

Constraints on prosodic domains and domain-sensitivity: Evidence from Xitsonga

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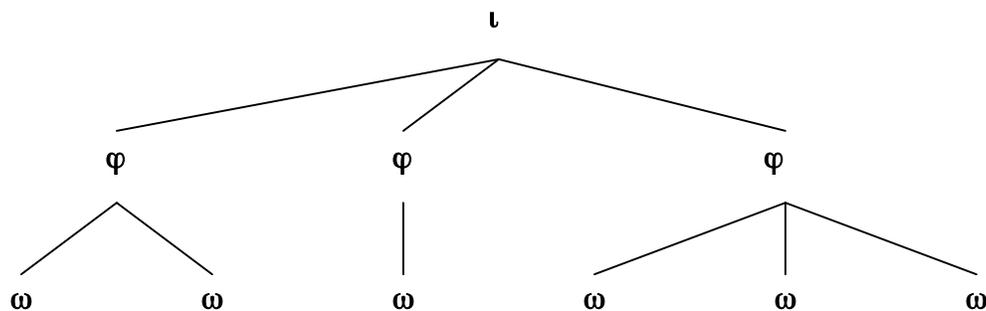
A. The ‘standard theory’ of prosodic structure: *prosodic hierarchy and strict layering* (Selkirk 1978/1981a, 1981b, 1986; Nespor and Vogel 1986; Beckman and Pierrehumbert 1986, Pierrehumbert and Beckman 1988; and others).

(1) The *prosodic hierarchy* is the name for an ordered set of prosodic category types that is *stipulated by phonological theory*, e.g.

Intonational Phrase (ι)
Phonological Phrase (φ)
Prosodic Word (ω)
Foot
Syllable

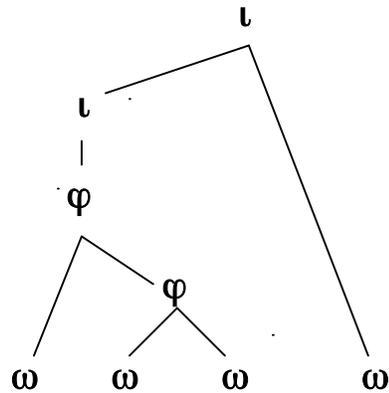
(2) The *strict layer hypothesis* is also *stipulated by phonological theory*

A constituent of category-level n in the prosodic hierarchy immediately dominates only a (sequence of) constituents at category-level $n-1$ in the hierarchy:



(Selkirk 1981, 1995, Nespor and Vogel 1982, 1986, Pierrehumbert and Beckman 1988, Hayes 1989, Inkelas 1990)

(3) A representation that violates the strict layer hypothesis



Violations of strict layering exhibited here, to be exemplified below in Xitsonga

- instances of *recursivity*: l/l and φ/φ
- instances of *level-skipping*: (l/ω)

The issue:

- Suppose that the markedness constraints which call for the avoidance of recursivity and level-skipping in prosodic representations are violable, as proposed in Selkirk 1995.
- Then the question becomes: what forces the appearance of recursivity and level-skipping in the first place.
- The answer (or part of it):

Given that syntactic structure is recursive and displays level-skipping, a theory of the relation between syntactic and prosodic constituency which calls the two types of constituency to match up would predict the systematic appearance of recursivity and level-skipping in prosodic structure.

B. A new proposal

(4) Match theory of syntactic-prosodic constituency interface correspondence (Selkirk 2006, 2009ab)—preliminary version

i. Match Clause

A clause in syntactic constituent structure must be matched by a corresponding prosodic constituent, call it ι , in phonological representation.

ii. Match Phrase

A phrase in syntactic constituent structure must be matched by a corresponding prosodic constituent, call it φ , in phonological representation.

iii. Match Word

A word in syntactic constituent structure must be matched by a corresponding prosodic constituent, call it ω , in phonological representation.

Predictions:

- A strong tendency for prosodic constituency to mirror syntactic constituency
- A mirroring of the fundamental syntactic category distinctions between clause, phrase and word in the corresponding ι , φ and ω category types of phonological representation.
- Any departures from the correspondence between syntactic constituency and prosodic domains that is predicted by the Match constraints would be driven by the phonology, in particular by prosodic structure markedness constraints, whose ranking with respect to Match interface correspondence constraints would be determined on a language-particular basis.

