

Sous la direction de
Patrick SAUZET & Anne ZRIBI-HERTZ

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L'Harmattan
5-7, rue de l'École-Polytechnique
75005 Paris
FRANCE

L'Harmattan Hongrie
Hargita u. 3
1026 Budapest
HONGRIE

L'Harmattan Italia
Via Bava, 37
10214 Torino
ITALIE

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A fonosyntactic parameter within Benue-Kwa
and its consequences for Èdó*

Victor Manfredi

1 Tones or affixes, an inverse correlation

The term *Benue-Kwa* (Elugbe & Williamson 1977) denotes the union of Greenberg's (1963) Kru/Kwa and Benue-Congo subgroups of the Niger-Congo family.¹ Within it, two broad comparative trends can be observed. One is phonological: Benue-Kwa languages possess from 2 to 4 level 'tonemes', i.e. lexical pitch contrasts in the sense of Pike (1948), not counting underspecification. The other trend is morphosyntactic: the languages do, or don't, possess obligatory affixes of various kinds. Juxtaposed as in (1), the two properties show an inverse correlation: the more tonemes, the less obligatory affixation. Languages with both obligatory prefixes and suffixes (1a) are limited to two tonemes (plus downstep); languages with neither (1c) contrast four level tones (without downstep); an intermediate

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¹ J.M. Stewart's (1973, 1993, 1994) sound shifts between Proto-Tano (= Macro-Àkán) and Proto-Bantu have no known counterparts in the rest of Benue-Kwa. This provisional, negative result weighs against any linear bi- or tri-furcation of Benue-Kwa into contiguous areas ranged along the east-west, coastal axis, as variously proposed by Bennett & Sterk (1977), Williamson (1989) and Williamson & Blench (2000) mainly on the basis of lexical counts. This issue does not affect (1) if Benue-Kwa is interpreted as a controlled typological sample, rather than as a historical entity.

status for the morphosyntactic property (1b) implies likewise for the phonological one.²

(1)	<i>least tones, most affixes</i>	
a. 2 tonemes plus downstep: Bantu, Èfìk-Ìbìbiò, Ìgbo, Èdó, Àkán	↑	obligatory N-prefixes, V-prefixes & V-suffixes
3 tonemes plus downstep: Íkóm Yàlà (Armstrong 1968)	↑	obligatory N-prefixes marking number (Armstrong 1983, 133)
b. 3 tonemes, local downstep: Yorùbá (Bámgbòsé 1966)	↑	obligatory N-prefixes; no suffixes (Awóyalé 1974; Stahlke 1976) ³
3 tonemes, no downstep: Èvè (Ansre 1961) ⁴	↑	obligatory N-prefixes: either [↘]- or à- (Stahlke 1971)
c. 4 tonemes, no downstep: the Kru group ⁵	↓	no N-prefixes; no obligatory suffixes (Marchese 1978, 31)
	↓	<i>most tones, least affixes</i>

2 Analyses

2.1 History or typology

Most Africanists who have addressed the pattern in (1) have relied on phonological and historical reasoning. The standard view deploys the *floating tone* (J.M. Stewart 1965; Bámgbòsé 1966) as distinct from the *tonal morpheme* (Sharman & Meeussen 1955; Welmers 1959;

² Both dimensions of (1) can be refined, but subregularities don't threaten the correlation. Type (1a) is clearly diverse: on the phonological side with respect to foot structure and the scope of downstep, and on the morphosyntactic side with respect to the feature content of affixes. Evidence for parametrised foot structure within (1a), consistent with the theory presented in this paper, is given in Excursus 1 *infra*. Also, suffixation may be more relevant than prefixation, if prefixes are generally analyzable as proclitics (phonological affixes) rather than morphosyntactic affixes, following Kayne (1994).

³ Every derived Yorùbá N begins with a prefix (vowel or reduplicand); all nonderived nouns show phonological effects at the left edge.

⁴ Also apparently in the rest of Gbè. In Èvè, Ansre showed the complementary distribution of the mid and low tonemes, based on syllable type. Welmers (1973, 91) and Clements (1977, 174) report downstep in some Èvè varieties.

⁵ The distributions of the high and superhigh tonemes are complementary, based on syllabic features (Kaye 2001b, 11).

Voorhoeve *et al.* 1969), the former being not necessarily a synchronic category. Floating tones can explain the transition from (1a) to (1b) via loss of tone-bearing segments in affixes and polysyllabic roots: if the pitch features of eroded material survive, their reattachment to surviving syllables can create more tonal contrasts (Hyman 1979; Williamson 1993). Such contrasts may remain syntagmatic, realised as pitch contours, or else assimilation rules can restructure them in paradigmatic terms, leading to the "phonologization" of new level tonemes, as apparently occurred in phrase-final position in γomala-Yamba (Voorhoeve 1971; Hyman & Tadadjeu 1976; Bird & Stegen 1995).

But a historical account is liable to accident: the loss of tone-bearing affixes or of root syllables could have left tonemic inventories untouched. Rephrased in terms of autosegmental phonology, the residual question is why pitch features resist erosion (as they do). Pending an answer to this question, the remaining possible source of explanation is Universal Grammar. Moreover, UG is plausibly responsible for the pattern in (1), because a similar implication holds across language families: loosely speaking, a human language is more likely to have lexical pitch contrasts, and to have more of these, if it has smaller words (cf. C.-W. Kim 1979, 283; Duanmu 1994, 1995).

