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The Strict Cycle Condition and Noncyclic Rules

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Within the framework known as Lexical Phonology a radical distinction is established between two types of rules: lexical rules, which apply along with different operations of word formation, and postlexical rules, which apply without morphological restrictions to any string of segments that satisfies their phonological requirements. Rules applying in each of these two main subcomponents of the phonology are claimed to be identifiable by a number of distinctive properties. In particular, two properties have been assumed to go hand in hand and to characterize either all or a type of lexical rules: cyclic application and restriction to derived environments (see Kiparsky (1985), Kaisse and Shaw (1985), Halle and Mohanan (1985), Pulleyblank (1986), Booij and Rubach (1987), among others). The prevalent view is that not all lexical rules present these properties. Booij and Rubach (1987) recognize a class of postcyclic lexical rules. Halle and Mohanan (1985) also argue that there are noncyclic lexical strata. The assumption is, then, that only lexical rules that apply cyclically will be subject to the Derived Environment Constraint, whereas rules that apply noncyclically will not. The conjunction of these two properties, cyclic application and restriction to derived environments, is known as the Strict Cycle Condition (see Mascaró (1976)). In this squib I will show that there are rules that apply noncyclically and yet obey the Derived Environment Constraint. Thus, the two properties of lexical rules associated under the Strict Cycle Condition do not go together by necessity, but constitute two separate conditions on rules. The evidence comes from the Basque dialect spoken in the town of Ondarroa, in Biscay, Spain.

The Basque dialect of Ondarroa, like many other Basque dialects, possesses a rule of Vowel Assimilation that raises /a/ to [e] when preceded by a high vowel, with possible intervening consonants. The operation of this rule can be observed in the pairs of examples in (1), where an /a/-final suffix (the singular article /-a/, the adverbializer /-ka/, and the distributive /-na/, respectively) is shown following nonhigh and high vowels:

(1)	a.	/gišon-a/	[gišona]	'the man'
		/lagun-a/	[layune]	'the friend'
	b.	/pelota-ka/	[pelotaka]	'throwing a ball'
		/aři-ka/	[ařike]	'throwing stones'
	c.	/bat-na/	[bana]	'one by one'
		/bi-na/	[biɲe]	'two by two'

This rule is both restricted to derived environments and noncyclic. That the rule is restricted to derived environments

I want to thank my main informant, Amaia Iparragirre. I am also grateful to Larry Hyman and Doug Pulleyblank for their comments on early presentations of the facts discussed in this squib, and to the squibs editors and two anonymous reviewers of this journal for many helpful suggestions. All errors are mine.

can be easily shown, since morpheme-internal iC_0a, uC_0a sequences are not infrequent. The rule of Vowel Assimilation that applies in the morphologically derived contexts in (1) does not apply in the underived, morpheme-internal contexts in (2):

(2)			
	/bisar/	[bisař]	'beard'
	/indar/	[iɲǰař]	'strength'
	/usain/	[usayɲ]	'smell'
	/ikas-i/	[ikasi]	'to learn'
	/pinta/	[piɲča]	'paint!'
	/čimista/	[čimista]	'lightning'
	/muga/	[muɣa]	'limit'
	/eliša/	[eliša]	'church'

The noncyclic character of the rule is also apparent, given an interesting condition in its application: for the rule to apply, its target must be strictly adjacent to a word boundary.[1] The rule thus fails to apply when the target /a/ is not word-final. Observe the absolutive singular and plural forms in (3). As the examples in (3a) show, the singular article /-a/ undergoes the rule, but the plural article /-ak/ does not. The examples in (3b) do not meet the minimal phonological requirements for the rule to apply and are given for comparison (that is, to show that the singular and plural articles are in fact /-a/ and /-ak/ underlyingly):

(3)	Stem	Abs. sg.	Abs. pl.	
a.	/ur/	[ure]	[urak]	'water'
	/lagun/	[laɣune]	[laɣunak]	'friend'
	/mutil/	[mutiʎe]	[mutiʎak]	'boy'
	/čakuř/	[čakuře]	[čakuřak]	'dog'
	/mendi/	[mendiše]	[mendišak]	'mountain'
b.	/gišon/	[gišona]	[gišonak]	'man'
	/plater/	[platera]	[platerak]	'dish'
	/ař/	[ařa]	[ařak]	'worm'