C. A case study from Xitsonga

In Xitsonga, a Bantu language of northeast South Africa and Mozambique described and analyzed by Kisseberth 1994 and Cassimjee & Kisseberth 1998, the prosodic domain structure motivated by both tonal and segmental phenomena of sentence-level phonology shows a clear effect of syntactic constituency, but this domain structure also exhibits divergences from syntactic structure which are arguably the effect of prosodic structure markedness constraints. Kisseberth 1994 provides all the empirical insights concerning the distribution of high tone spread and penultimate lengthening in Xitsonga sentences that are the basis for the analysis of phonological domain structure and domain-sensitivity offered here. The data from Xitsonga is particularly valuable in that it provides evidence for the two distinct above-word levels of prosodic constituency that are grounded in the Match theory in (4), namely, the ι -domain and the φ -domain. Moreover, restrictions on H tone spread in Xitsonga allow for diagnosing both the left and the right edges of the φ -domain, and therefore provide critical support of the Match theory of syntactic-prosodic constituency correspondence.

I. Penultimate lengthening on the ι -domain

In Xitsonga, all and only vowels that are penultimate in the clause are long (V:); penultimate lengthening on the ι -domain is introduced by the phonology:

o Simple clause:

(5) a. **clause** [[ndzi-xav-el-a_{Verb} [xi-phukuphuku] [fo:le]]] **clause** [K148]

1st.sg.Subj-buy-appl-FV class7-tobacco fool

‘I am buying tobacco for a fool’

b. ι (ndzi-xavela xi-phukuphuku fo:le) ι

[Prosodic constituents internal to the ι will be shown when they are under discussion.]

o Embedded clause structure: Right dislocations

[According to Kisseberth 1994, the morphosyntax of such sentences argues that what precedes the subject is a clause itself.]

(6) a. **clause** [**clause** [[y-â:j!á_{Verb}]]] **clause** [n-gúlú:ve]] **clause** [K150-151]

Class9.subj-tense-eat-FV Class9-pig

‘it’s eating, the pig’

b-i. ι (ι (yâ:j!á) ι n-gúlú:ve) ι

b-ii. * ι (yâ:j!á) ι ι (n-gúlú:ve) ι

c. **clause** [**clause** [[vá-xáv-á_{Verb} [tí-ho:m!ú]]]] **clause** [vá:-nhu]] **clause**

‘they are buying cattle, the people are’

d-i. ι (ι (vá-xává tí-ho:m!ú) ι vá:-nhu) ι

d-ii. * ι (vá-xává tí-ho:m!ú) ι ι (vá:-nhu) ι

NB: The nested prosodic ι -domain structure seen at the left in (6b-i, 6d-i) mirrors the embedded syntactic clause structure, as predicted by Match Clause.

That this recursive ι -domain structure would have to be posited in a prosodic account, rather than the alternative, sequential, ι -domain structure at the right in (6b-ii, 6e-ii), is shown by the ability of a lexical H tone that’s final in the preceding clause to spread onto the postposed subject. As we will see below, such tone spreading is blocked at the left edge of both phonological phrases (φ) and intonational phrases (ι), so the postposed subjects in (6) cannot be parsed as a φ or an ι . a first indication from Xitsonga that faithfulness to syntactic constituency leads to a violation of the strict layering that is assumed by the standard theory of prosodic structure.

■ Embedded clause structure: Left dislocations

(7) a. **clause** [[ti-ho:mú] **clause** [[ndz-a-xa:v-a_{verb}]] **clause**] **clause** [K154-155]

‘as for the cattle, I am buying’

b-i. *_ι(ti-homú _ι(ndz-a-xa:va)_ι)_ι b-ii. _ι(ti-ho:mú)_ι _ι(ndz-axa:va)_ι

c. **clause** [[ti-ho:mú] **clause** [[hi-hontlovila] [x-!á-xá:v-a]] **clause**] **clause**

‘as for the cattle, the giant is buying’

d-i. *_ι(ti-homú _ι(hi-hontlovila x!áxá:va)_ι)_ι

d-ii. _ι(ti-ho:mú)_ι _ι(hi-hontlovila x!á-xá:va)_ι

e. **clause** [[n-sá:tí] **clause** [[ti-n-gu:vu] **clause** [[w-!á-xá:v-a]] **clause**] **clause**] **clause**

‘the wife, as for the clothes, she is buying’

f-i. *_ι(n-sátí _ι(t-n-guvu _ι(w!á-xá:va)_ι)_ι)_ι

f-ii. _ι(n-sá:tí)_ι _ι(t-n-gu:vu)_ι _ι(w!á-xá:va)_ι

NB: The sequential prosodic ι -domain structure seen at the right in (7b-ii, 7d-ii, 7-f-ii) does *not* mirror the embedded syntactic clause structure. Hypothesis: some prosodic markedness constraint calls for the ι -domain status of the left-dislocated phrases here.

