

## Prosodic Words

*Sharon Peperkamp*

From a phonological point of view, morphological words, i.e. syntactic atoms, do not necessarily behave as a unit. For instance, derivational affixes and compound members can be treated independently by phonological word-level rules. The prosodic word has been defined in order to account for the non-isomorphy between morphology and phonology. Prosodic words are typically characterized as being the domain of word stress, phonotactics and segmental word-level rules. This thesis deals with various aspects concerning the definition of the prosodic word in the realm of derivation, compounding, and cliticization. In addition, it addresses several morphological issues; given the limitations on the length of the present article though, I will leave these aside.

The prosodic word is but one element in a series of hierarchically ordered phonological constituents known as the prosodic hierarchy (Selkirk 1981, 1986; Nespor & Vogel 1986). The Strict Layer Hypothesis (SLH) determines the geometry of this constituent structure, as follows:

- (1) *Strict Layer Hypothesis* (Selkirk 1984; Nespor & Vogel 1986)
  - a. A given non-terminal unit is composed of one or more units of the immediately lower category.
  - b. A unit of a given level is exhaustively contained in the superordinate unit of which it is part.

The first clause concerns prosodic domination; it requires each prosodic constituent to directly dominate constituents of the immediately lower category only. The second clause concerns the formation of well-formed prosodic trees, in that it demands each string to be parsed exhaustively into non-overlapping domains. Both clauses appear to be problematic with respect to the formation of prosodic words.

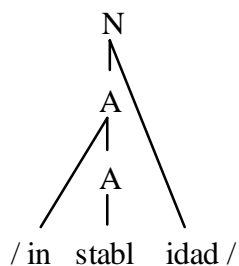
As to the first clause, the prosodization of affixes, clitics, and compound members can induce violations of the requirements on prosodic domination. Specifically, some of these elements neither incorporate into an adjacent prosodic word nor form an independent prosodic word. An example is provided by prefixation in Spanish.

In Spanish, words cannot begin with [s] followed by another consonant; a rule of *e*-epenthesis applies at the left edge of underlying /sC/-clusters (2a). Crucially, I show that whereas the process does not generally apply word-internally (2b), it does apply at the left edge of the base of productively formed prefixed words (2c).

- (2)
- |    |             |               |
|----|-------------|---------------|
| a. | estable     | ‘stable’      |
|    | esnob       | ‘snob’        |
| b. | instrucción | ‘instruction’ |
|    | obstaculo   | ‘obstacle’    |
| c. | inestable   | ‘unstable’    |
|    | biescalar   | ‘biscalar’    |

Contrary to Cressey (1978) and Harris (1983, 1986), I argue that *e*-epenthesis does not refer to a morphological constituent. Consider, for instance, the multiply derived word *inestabilidad* ‘unstability’. There are two reasons to attribute the morphological structure shown in (3) to this word. First, its meaning is ‘the state of not being stable’, rather than ‘not the state of being stable’. Second, *in-* subcategorizes for adjectives, not for nouns.

(3)

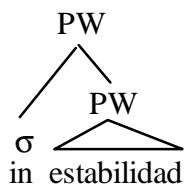


Suppose that *e*-epenthesis applied to the embedded adjectival stem /stabl/. The rule would then precede suffixation. Given that many suffixes in Spanish are stress-shifting, it would also be ordered before stress assignment. Consequently, we would predict that epenthetic /e/ can surface with stress, contrary to fact (Harris 1986).

Alternatively, I propose that epenthesis apply at the left edge of the prosodic word, which crucially contains a stem and any suffixes, to the exclusion of any prefixes. Thus, *estabilidad* forms a single prosodic word, which does not incorporate the prefix *in-*. Given the requirement of prosodic

minimality (McCarthy & Prince 1986), the prefix cannot form an independent prosodic word either. In fact, it does not bear main word stress. Alternatively, I propose that it adjoin to the base prosodic word, as in (4).

(4)



In this structure, a prosodic word dominates another prosodic word. Moreover, the prefix syllable is not dominated by a foot.

Similarly, I argue that compounding and cliticization can also give rise to recursion and the skipping of levels in the prosodic constituent structure. A constrained account of when and how these marked prosodic structures occur crucially involves the decomposition of the first clause of the SLH into separate, violable, constraints, as proposed in Selkirk (1995).

(5) *Prosodic domination*

- a. LAYEREDNESS: No  $C_i$  dominates a  $C_j$ ,  $j > i$
- b. HEADEDNESS: Any  $C_i$  must dominate a  $C_{i-1}$
- c. NONRECURSIVITY: No  $C_i$  dominates another  $C_i$
- d. Exhaustivity: No  $C_i$  immediately dominates a  $C_k$ ,  $k < i-1$

In particular, by ranking NONRECURSIVITY and EXHAUSTIVITY below constraints on the alignment of morphological and prosodic structure or on faithfulness of input representation, recursion and the skipping of levels, respectively, result.