A preliminary UG-based analysis of (1) is given in (2), quoted from Manfredi (1991, 93; 1993, 177).

(2) *Prosodic linking parameter*: The units which project metrical structure attach are: {tones}, {rimes}.

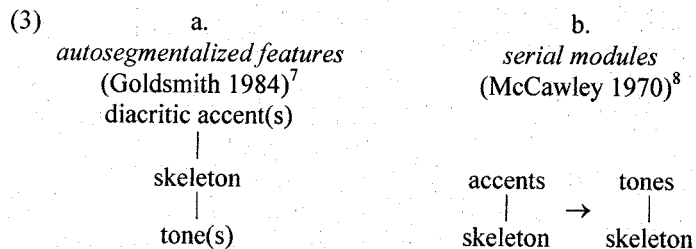
Note that (2) is neutral with respect to affixation versus syllable weight, both of which are represented in terms of the rimal constituent of prosodic structure (Halle & Vergnaud's *rime projection*).⁶ I consider syllable weight in section 3 below.

The terms "project" and "attach", which (redundantly) occur in the formulation of (2), assume that nonlinear phonological architecture

⁶ (2) is formulated within Government Phonology (Kaye, Lowenstamm & Vergnaud 1985, 1990), which adopts the concept of *parameter* from generative syntax, where since the 1980's it is understood as "a finite array of options" in the initial state of the cognitive system, which yield "language differences and typology" and whose fixing allows language acquisition to occur within the constraints of "Plato's Problem" (Chomsky 1986), cf. Booij (1983), Dresher (1989), Haraguchi (1991, 1-3). In current Government Phonology (Lowenstamm 1996; Kaye 2001a), rimes are technically not constituents, but licensed sequences of nucleus plus onset; this may complicate the statement of (2).

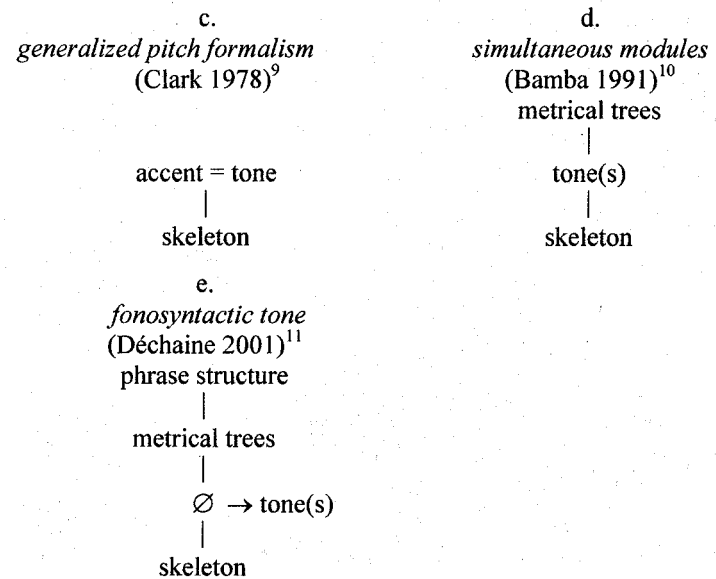
imposes a competition between pitch features and other prosodic marks like accents. This is plausible. The interchangeability of tones and rimes with respect to metrical licensing is indirectly supported by redundancies between tone contrasts and syllable type; well known Benue-Kwa examples occur in Gbè and Kru (see footnotes 4 and 5 above). More strikingly, Kaye reports a direct illustration of the parameter in (2): “The differences between Japanese and Brazilian Portuguese reduce to the differences between using headless/headed [syllable nuclei] versus toneless/toned [syllables i.e. rimes] for marking accentual domains” (1997, 218).

If (2) is correct, tone and accent are not associated to the timing tier independently, e.g. on separate planes à la Halle & Vergnaud (1980), because if the notion of autosegmental planes has any content, a restriction *across* planes can only be stipulated, hence is not learnable in the technical sense (Dresher & Kaye 1990). With respect to this point, standard autosegmental-metrical theory as in (3a) differs from the alternatives sketched in (3b-e), and any evidence for the reduction of tone to accent supports any/all the latter as against the former. What matters in (3) is not the graphical notation, but just the claim depicted in (3a), that the only interaction of accent and tone is to determine the location in the skeletal timing tier where the tonal melody associates. By contrast, in all the other theories depicted in (3), accents directly “license” or “are realized as” tones in various ways.



⁷ Also Halle & Vergnaud (1987).

⁸ Also Haraguchi (1991), Purnell (1998).



With respect to the claim in (2), the choice between (3a) and the rest is more than notational: there are empirical consequences if natural languages are indeed constrained in terms of the relative complexity of rimes and pitch features. The metrical competition between tones and rimes, observed in (1) and provisionally captured in (2), follows directly from or is at least consistent with (3b-e), but is not even stateable in (3a). Thus (3a) can be true iff (2) is false. Certainly, (3a) is consistent with the mainstream view of tone typology presented in a standard technical article which lists the properties in (4) as “parameters” of “tone systems” (Clements 1981, 95f):

- (4)
- a. “number of tone levels
 - b. “presence or absence of (systematic) downdrift
 - c. “presence or absence of downstep
 - d. “presence or absence of upstep
 - e. “partial vs. total register shift”

⁹ After a critique of Clark (1980a) by Clements & Goldsmith (1980), Clark (1989) recanted (3c) and returned to the framework of (3a).