These Xitsonga data on penultimate lengthening in preposing structures show a certain divergence between syntactic structure and the phonological domain structure, given that the preposed phrases constitute ι -domains which do not correspond to syntactic clauses. That this divergence may have a source in some prosodic markedness constraint(s) is suggested by a comparison with the distribution of penultimate lengthening in the Bantu language Northern Sotho, a neighbor of Xitsonga in northeastern South Africa. Zerbian 2006, 2007 points out that penultimate lengthening appears sentence-finally in Northern Sotho, and also at the right end of the internal clauses in subject postposing cases, analogous to the Xitsonga cases in (5) and (6). But penultimate lengthening does not occur at the right edge of preposed phrases in Northern Sotho; the preposed phrases don't have the status of ι -domains, unlike in Xitsonga. Supposing that Northern Sotho and Xitsonga have the same clause-adjoining syntax for left-dislocations, as Zerbian argues, a nonsyntactic explanation for the difference in the domain structure for penultimate lengthening in the two languages would be required. The ι -domain structure of the Northern Sotho preposing construction is faithful to the syntactic clause constituency, unaffected by phonological constraints; it is predicted by the constraint Match Clause alone. But the Xitsonga preposing cases violate Match Clause in that they contain instances of prosodic ι -domains which do not correspond to syntactic clauses.

- (11) a. [[ndzi-xavela [xi-phukuphuku] [fo:le]]] [[ndzi-xavela [mu-nhu] [ti-n-gu:vu]]]
 ‘I am buying tobacco for a fool’ ‘I am buying clothes for s.o.’
- b. [[vá-xávélá [xí-phúkúphúku] [fo:le]]] [[vá-xávélá [mú-nhu] [ti-n-gu:vu]]]
 ‘they are buying tobacco for a fool’ ‘they are buying clothes for s.o.’
- c. $\iota_{(\varphi(vá-xávélá\ xí-phúkúphúku)_{\varphi}\ fo:le)}_{\iota}$ $\iota_{(\varphi(vá-xávélá\ mú-nhu)_{\varphi}\ ti-n-gu:vu)}_{\iota}$

NB: Domain edge for Nonfinality is not the same as for Penultimate Shortening: φ vs. ι

Blocking High Tone Spread I: Nonfinality

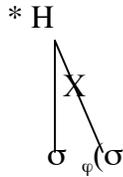
- (12) a. Nonfinality(φ , H) b. High Tone Spread (H-Spread)
- * H * H
- | |
- $\sigma)_{\varphi}$ $\sigma\ \sigma$

[pace Cassimjee & Kisseberth 1998 inter alia on tonal domains)

- c. Nonfinality(φ , H) >> H-Spread in the grammar of Xitsonga
- Spreading of a lexical H tone from φ -final position: see postposing examples in (6)
 - Tonal faithfulness outranks Nonfinality
 - Right edge of φ and right edge of ι do not block spreading of H tone
 - Blocking of lexical H tone spread from φ -final position: preposing examples in (7)
 - Right edge of φ and right edge of ι do not block spreading of H tone
 - Therefore it's the left edge of the following ι -domain, or any left edge of φ -domain coinciding with it, which blocks H tone spread from preposed element

Blocking H Tone Spread II: CrispEdgeLeft

- (13) a. CrispEdgeLeft (φ , H) (see Ito and Mester 1999)



- b. CrispEdgeLeft (φ , H) >> H-Spread in the grammar of Xitsonga

NB: Effects of left-edge blocking of H Tone Spread can also be seen with any noun phrase which consists of two words (or more). This blocking can be accounted for by CrispEdgeLeft if single-word noun phrases do not count as φ , but multi-word noun phrases do count as φ . Match Phrase predicts *all* syntactic phrases would correspond to φ -domains, so some prosodic markedness constraint must rule out the status of one word phrases as φ .

