A Neo-Jakobsonian merger of [−ATR], lowering, and emphaticness with aperture

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Claim. The primitives underlying (vocalic) aperture and [ATR] are usually seen as distinct; Schane (1990) and Rennison (1996) are notable exceptions. In this presentation, couched within Government Phonology 2.0, I argue that aperture is structure and that [−ATR] is a particular position in that structure: a specifier. This not only allows for a straightforward account of Standard Yoruba vowel harmony (the main focus of this abstract), but also extends naturally to lowering (as triggered by French *r*) and emphaticness (as in Arabic).

Background. In Government Phonology (GP; Kaye, Lowenstamm & Vergnaud 1990), designating (any) one element in a set as the head expresses [+ATR] (Cobb 2003; van der Hulst 2018 for the opposite view): Thus ({**A**}**I̲**), with **I** the head, counts as the [+ATR] vowel [e]; while ({**A,I**}**__**), with no head, is [−ATR] [ɛ]. This is (mostly) independent from the expression of openness, captured by (the presence and role of) **A**.

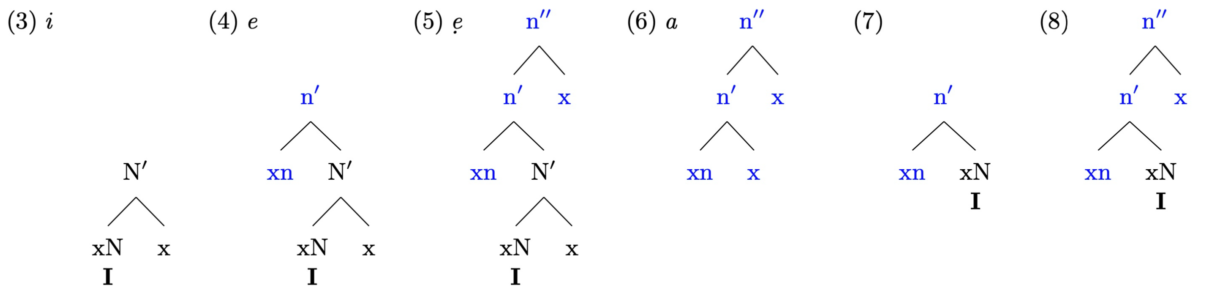
The offspring GP 2.0 (Pöchtrager 2006 & references below) reinterprets as structural certain phonological properties commonly taken as melodic. This includes the element **A** (aperture in vowels, coronality in consonants), which interacts with (constituent) structure by allowing for bigger structures than otherwise possible. Fudge (1969), Selkirk (1982), or Vaux & Wolfe (2009) assume special syllabic positions for coronals since the size limit of English mono-syllables (VVC/VCC: *seek*, *late*/*sink*, *left*) can be exceeded (to VVCC) if both final consonants are coronal: *fiend* (**fiemp*/**fienk*), *count* (**coump*/**counk*), *feast* (**feasp*/**feask*) etc. But special syllabic positions do not explain *why* coronals are special. Also, vowels show similar "excesses": Southern British English has long *a* in *draft*, *task*, *clasp* but only one coronal following; the vowel (**A**) makes up for a coronal. GP 2.0 reinterprets **A** as a structural configuration, with part of the structure "unused" and available to adjacent segments. (In *fiend* the long vowel borrows space from the coronals.) Coronality and aperture (both old **A**) *are* structure; objects that used to contain **A** are bigger (rather: contain more empty structure) than those without. This provides, amongst other things, a scalar representation of openness from which several types of vowel reduction (and lenition in general) as well as stress-related phenomena fall out (Pöchtrager 2006, 2018, 2020, 2021 for detailed analyses).

Standard Yoruba (SY) has 7 oral vowels (Bamgbọṣe 1967); the higher 4 [+ATR], the lower 3 [−ATR], cf. (1). That table also already suggests a close link between openness and [ATR]. In addition, there are three facts about harmony that should ideally follow from the theory: (a) Mid-vowels are [−ATR] when followed by another [−ATR] vowel (mid or low). (b) The vowel *a* is a trigger, but not a target. (c) The high vowels are neither target nor trigger, but instead block harmony. All these points are illustrated in (2).