¹⁰ Also Huang (1980, 1985); Odden (1984); Ladd (1990); Liberman (1995), M. Kim (1996, 1997), Akinlabi & Liberman (2001, 2002).

¹¹ Déchaine’s analysis of Yorùbá metrical tone is illustrated in *Excursus 2 infra*.

A similar list is offered in a recent Africanist handbook as “parameters of African prosodic systems” alongside the statement that “African tone languages tend to reshuffle the properties ... in many different combinations and with infinite variations” (Clements 2000, 157):

- (5) a. number of lexical tones
- b. type of tone association
- c. “function of floating tones” e.g. “lexical, phonological, grammatical or syntactic”
- d. the presence of downdrift
- e. and/or downstep.

The typological lists in (4) and (5) allow that the correlation in (1) is accidental, i.e. they are consistent with the standard historical view. But whatever the position of historical linguistics may be with respect to language acquisition, no synchronic theory incorporating (4) or (5) can escape the learnability problem (Dresher 1989, 184). For tone, this problem is nontrivial because the acoustic cues of stress and tone overlap in F-zero information (Ko 2001).¹² I revisit this point in the concluding section.

2.2 Phonology or fonosyntax

Typology aside, the standard historical-phonological view of the pattern in (1) also faces the criticism that syntax cannot be excluded in principle from a phenomenon involving affixation. Of course such a critique begs the “interface” question of the relationship of syntax to morphology. The 1980’s witnessed a consensus among syntacticians that overt affixation and non string-vacuous head movement are operations of the syntactic component—expressed in derivational terms, that they appear in S-structure (Fabb 1984; Baker 1988). This consensus excluded those generative phonologists who treated affixation within Lexical Phonology (e.g. Pulleyblank 1983, Clark 1989), but even then, the only way to exclude head-movement from the data in (1) is by requiring a “syntax-free” phonology (Nespor & Vogel 1986). Absent such a stipulation, the effects in (1) which

¹² In responding to this point at the Paris-8 conference, Prof. Clements clarified that his 1981 and 2000 papers did not intend the term *parameter* in the particular usage of Universal Grammar, but just in the generic sense in which this concept is used in computer programming. Perhaps computer science offers an alternative account of learnability, e.g. as suggested by Prince & Smolensky (1993), but one would still need to know how this affects the difference between (4)-(5) on the one hand and (2) on the other.

involve affixation fully merit the label *fonosyntactic* (Rizzi & Savoia 1992).¹³

Independently supporting a fonosyntactic analysis of prosody, Martin (1978, 1981), Ladd (1988) and Kubozono (1992) argue in various ways that intonation is computed on syntactic trees and not on flat autosegmental ToBI melodies *à la* Pierrehumbert (1980). Ronat (1982) makes the converse point, that syntax is itself constrained by prosody. In her data, the anaphoric phrases in square brackets, obligatorily distressed, are islands for overt movement (6c) and for quantifier scope (7b).¹⁴

- (6) a. Paul avait comme ami uniquement des gens qu’il croyait capables de tuer le roi.
- b. Mais tout le monde était [_w capable de ça].
- c. * Mais tout le monde en_i était [_w capable t_i].
- (7) a. Pour avoir ce job, il faut connaître deux langues.
- b. Tout le monde ici parle couramment [_w deux langues].

Interpretation: $\forall > \exists$, $*\exists > \forall$.

The same conclusion is supported if prosodic type plays a determining role in the acquisition of syntax (Nespor *et al.* 1996), or indeed if syntactic movement itself can be triggered by prosody (Zubizarreta 1998).

Consistent with Déchaine’s (2001) analysis of Yorùbá incorporating the tonal theory in (3e), section 5 below makes a *prima facie* case for the fonosyntactic character of some tonal effects in Èdó.¹⁵

3 Tone or weight

Hyman (1982, 28) identifies a phenomenon in some Bantu languages of “incomplete tonification” with four “accent-like characteristics” as

¹³ Minimalism, to be sure, lacks a representational level corresponding to S-structure, and Minimalist affixation may entail movements of other kinds such as covert affix licensing (Lasnik 1995) or purely phonological displacement (Halle & Marantz 1993; Zwart 2001). Antisymmetry further reorganizes the boundary between overt and covert movement by enriching movement types (Kayne 1998).

¹⁴ Cf. Williams (1980, 1997), Haik (1981) and Ruwet (1990).

¹⁵ Fonosyntax potentially contradicts the claim that “phonology is different” (Bromberger & Halle 1989), but this depends on some meta-theoretical considerations, specifically that it’s hard to argue against a richer theory with respect to particular cases, i.e. without taking typology and learnability into account (Kaye 1988).

in (8). Similarly, Odden 1988 has described “predictable tone” in Bantu as in (9).¹⁶

- (8) a. “linear constraints ... at most one * [accent] per morpheme and at most one HL melody per word.”
 b. “hierarchical constraints ... accent subordination as in compounding processes and focus ...”
 c. “[lack of] mobility constraints [e.g. presence of tone shift] ...”
 d. “globality constraints [e.g. accent is diacritic] ...”
- (9) a. “The fundamental property of [predictable tone] systems is that, at least in the verbal system, the location of H is predictable by reference to the phonological shape of the verb and the morphological (tense-aspect) category ...” (Odden 1988: 226).
 b. “In contrast to the situation with lexical nouns and adjectives, verbs and deverbal nouns and adjectives have no underlying tonal information. Here, the placement of H-tone is totally predictable from syllabic structure and morphological information ... A number of Bantu languages (generally spoken in southern Tanzania and northern Mozambique) have a similar bipartite tonal system, which allows lexical contrasts in position (and possibly number) of H-tones within nouns, but have no lexical prosodic contrasts in verbs; examples include Kikuria, Kihehe, Kinga, Safwa, Makua, Makonde and Yao” (Odden 1996, 191).