In recent optimality-theoretic work, constraints requiring surface identity between paradigmatically related forms such as a base and a word derived from it, are invoked to explain the non-coherent character of certain affixes, such as the Spanish prefixes (Burzio 1994; Benua 1995; Kenstowicz 1996). Essentially, the base of the affixed word behaves as if the affix were not there, thus remaining phonetically identical to its form in isolation; if the affix were to cohere phonologically, either word-internal phonological processes would apply at the juncture with the

affix, or word-edge processes would fail to apply at this juncture. In either case would the base be made distinct from its surface form in isolation. Cohering affixes, in contrast, attach to bases which are not existing words. There is, therefore, no effect from the isolated form of these bases in the derived words.

I argue that this approach is too restricted in two ways (cf. Peperkamp 1997). On the one hand, paradigmatic identity effects can arise in derived words the morphological base of which is not an occurring word. On the other hand, the distinction found within a single language between words that are subject to paradigmatic identity effects and those that are not cannot always be attributed to a distinction between stem-based and word-based morphology. Spanish *e*-epenthesis is an example of the former case. In fact, the presence of epenthetic /e/ in *inestabilidad* cannot be due to a paradigmatic identity constraint, since *estabilidad*, the only independently occurring word embedded within it, is not its morphological base (cf. (3)). An example of the latter case is provided by suffixation in Dutch. Syllabification of a base-final consonant applies across the boundary of cohering suffixes in Dutch (6a), but is blocked across the boundary of non-cohering suffixes (6b).

- |     |                 |              |             |
|-----|-----------------|--------------|-------------|
| (6) | a. groen+ig     | groe.nig     | ‘greenish’  |
|     | b. groen+achtig | groen.achtig | ‘greenlike’ |

I show that morphological subcategorization for stems or words does not interfere with the phonological behavior of suffixes. Rather, it is the phonological form of the suffix itself that determines whether it is cohering or non-cohering; suffixes which are eligible for prosodic word status are non-cohering, while suffixes that fail to satisfy requirements on prosodic words are cohering (Booij 1995). Paradigmatic identity constraints have nothing to say about this distinction, since suffixes - whether cohering or non-cohering - do not occur as independent outputs.

In many languages, the distinction between cohering and non-cohering affixes coincides with that between derivational suffixes and prefixes. That is, in these languages, prefixes, as opposed to suffixes, fail to incorporate into the prosodic word to which they attach (Booij & Rubach 1984; Nespor & Vogel 1986; Cohn 1989). I show that the same left-right asymmetry occurs with cliticization, in that in several languages, proclitics are phonologically less coherent than enclitics. This asymmetry provides an argument against the necessity of the clitic group, introduced by Hayes (1989) and Nespor & Vogel (1986) as a constituent of the prosodic hierarchy. In fact, given the symmetrical nature of the clitic group, phonological asymmetries between proclisis and enclisis

cannot be accounted for by making reference to this constituent. Rather, I propose that clitics be bare syllables that can attach at various prosodic levels. This varied - but constrained - set of possible prosodizations allows to account not only for asymmetries between proclisis and enclisis, but also for crosslinguistic variation found in the behavior of clitics and their hosts with respect to stress assignment (cf. Peperkamp 1995, 1996).

Postlexical resyllabification constitutes the other potential problem for the SLH. Recall that the second clause of the SLH requires prosodic constituents to be properly nested within the constituent that dominates them. Syllabification, therefore, should not cross prosodic word boundaries. In many languages, however, phrasal resyllabification applies across prosodic words. Consider, for instance, the Italian phrase *bar aperto* ‘open bar’, which is syllabified [ba.ra.per.to]. I argue that neither extraprosodicity nor ambisyllabicity are feasible alternatives to an account involving lexical syllabification followed by postlexical resyllabification. I then propose that resyllabification induce prosodic restructuring, such that all syllables are properly part of a single prosodic word. Specifically, I propose that of two possible restructurings, shown in (7b), the latter one is correct. In fact, there is no evidence that resyllabification induces the restructuring of two prosodic words into one, with a single main stress.

