchtrager. 2010. GP 2, and Putonghua too. *Acta Linguistica Hungarica* **57:4**. 357–380.