Along the same lines, in Kinyarwanda “there are not that many verb stems which are differentiated [solely] by tones. Only vowel length seems to play a very important role in words differentiation. Even when speakers assign a high tone wrongly to a verb, it doesn’t affect communication” (Kimenyi *in press*). Of interest is Kimenyi’s further observation that the set of Kinyarwanda verb roots span four different rimal structures (VC, VVC, VNC and VVN), but lacks simple V, the unmarked rime structure of other categories. This fact, taken together with Odden’s observation in (9a) that “the location of H is predictable

¹⁶ Comparable phenomena are described by Voorhoeve (1973), Hyman (1982), Pulleyblank (1982), Goldsmith (1983, 1984, 1992), Odden (1987), Goldsmith (1992) and Hyman & Katamba (1993). Prof. Calvert Watkins informs me that the verb roots of Proto-Indo-European, which canonically have the marked syllabic shape [TeRT-], do not support paradigmatic pitch contrasts, in contrast to the situation for nouns in that protolanguage.

by reference to the phonological shape of the verb”, constitutes a second, independent class of evidence for (2), namely the correlation of tonelessness with a paradigmatic weight contrast in rimes.

For historical phonologists, the tonelessness of verb roots, as well as the weight contrast in verb roots, are just two independent accidents¹⁷, and presumably the standard typology of African “tone languages” as in (4) -(5) carries no expectations about these facts one way or the other. From the perspective of (2), however, both phenomena, and their correlation, amount to language-internal parametric variation which is learnable, i.e. capable of explanation, presumably again on a fonosyntactic basis, as follows. Given the existence of obligatory suffixes for verbs (but not for nouns), perhaps based on an inflectional parameter like V-to-T, the presence of more marked syllable types in verb roots follows because lexical verbs (unlike lexical nouns) are not pronounceable in isolation. Then the tonelessness of the same set of items follows from (2), assuming plausibly that the presence of marked syllable weights invokes metrical licensing.¹⁸

Èdó provides another relevant case.¹⁹ Èdó may have less obligatory affixation than the Bantu languages²⁰ but it does have numerous singular-plural alternations in noun prefixes, and at least some finite verb forms in the language bear obligatory segmental suffixes (e.g. in (11) below; cf. Aikiṅbare 1988; this contrasts with the situation in Yorùbá). Now there is a consensus in the descriptive literature that Èdó verb roots support no tonal contrasts.²¹ Moreover,

¹⁷ Meeussen (1979, 6f.) notes that distinctive vowel length in Proto-Bantu is restricted to verb roots, although “without further data it is impossible to decide whether this is indicative of a contrast in the process of being lost or whether it reflects an incipient development.”

¹⁸ This reasoning recalls, and partially motivates, the following observation by Kaye (2001b, 3): “Phonological strings that are not phonological words cannot license tonal patterns and are always toneless.”

¹⁹ This language is often referred to in linguistic literature as “Èdó (Benin)”; in Nigerian English it is informally called “Bini”.

²⁰ However not necessarily so, because conventional orthography in Bantu languages may create an illusion of polysynthesis, cf. Fortune (1982), Keach (1986), Myers (1987), Russell (1999) vs. Guthrie (1948), Baker (1996).

²¹ “[S]ince we cannot elicit any minimal tone contrasts on verb stems independent of their grammatical contexts, we have no basis for representing tone on verb stems in the lexicon. We are, in effect, in agreement with the conclusion reached by Wescott and Elugbe that ... they acquire tonal representation at the syntactic level” (Amáyó 1975, 22). Dissenters to this view include Melzian (1943) and Ogieiriaikhi (1973); cf. Siertsema (1959), Spears (1974).

with respect to the issue of syllable structure, Èdó (unlike Yorùbá for example) massively contrasts CV and CVV in verb roots, but remarkably not in underived nouns, for example the contrast between [lɔ] ‘to grind (something)’ and [lɔɔ] ‘to iron (something)’, as shown in the habitual form in (10a-b) as well as in the default past form in (11a-b).

- | | |
|---------------------------|----------------------------|
| (10)a. Ǿ lɔ. | b. Ǿ lɔɔ. |
| 3S grind | 3S iron |
| ‘S/he grinds habitually | ‘S/he irons habitually |
| /is grinding (something)’ | /is ironing (some cloth)’ |
| c. Ǿ kpòlɔ. | |
| 3S sweep | |
| ‘S/he sweeps habitually | |
| /is sweeping (somewhere)’ | |
| (11)a. Ǿ lɔ-è. | b. Ǿ lɔɔ-rè. |
| 3S grind-AFF | 3S iron-AFF |
| ‘S/he ground (something)’ | ‘S/he ironed (some cloth)’ |
| c. Ǿ kpòlɔ-rè. | |
| 3S sweep-AFF | |
| ‘S/he swept (somewhere)’ | |

Phonetically, (10a) and (10b) differ in two properties: pitch and rime weight. In these examples the two factors are redundant, so in principle either one could derive from the other. Inclusion of (10c) and (11c) in the paradigm helped Ámáyo to decide that [lɔɔ] contains a basic long or double vowel, because as shown in (11) it inflects exactly like an uncontroversial bisyllabic root such as [kpɔlɔ] ‘to sweep (some place)’, in contrast to the inflection of the uncontroversially monosyllabic [lɔ].