- (7) a. *lexical prosodic structure*  
       (bar)<sub>PW</sub> (aperto)<sub>PW</sub>
- b. *postlexical prosodic structure*  
           \* (ba.ra.per.to)<sub>PW</sub>  
           (ba.)<sub>PW</sub> (ra.per.to)<sub>PW</sub>

Thus, postlexical resyllabification results in the formation of postlexical prosodic words, which differ minimally from the lexically built prosodic words from which they derive. As a consequence, syllables are properly nested within prosodic words, both lexically and postlexically, and no ill-formed prosodic trees result.

In order to account for prosodic restructuring, I propose a generalized proper nesting constraint, which involves the alignment of prosodic constituents. In fact, the decomposition by Selkirk in (5) involves the first clause of the SLH only. The second clause translates into the proper nesting constraint, defined in (8).

(8) *Proper nesting*

Align( $C_i$ , L/R;  $C_j$ , L/R)

where  $C_i$  and  $C_j$  are categories of the prosodic hierarchy and  $C_i$  immediately dominates  $C_j$ .

Notice, finally, that proper nesting is unviolable and hence should be universally undominated. Violation of proper nesting would, indeed, give rise to geometrically ill-formed structures.

### References

- Benua, L. (1995) Identity Effects in Morphological Truncation. In: J. Beckman, L. Walsh Dickey and S. Urbanczyk (eds.) *Papers in Optimality Theory*. University of Massachusetts Occasional Papers 18. Amherst, MA: GLSA, 77-136
- Booij, G. and J. Rubach (1984) Morphological and Prosodic Domains in Lexical Phonology. *Phonology Yearbook* 1, 1-27.
- Booij, G. (1995) *The phonology of Dutch*. Oxford: Clarendon Press.
- Burzio, L. (1994) *Principles of English Stress*. Cambridge: Cambridge University Press.
- Cohn, A. (1989) Stress in Indonesian and Bracketing Paradoxes. *Natural Language and Linguistic Theory* 7, 167-216.
- Cressey, W. (1978) *Spanish Phonology and Morphology: A Generative View*. Washington, D.C.: Georgetown University Press.
- Harris, J. (1983) *Syllable Structure and Stress in Spanish: A Nonlinear Analysis*. Cambridge, MA: MIT Press.
- Harris, J. (1986) Epenthesis Processes in Spanish. In: C. Neidle and R. Nuñez Cedeño (eds.) *Studies in Romance Languages*. Dordrecht: Foris, 107-122.
- Hayes, B. (1989) The Prosodic Hierarchy in Meter. In: P. Kiparsky and G. Youmans (eds.) *Rhythm and Meter*. New York: Academic Press, 201-260.
- Kenstowicz, M. (1996) Base-Identity and Uniform Exponence: Alternatives to Cyclicity. In: J. Durand and B. Laks (eds.) *Current Trends in Phonology: Models and Methods. Volume One*. Salford: ESRI, 363-393.
- McCarthy, J. and A. Prince (1986) *Prosodic Morphology*. Ms., University of Massachusetts, Amherst, and Brandeis University.
- Nespor, M. and I. Vogel (1986) *Prosodic Phonology*. Dordrecht: Foris.
- Peperkamp, S. (1995) Enclitic Stress in Romance. In: A. Dainora, R. Hemphill, B. Luka, B. Need and S. Pargman (eds.) *Papers from the 31st Regional Meeting of the Chicago Linguistic Society. Volume 2: The Parasession on Clitics*. Chicago: CLS, 234-249.
- Peperkamp, S. (1996) On the Prosodic Representation of Clitics. In: U. Kleinhenz (ed.) *Interfaces in Phonology*. Berlin: Akademie Verlag, 102-127.
- Peperkamp (1997) Output-to-Output Identity in Word Level Phonology. In: J. Coerts and H. de Hoop (eds.) *Linguistics in the Netherlands 1997*. Amsterdam: John Benjamins, 159-170.
- Selkirk, E. (1981) On Prosodic Structure and its Relation to Syntactic Structure. In: T. Fretheim (ed.) *Nordic Prosody II*. Trondheim: TAPIR, 111-140.
- Selkirk, E. (1984) *Phonology and Syntax. The Relation between Sound and Structure*. Cambridge, MA: MIT Press.
- Selkirk, E. (1986) On Derived Domains in Sentence Phonology. *Phonology Yearbook* 3, 371-405.
- Selkirk, E. (1995). The Prosodic Structure of Function Words. In: J. Beckman, L. Walsh Dickey and S. Urbanczyk (eds.) *Papers in Optimality Theory*. University of Massachusetts Occasional Papers 18. Amherst, MA: GLSA, 439-469.

Laboratoire de Sciences Cognitives et Psycholinguistique  
CNRS - EHESS  
54, Bd. Raspail  
75270 Paris Cedex 6  
FRANCE  
sharon@lscp.ehess.fr