Cyclicity Reconsidered: An Optimality Theoretic Approach

Hideki Zamma and Takeshi Shimada

Since Chomsky and Halle (1968), cyclicity has been widely assumed in phonology. On the other hand phonological theories have developed rapidly, but it is rarely discussed how the classical notion of cyclicity is treated in the recent systems. In particular, Optimality Theory (cf. Prince and Smolensky (1993) among others) assumes no (phonological) derivation, and thus cyclicity is predicted to be abolished in this theory. In this research, we will reconsider whether this prediction is correct or refinement of the theory is necessary.

Facts reconsidered in this research are as follows: (i) English stress assignment (cf. Chomsky and Halle (1968), Halle and Vergnaud (1986), etc.); (ii) Catalan Nasal Assimilation (cf. Mascaró (1976), Kiparsky (1985), etc.); and (iii) Finnish *t*-spirantization (cf. Kenstowicz (1994) for a cyclic analysis). First, as for English stress, for which cyclicity is first proposed by Chomsky and Halle to capture the difference between *còndènsátion* (cf. *condénse*) and *còmpensátion* (cf. *cómpensàte*), some correspondence constraint, perhaps Kenstowicz's (1995) **Base-Identity**, would account for the fact properly without making any special stipulation in Optimality Theory (see McCarthy and Prince (1995), etc., for the notion 'correspondence').

Catalan Nasal Assimilation interacts with Cluster Simplification, as evident in [beŋ] 'sell (1sg.),' which is derived from /ben-k/. The derivation of [beŋ] suggests that Nasal Assimilation precedes Cluster Simplification (i.e. /ben-k/ → /beŋk/ → [beŋ]), but there is a fact that suggests Nasal Assimilation reapplies at the word boundary; e.g. [bim pans] 'twenty breads,' which is underlyingly /bint/ + /pans/. Mascaró's cyclic analysis succeeds in explaining this fact, but it is unsuitable for Lexical Phonology in that it requires a compound to constitute a distinct cycle. Kiparsky, without recourse to cyclicity, proposes that Nasal Assimilation applies both at the lexical level (cf. [beŋ]) and the post-lexical level (cf. [bim pans]), assuming that coronals are underspecified.

In Optimality Theory, given underspecification of coronals, the fact can be analyzed in the mono-stratal model, once we translate Nasal Assimilation and Cluster Simplification into OT constraints. Note, however, that Nasal Assimilation produces segments which are not phonemes in Catalan. It is not yet clear how Optimality Theory accommodates Structure Preservation, but if the theory should include the principle in it, the post-lexical component may be posited also in Optimality Theory. We should await further researches on this issue.

Finally, let us consider Finnish *t*-spirantization, which applies only to derived words; e.g. *halus-i* 'wanted' (cf. *halut-a* 'to want') vs. *tila* 'room.' Mascaró's Strict Cycle Condition, which requires phonological rules to apply only in derived environments, accounts for this difference in application. What is interesting in Finnish is that *t*-spirantization seems to interact with *i*-raising; e.g. *vesi* 'water' vs. *vetenä* (essive sg.). Kenstowicz (1994) proposes that the application of *i*-raising constitutes a derived environment and thus *t*-spirantization can apply to produce *vesi*.

Kenstowicz's analysis, however, is problematic in the following respects. First, it is not clear why *i*-raising can apply to non-derivative /vete/, while *t*-spirantization never applies in non-derived environments. Second, Cole (1995:76) reports that "there have been no additional examples in which a derived environment can be created morpheme-internally by the prior application of a phonological rule." Finally, a closer investigation to Finnish inflection reveals that /vete/ is not the underlying form of |vesi|: both the /i/ in *vesi* and the /e/ in *vetenä* might be epenthetic.

Now we can analyze the Finnish fact with just a single condition; i.e. *t*-spirantization applies only at stem boundaries. Note that the process does not apply to all derived words; e.g. *äiti-nä* 'mother (essive sg.).' What remains to be solved is how this condition is translated into OT constraint(s). The simplest way to do it is to postulate a constraint like *$t|i$. Although it is preferable to paraphrase this constraint perhaps into some alignment constraint in order to avoid referring to the boundary symbol directly, formulation of such a constraint seems to be a difficult task. So, again, we must await further research on this issue.

References

Chomsky, N., & M. Halle 1968. *The Sound Pattern of English*. New York: Harper & Row.

Cole, J. 1994. The Cycle in Phonology. In *The Handbook of Phonological Theory*, ed. John Goldsmith, 70-113, Cambridge, Massachusetts: Basil Blackwell.

Halle, M. & J.-R.Vergnaud 1987. *An Essay on Stress*. Cambridge, Massachusetts: MIT Press.

Kenstowicz, M. 1994. *Phonology in Generative Grammar*. Cambridge, Massachusetts: Basil Blackwell.

Kenstowicz, M. 1995. Base-Identity and Uniform Exponence: Alternative to Cyclicity. Ms. MIT.

Kiparsky, P. 1985. Some Consequences of Lexical Phonology. *Phonology Yearbook* 2: 85-138.

Mascaró, J. 1976. Catalan Phonology and the Phonological Cycle. Doctoral dissertation, MIT.

McCarthy, J. & A. Prince 1995. Faithfulness and Reduplicative Identity. In *UMOP* 18, 249-384.

Prince, A. & P. Smolensky 1993. Optimality Theory: Constraint Interaction in Generative Grammar. Ms. Rutgers University and University of Colorado.