In Melzian (1937), I count 80 minimal pairs of the type [lɔ] vs. [lɔɔ], out of a total of 400 monoconsonantal verb roots, i.e. nearly half the possible examples participate in a length contrast. This meets the requirements of learnability even if children don’t know how to compute *chi*-squared! To be sure, in many of the CV ~ CVV pairs, impressionistic translation-semantics suggest an inchoative/causative or affecting/antipassive aspectual relationship between the two items, for example with respect to [lɔ] vs. [lɔɔ] above, to iron is to perform a

certain manual activity in a location, whereas to grind is to affect something by means of that activity (a repeated pressing motion).²²

At least some CVV forms in Melzian’s collection derive historically from *CVrV, where -r is a notoriously weak consonant and the -rV part was conceivably a derivational affix. If this were true for all examples, then potentially the phenomenon in (10) would reduce to that in (1). Otherwise, based on the observations in (8) - (11) taken as such, the parameter in (2) can still be restated as in (12):

- (12) Tone is (just) the option of lexically prelinked—i.e. phonologically unpredictable—metrical structure. In acquisition, this option is blocked wherever metrical structure must be assigned on a predictable basis, i.e. on the basis of distinctive contrasts in syllable weight and/or by position within complex word domains created through obligatory affixation.

The idea is that the length contrast in (10a-b) and (11a-b) prevents children from lexically prelinking metrical structure in Èdó verbs.

Note also that (12) contradicts both (13a), which represents the autosegmental position on the acquisition of metrical structure, and also (13b), which restates the autosegmental view that tone and accent are formally independent.

- (13)a. “[M]etrical structure plays a role in the organization of language in a large number of cases in which there is no phonetic evidence of alternating stress or overt rhythm. If this is correct, as I am convinced that it is, it is more appropriate to say that metrical structure arises not when the data of a language permits it, but rather when the data of the language does not forbid it.” (Goldsmith 1992: 92)

- b. “Ladd does not give explicit rules for labeling trees, but it is crucial that the H/L labeling must not correspond to the s/w labeling of metrical stress trees at least in some cases, since otherwise the two systems would be isomorphic and the metrical structures alone would be sufficient for pitch interpretation.” (Clements 1990, 61)

²² Traditional Èdó grinding (e.g. of plant material, between stones) doesn’t employ a wheel, so the semantic similarity of grinding to ironing may be greater for an Èdó-speaker than it might be for the speaker of an Indo-European language.

As against (13a), (12) holds that it is *lexical tone*, and not accent, which arises “when the data of the language do not forbid it”.²³ As against (13b), (12) has no choice but to treat tone as isomorphic to metrical structure with respect to pitch interpretation.

Phrasal contexts in Èdó provide another instance in which to test autosegmental assumptions.

4 Èdó autosegmentally

Alongside the precise descriptions by Melzian (1942) and Wescott (1962-3), to my knowledge there exists to date only one full, formal phonological analysis of Èdó phrasal tone: Ámáyo (1976), summarized in Ámáyo (1981/83).²⁴ Besides the standard, theory-internal assumptions in (14) and the independently motivated phonetic processes in (15), Ámáyo posits two necessarily global rules (16a-b) to account for the Genitive phrases in (17).²⁵ For illustration, (18) restates Ámáyo’s derivations of these forms in autosegmental notation.²⁶

²³ In Tokyo Japanese, in nouns of over three syllables, accent is predictably assigned to “the antepenultimate mora” (Haraguchi 1991, 11). This supports (2) and (12), as opposed to (13a), assuming that a word of four syllables forces the metrification of its rimes.

²⁴ Elimelech (1978) treats similar phenomena in the closely-related language Etsakó. Melzian was one of Westermann’s students, equally absorbed in phonetics, lexicography and morphosyntactic typology. His death “on the last day of the Battle of Berlin” (Armstrong 1967, i) held back the analysis of Èdó grammar by decades, not least because his 1942 monograph was literally buried in a late-Third Reich series on “Die deutsche Mundarten”.

²⁵ Called “the associative construction” by West Africanists like Welmers (1963), following Tervuren Bantuists like Meeussen (1959). Kinyalolo (2002) maintains the “associative” label on the grounds that the construction does not involve Genitive Case.

²⁶ Adopting the tonal OCP in (18) would not by itself suffice to eliminate the global character of the rules in (16). However, as pointed out to me by Prof. Akinlabí, the OCP applied to tones makes it easier to express metrical generalizations; presumably this is so because tonal representations constrained by the OCP express in effect the immediate constituents of tonal feet (cf. the references in footnote 10 above). Of course metrical tone theory is not wedded to constituent structure; its role in prosodic representations is explicitly denied by Simplified Bracketed Grid theory (Idsardi 1992; Halle 1997), as applied to tone by Idsardi & Purnell (1997) and Purnell (1998). Similarly, Akinlabí (1996) reanalyzes the relevant Èdó (as well as Etsakó) data in terms of alignment constraints, without making explicit reference to metrical structure, but at least assuming the OCP. Since Akinlabí’s analysis is not fonosyntactic, naturally it makes no predictions about the distribution of the genitive H tone, e.g. its absence in (17b, d).

(14)a. Floating genitive H tone

“In the associative construction we would need to posit a floating high tone between the two nominals.”

b. Tone shifting

“We postulate that a floating tone shifts onto the immediately preceding vowel and literally covers up its tone. ...In all instances of tone shifting in Èdó, the floating tone moves leftwards.”