(1)	*i*	*u*		(2)	*ẹsẹ̀* 'foot' **esẹ̀*
	e	*o*	[+ATR]		*ọbẹ̀* 'soup' **obẹ̀*
	ẹ /ɛ/	*ọ* /ɔ/	[−ATR]		*ẹ̀pà* 'groundnut' **epà*
	a				*Yorùbá* 'Yoruba' **Yọrùbá*

Proposal. [−ATR] vowels are more complex than their [+ATR] counterparts; [−ATR] means more structure, *as does aperture,* but the two differ in internal arrangement; see below. Schane (1990) makes a similar (less elaborate) equation, but treats both as *melodic* properties, thus leaving the interaction of (the old element) **A** with structure completely unexplained.

Application. In GP 2.0 nuclei have a bipartite structure (Pöchtrager 2018, 2020, 2021) of up to two heads (xn, xN), with xn on top of xN (if both are present). Each head projects maximally twice (xn–n'–n", xN–N'–N") in accordance with x-bar theory. Aperture is expressed by the *amount of empty structure.* Note that since the theory gives structure a more important role to play, the number of skeletal positions (xn, xN, x) involved in (say) a short vowel will increase considerably. This can be seen in (3–6), which show SY *i e ẹ a*.



Any particular language has a subset of universally possible structures; I assume that SY limits elements to xN, which also bars combinations of **I** and **U** (ie. front rounded vowels), given a limit of one element per head. *[−ATR] is expressed by a specifier of xn (Specxn),* which is crucial for harmony: If a vowel projects up to Specxn, then a vowel to its left will do as well, provided it contains xn to begin with. This derives the three properties of harmony: (a) Mid vowels contain xn, thus, when preceding a vowel with Specxn (the triggers *ẹ ọ a*), they themselves must project up to Specxn (=*ẹ ọ*). (b) The vowel *a* already contains Specxn, thus it will necessarily be a trigger, but not a target. (Vacuous target at best.) (c) High vowels lack xn and therefore the necessary 'foundation' to project up to Specxn, i.e. they fail to undergo harmony and by the same token also fail to trigger it. Harmony, an agreement between Specs, falls out from the internal structure of the vowels.

Further issues & potential extensions. 1. For Archangeli & Pulleyblank (1989), non-mid vowels are underspecified for ATR. [−ATR] is filled in in time to make /a/ a trigger, casting doubt on the usefulness/testability of underspecification (Dresher 2009: 125f). No underspecification is required (or indeed possible) in our (privative) account.

2. The analysis extends to more complex vowel systems and explains why ATR contrasts are diachronically unstable in high vowels: [−ATR] *high* vowels typically merge with [+ATR] *mid* vowels (Stewart 1971). With openness a function of size and [−ATR] expressed by Specxn, high (front) vowels with an ATR contrast (i.e. other than SY) can be expressed as in (7–8). (7–8) are unusual in that two heads are sisters, as xN does not project. (In mid/low vowels in such systems xN *does* project for openness.) If those marked structures are reinterpreted (by learners) such that the lowest level of projection is a projection of xN, while keeping the amount of structure constant, (7) changes to (3), a high vowel identical to SY *i*. Exactly the *same* change also takes (8) to (4), identical to SY *e*. That is, a former high vowel (with Specxn, i.e. [−ATR]) is *reorganised such that [−ATR] is lost but openness gained.*

3. Acoustic evidence (Lindau 1978: 552) supports the parallel treatment of [−ATR] and aperture (both structure), cf. also Schane (1990). Both have lower F_1 (vis-à-vis [+ATR]/ higher counterparts), with high [−ATR] vowels particularly close to mid [+ATR] vowels.

4. SY high vowels *block* as they lack xn; while Finnish *i e* are (partially) *neutral* in (palatal) harmony for the same reason (lack of xn, Pöchtrager 2017). They differ in harmony being strictly local in SY (between adjacent vowels), but operating over larger strings in Finnish: *häkki-ä* 'cage PAR.', *lakki-a* 'cap PAR.' (*i* neutral) but *tikki-ä* 'stitch PAR.'; the entire base is required to establish neutrality (neutrals alone behave as front).

5. European French *r* lowers preceding mid-vowels but not high vowels (Tranel 1987): *mer* [mɛʁ] 'sea', *or* [ɔʁ] 'gold', *heure* [œʁ] 'hour'. (NB: *r* is not the only lowering agent.) If European French high vowels lack Specxn, while mid vowels have it (like SY), the susceptibility of the latter to lowering will parallel SY harmony. This also suggests that the internal structure of *r* contains an appropriate specifier.

6. Reinterpreting **A** as structure implies that coronals are bigger than non-coronals, and that some coronals will have a specifier comparable to that of [−ATR]. I submit that this expresses emphaticness in languages like Arabic, leading to lowering of adjacent vowels.

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