■ Binariness constraint on φ -domain formation

- (14) (i) a. vá-súsá [n-gúlú:ve] (ii) a. vá-súsá [n-guluve t!á vo:n!á] [K157]

‘they are removing a pig’

‘they are removing their pig’

b. $\iota(\varphi(\text{vá-súsá n-gúlú:ve})\varphi)\iota$

b. $\iota(\text{vá-súsá } \varphi(\text{n-guluve t!á vo:n!á})\varphi)\iota$

↑ blocked by CrispEdgeLeft

c. $\iota(\varphi(\text{vá-súsá})\varphi \varphi(\text{n-guluve t!á vo:n!á})\varphi)\iota$

↑ *not* blocked by Nonfinality

NB: The prosodic structure seen in (14-ii-b) that’s required to account for the blocking of H tone spread shows a case of level-skipping, in that the verb which is sister to the φ -domain of the two word noun phrase object is not a φ itself (as shown by the fact that H tone spreads through the last syllable of the verb)

- [Further evidence for φ status of multi-word NP from blocking of HTS not available, but said by Kisseberth 1994 to be systematic.]

- o Further evidence non- φ status of single word NP (in addition to (6))

(15) a. ndzi-nyíká [mu-nw!í] [tí-n-gú:vu] [K149]

b. ‘I am giving the drinker clothes’

c. ${}_i(\varphi(\text{ndzi-nyíká mu-nw!í})_\varphi \omega(\text{tí-n-gú:vu})_\omega)_i$

H tone spread \Uparrow onto second object from final syllable of first object

The prosodic markedness constraint at issue: BinMin(φ, ω)

(16) BinMin(φ, ω)

A prosodic constituent of type φ must contain at least two constituents of type ω .

(Inkelas and Zec 1990, 1995, Ghini 1993, Selkirk 2000)

■ The interaction of BinMin(φ, ω) and Match Phrase in Xitsonga grammar:

(17) (i)

clause[[verb [noun] _{NP}] _{VP}] _{clause}	BinMin(φ, ω)	Match (Phrase, φ)
a. ${}_i(\varphi(\text{verb } \varphi(\text{noun})_\varphi)_i$	*	
φ b. ${}_i(\varphi(\text{verb noun})_\varphi)_i$		*

(ii)

clause[[verb [noun adj] _{NP}] _{VP}] _{clause}	BinMin(φ, ω)	Match (Phrase, φ)
φ a. ${}_i(\varphi(\text{verb } \varphi(\text{noun adj})_\varphi)_i$		
b. ${}_i(\varphi(\varphi(\text{verb noun})_\varphi \text{adj})_\varphi)_i$		*

NB: Note that (16-ii-a) shows a violation of strict layering, in that the verb stands external to the φ of its direct object, but does not itself have the status of a φ (as shown by the fact that tone may spread onto the final syllable of the verb in such cases). It should be noted here that Xitsonga sentence consisting of a verb plus two-word object and in addition a single-word postposed subject noun phrase provides an instance of the structure in (3), which served to illustrate configurations in violation of the strict layer hypothesis, namely instances of recursivity and level-skipping.

The general point:

Syntactic constituency has a central role in determining the phonological domain structure of a sentence, through the agency of Match correspondence constraints, but the effect of syntactic constituency on that domain structure may, depending on the constraint ranking of the language, be mitigated by prosodic markedness constraints.

D. Sources of typological variation in phonological domain structure and domain-sensitivity: A program for future research

Constraints on prosodic structure formation

Language-particular rankings of universal Match constraints on syntactic-prosodic constituency correspondence with respect to universal prosodic structure markedness constraints define the array of possible prosodic constituent structures that are assignable to a given syntactic structure.

Constraints on syntactic structure

Language-particular differences in syntactic structure itself, like differences in the surface position of preposed constituents from one language to another—e.g. whether they are located inside or outside the basic clause—can have consequences for the prosodic structure of the sentence.

Phonological constraints on domain-sensitivity

Assuming that there are families of domain-sensitive constraints like Nonfinality, CrispEdgeLeft and the OCP, each containing a distinct constraint for the different types of prosodic constituent (ι , φ , ω), language-particular rankings of particular phenomena like H tone spread with respect to the members of these constraint families can lead to different distributions of domain-sensitive phenomena with respect to the same prosodic constituent structure representation from one language to another. The rankings for H tone spread with respect to Nonfinality and CrispEdgeLeft seen in Xitsonga are formulated in (18) and (19).

(18) Nonfinality constraints and high tone spread in Xitsonga

Nonfinality (ι , H), Nonfinality (φ , H) \gg H-Spread \gg Nonfinality (ω)

(19) CrispEdgeLeft and high tone spread in Xitsonga

CrispEdgeL (ι , H), CrispEdgeL (φ , H) \gg H-Spread \gg CrispEdgeL (ω)