(15)a. Downdrift

“[I]f two high tones are separated by one or more lows, the second high is lower than the first.”

b. High tone spread

“[W]henver a [nonfloating] L occurs immediately following a H, the L is realized as a fall from H to L.”

c. Tonal simplification

“When a H-L which is borne by the second vowel in a sequence is followed by another syllable, the H-L gets simplified to a segmental H followed by a floating L.”

d. Regressive vowel assimilation

$$V_i V_j \rightarrow V_j V_j$$

e. Vowel contraction

$$V_i V_i \rightarrow V_i \text{ unless tonally distinct.}$$

(16)a. Low tone raising

“We therefore require a rule which can raise all but the initial L of a head noun [of a genitive construction] with an all-L tone pattern. This rule will have to be constrained to raise only a L preceding a H derived from an underlying L.”

b. Derived H lowering

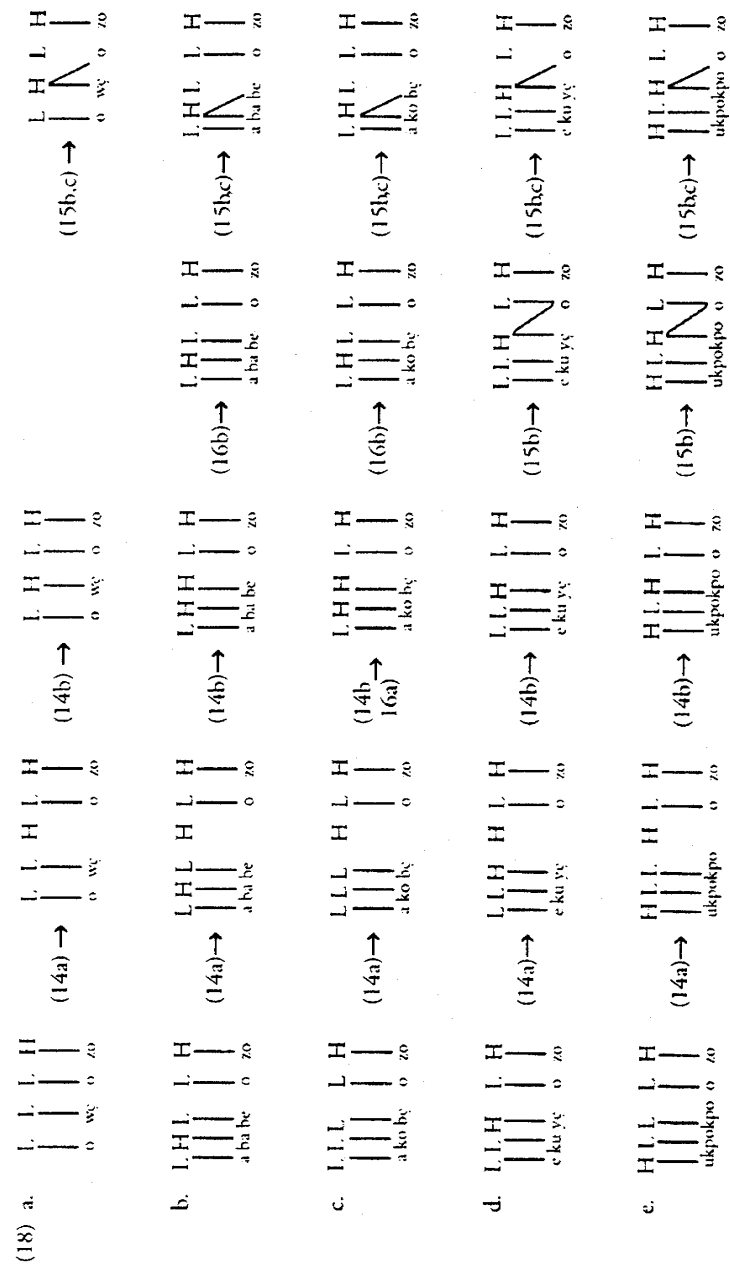
“A word-final H derived from L will become L when collocating with an L-initial word...in the associative construction.” Nb. does not apply in bisyllabic words.

- (17) a. [òwó¹zó]²⁷ ‘Òzó’s leg’ cf. *òwé* ‘leg/foot’
 b. [ábábóòzó] ‘Òzó’s witchcraft’ cf. *ábábe* ‘witchcraft’²⁸
 c. [àkóbóòzó] ‘Òzó’s iron trap’ cf. *àkòbe* ‘iron trap’
 d. [èkùyó¹zó] ‘Òzó’s spoon’ cf. *èkiyé* ‘spoon’
 e. [úkpòkpó¹zó] ‘Òzó’s cane’ cf. *úkpòkpò* ‘cane’
 f. [ùgbalétoòzó] ‘Òzó’s headwrap’ cf. *ùgbalètò* ‘headwrap’

Without the globality of (16a), derivation (18d) would merge with (18b), incorrectly. Without the globality of (16b)—and setting aside the binarity stipulation that saves (18a)—derivation (18d) would give the bad output *[èkùyòzó]. Also note that the effect of (16b) in (18b) is to wipe out the effect of (14a), making abstract the floating H which (14a) has inserted, an example of absolute neutralization.

²⁷ A raised exclamation point indicates downstep: a lowering juncture between H tones where no overt L tone intervenes. In Èdó, a stray (phrase-final) downstepped syllable is lowered an extra interval, to the pitch where a L would be expected to be realised, but because it is categorially H, rule (15b) does not apply. The downsteps in (17a,d,e) follow automatically from the right-hand column of (18a,d,e).

²⁸ For Dr. Úyi Stewart (p.c.), this noun has no underlying H tone, hence his paradigm merges (17b) with (17c). I don’t know if this gap is systematic, but note that the two cases have identical prosodic *outputs* even for Ámáyo. Even for Dr. Stewart’s paradigm, the globality problem in (18) remains.



5. Èdó fonosyntactically

It is an open question whether autosegmental theory (3a), deploying formally independent tones and accents, can avoid globality in the analysis of (17). I believe that such an attempt can succeed only by introducing extra assumptions which are stipulative from the point of view of (3a), but which are deducible from the architectures in (3b-e). Here I deploy a radicalized version of (3e) which, consistent with the parameter in (12), is ‘tone-free’. (19) gives the required rules of pitch interpretation in Èdó.

- (19)a. linked *s* ↔ crico-thyroid laryngeal gesture/high F_0 acoustic ‘target’
 b. linked *w* ↔ sterno-hyroid laryngeal gesture/low F_0 acoustic ‘target’
 c. trochaic feet [sw] (cf. Excursus 1 below)
 d. catathesis (Poser 1985, i.e. persistent, cumulative downstep/downdrift) between feet.

Before revisiting (17), it is relevant to note that restricted tone distribution in the Èdó lexicon may provide independent evidence for accentual structure, along the lines of Kaye (2001b). Èdó underived trisyllabic nouns do not exploit the whole geometric product of tonal melodies, cf. (20) and discussion in Ogieiriaikhi (1973, 18f.). The status of the pattern in (20b) is unknown at present; if it is not marginal but just accidentally sparse, then the restriction can be crudely stated as in (21a); otherwise (21b).

underived trisyllabic nouns in

- (20)a. [HHH], [HLH], [LHL], [LLH], [LLL], [HLL]
 b. ?[LHH] (two items from the dictionary, both probable loanwords: òkóró ‘prince’, òkútá ‘stone’)
 c. *[HHL]
 (21)a. *Doubly prelinked [s].
 b. *Doubly prelinked [s] in a complete foot.

The distribution of H before genitive complements—one cause of globality in the autosegmental account—has a nonglobal analysis in a tone-free accentual framework, assuming that prosody has access to phrasal syntax not just edges (Odden 1990). In terms of a moderately articulated theory of the extended projection of N (Fukui 1986, Abney

1987), the head of a genitive phrase is not a lexical noun but a functional element, which we can label K, and which the Èdó child sets parametrically as null, based on the absence of obligatory morphological content.²⁹ The pattern in (17) is predicted, assuming that null K governing a genitive complement is pronounced as a strong position, just in case it is not prosodically governed by the head noun (separated from a preceding *s* by at most one *w*). This result follows from a version of the ECP; the formulation in (22) is quoted from Déchaine (2001), cf. Kaye, Lowenstamm & Vergnaud (1990, 198).³⁰

- (22)a. syntactic ECP: A non-pronominal empty category must be properly head-governed.
 b. prosodic ECP: A null position must be prosodically governed.
 c. fonosyntactic ECP: If a null F-head is not properly head-governed, then it must be prosodically governed.

The other theory-internal assumptions in (14) are also derivable. In (23c, e, f), when the ECP requires a syntactic (non-prelinked) strong position, it is pronounced on the maximal span of weak rimes in the governing noun, not including the initial one. In the fonosyntactic analysis, this follows if structure preservation holds for feet: an initial weak position is preserved in the head noun.

The independent phonetic effects in (15a,b) are also captured in an accentual, tone-free framework: (15a) = (19c), while (15b) follows if foot structure defines the relevant concept of locality (cf. Akinlabí & Liberman 2001, 2002).

²⁹ I.e. the examples in (17) contain no overt Èdó counterpart for English *of*; this difference may be one reason why “associative” terminology has stuck with West Africanists, as opposed to “Genitive”. Èdó D may in general be null, i.e. bare N arguments can be interpreted as definite, as in Ígbo (Déchaine & Manfredi 1998) or Yorùbá (Ajibóyè 2001). Èdó requires overt D just in adjuncts such as the head of a relative clause—an ECP-type effect expected under the assumptions of Longobardi (1994).

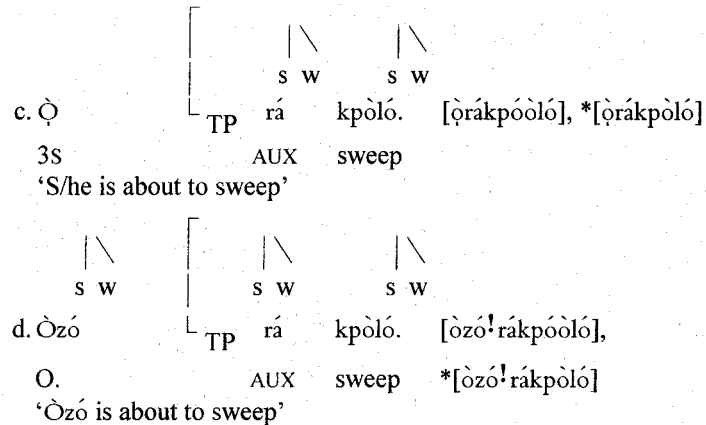
³⁰ Cf. Excursus 2 for supporting data in Yorùbá. I assume that the head noun of a genitive phrase does not properly govern its genitive complement syntactically, although of course this question was not resolved in the pre-Minimalist era, when it could still be asked.

(23) a.	òwẹ̀	leg/foot	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{Òzó}$	[òwó!zó]
b.	àbábẹ̀	witchcraft	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{Òzó}$	[àbábóòzó]
c.	àkòbẹ̀	iron.trap	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{Òzó}$	[àkóbóòzó]
d.	èkùyẹ̀	spoon	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{Òzó}$	[èkùyó!zó]
e.	úk̀pòk̀pò	cane	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{Òzó}$	[úk̀pòk̀pó!zó]
f.	ùgbàlètò	headwrap	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{Òzó}$	[ùgbàlétóòzó]

As controls, Ámáyo discusses two more phrasal contexts: VP (where an Accusative KP is presumably properly governed) and TP (assuming that T⁰ is ungoverned in finite main clauses). In the former,

no syntactic strong position is ever invoked (24), and in the latter the subject and predicate cannot share a foot, the subject being in effect an adjunct, hence the absence in (25) of the tone-spreading effect.

(24) a.	Ò gbé	3S kill	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{ẹ̀wé.}$	goat	[ògbé!wé]
‘S/he killed a goat’					
b.	Ò sá	3S scoop	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{àmẹ̀n.}$	water	[òsámẹ̀]
‘S/he drew water’					
c.	Ò ghée	3S watch	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{KP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{ẹ̀kì.}$	market	[òghékì]
‘S/he looked at the market’					
(25) a.	Òzó		$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{TP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{kpòlò.}$		[òzókpòlò] (in Ámáyo’s notation: [òzó!kpòlò]), *[òzókpòòlò]
O. ‘Òzó is sweeping’					
b.	Èkóò	stomach	$\left[\begin{array}{c} \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \\ \text{TP} \quad \emptyset \end{array} \right] \quad \left[\begin{array}{c} \backslash \\ s \quad w \end{array} \right] \quad \text{kpòlò.}$	big	[èkók̀pòlò] (in Ámáyo’s notation: [òzó!kpòlò]), *[èkók̀pòlò]
‘The stomach is big’					



5 Conclusion: responses to Odden (1985, 1999)

Odden is one of the few generative phonologists who has argued explicitly against reducing tone to accent, but his reasoning is so nuanced that it makes the contrary view seem reasonable. His 1985 paper is actually consistent with the claim that tone and accent are in complementary distribution, and hence reflect one single ability of the human computational system, as follows. In great detail, he analyzes Kimatuumbi nouns as having prelinked “accents” which are realised tonally, while Kimattumbi verb roots have no lexical pitch information, and receive “tones” in a way which is predictable purely from “syllable structure and morphological construction” (1985, 383). Obviously, the labels “tone” and “accent” could be reversed in the two cases without loss. Odden further states that Kimatuumbi cannot be analyzed without “accent” at least in the lexical representation of nouns (1985, 397), so I think it follows that a purely tonal analysis of the language is impossible, and a purely accentual one possible.

Perhaps seeking to exclude such indeterminacy, Odden’s 1999 paper tries to build a typological wall between “stress” (the former “accent”) and “tone”, suggesting a number of general criteria. Once again, the act of trying to save this view reveals the great attraction of its antithesis, and so in each case I will limit myself to stating the countervailing proposition which Odden’s comments invite.

(26)a. “[W]hile stress languages are limited to a two-way distinction between stressed and unstressed ... a language like Yorùbá or

Angas which contrasts H, M and L tones could not be treated as simply having stress.” (Odden 1999, 193)

b. Secondary stresses in English are also intermediary levels; moreover, a 3-tone system can be analyzed metrically, e.g. given Akinlabí’s theory that Yorùbá M is unmarked, i.e. weak. Manfredi (1995) and Déchaine (2001) treat Yorùbá L as an adjunct to a strong position. At least within Benue-Kwa, I know of no examples of 4 tonemes where there is no complementarity between two of them (cf. footnote 5 above).

(27)a. “[T]ones spread, and stresses do not.” (Odden 1999, 194)

b. Akinlabí & Liberman (2001) argue for accentual treatment of local spreading in Yorùbá. Nonlocal spreading could be phonetic interpolation.

(28)a. “[S]tress is a property of syllables, whereas tone is at least often a property of moras.” (Odden 1999, 195)

b. The difference is negligible, so long as tone never links to codas; if borne out, this situation conforms to the parameter in (12).

(29)a. “Culminativity ... (a word has only a single main stress)” (Odden 1999, 196)

b. (9) predicts such restrictions to arise more in tone languages which are more agglutinative; Odden himself cites North Kyungsang Korean.

(30)a. “Stress Clash vs. the OCP” (Odden 1999, 199)

b. Reexamined in fonosyntactic terms, OCP exceptions in tone languages, like Meussen’s Rule in Bantu, may reduce to structure preservation. Manfredi (1991/93) gives a fonosyntactic analysis of OCP violations in Ìgbo genitive phrases (see also Clark 1989).

(31)a. “[S]tress can generally be assigned by general rules, whereas in the canonical tone system, tones are in large part unpredictable.” (Odden 1999, 200)

b. This may be true, but it follows directly from the parameter in (12).

(32)a. “[B]inary alternating pattern ... There is no tone language which assigns H tone to every other syllable ...” (Odden 1999, 208)

b. orí i Tolú
 head Ø T.
 'Tolú's head'

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