The fact that the plural article does not undergo assimilation does not mark it as exceptional. Consistently, only monosyllabic suffixes ending in /a/ (/-C_0a/ suffixes) show the effects of assimilation. Inflectional suffixes that do not conform to this phonological shape do not undergo the rule. Thus, the prolative /-tsat/ does not show vocalic alternation ([laɣun-tsat] 'as a friend', not *[laɣuntset]). Nor does the dative suffix /-ai/ ([laɣunay] 'to the friend', not *[laɣuney]); nor do locative markers that end in a segment other than /a/ (/toki-tan/ [tokičan] 'in

[1] Notice that whereas some of the monomorphemic examples in (2) do not fulfill this condition, the last four do; but Vowel Assimilation still does not apply.

place', not *[tokičen]). A simplified formulation of the rule is given in (4):

(4) $a \rightarrow e \,/\, \underset{[+\text{high}]}{V}\ C_0 \_\_\_]$

Crucial evidence in determining the noncyclic nature of Vowel Assimilation comes from comparing examples in which the same suffix undergoes the rule when word-final but does not undergo it when it is followed by another suffix. (5a–d) provide such examples for the singular article /-a/, the adlative suffix /-ra/, the distributive /-na/, and the adverbializer /-ka/, respectively, in word-final position and followed by other suffixes:

(5)				
a.	/mutil-a/	[mutiʎe]	'the boy'
	/mutil-a-k/	[mutiʎak]	'the boy (erg)'
b.	/ondařu-ra/	[ondařure]	'to Ondarroa'
	/ondařu-ra-ko/	[ondařurako]	'bound for Ondarroa'
c.	/bi-na/	[biɲe]	'two for each'
	/bi-na-ka/	[biɲaka]	'two by two'
d.	/aři-ka/	[ařike]	'throwing stones'
	/aři-ka-da/	[ařikara]	'throwing of a stone'

These examples show that Vowel Assimilation must apply noncyclically. The condition of being adjacent to a boundary must be determined after all suffixation has been completed. If the rule applied cyclically, that is, after each operation of suffixation, it would apply in all the examples in (5). For the correct results to be obtained, it must instead apply only after all suffixation has taken place, as indicated in (6):

(6) *Stratum 1*

Morphology	Phonology
suffix a	
suffix b	
. . . . .	
suffix z →	Vowel Assimilation

This interaction between suffixation and Vowel Assimilation is illustrated with two examples, [čakuře] 'the dog' and [čakuřak] 'the dog (erg)':

(7)

	[čakuř] a] dog sg	[čakuř] a] k] dog sg erg
Stratum 1		
Suffixation of /-a/	[čakuřa]	[čakuřa]
Suffixation of /-k/		[čakuřak]
Output of morphology	[čakuřa]	[čakuřak]
Vowel Assimilation	[čakuře]	S.D. not met

In [čakuřak] the structural description of Vowel Assimilation is not met because the possible /a/ target is not adjacent to a morphological boundary at the point when the rule applies, at the output of all stratum 1 operations.[2] If the rule applied cyclically, after each affix is attached, as in (7), we would obtain the incorrect *[čakuřek], since there is a stage at which the target is word-final (after the singular article /-a/ is attached and before the attachment of ergative /-k/), thus meeting the conditions for the rule to apply:[3]

(8)

	[čakuř] a] dog sg	[čakuř] a] k] dog sg erg
Stratum 1		
Suffixation of /-a/	[čakuřa]	[čakuřa]
Vowel Assimilation	[čakuře]	[čakuře]
Suffixation of /-k/		*[čakuřek]

Finally, we must consider the interaction of Vowel Assimilation with cliticization. Clitic attachment does not block the application of Vowel Assimilation to an otherwise word-final /a/ in a suffix, unlike what happens when another suffix is added. Thus, in the examples in (9) the singular article, which is internal to the phonological unit created by the cliticization of the copula, is not prevented from undergoing Vowel Assimilation:[4]

(9) /lagun-a da/ [layunera] 'it is the friend'
/mendi-a da/ [mendišera] 'it is the mountain'

[2] There are instances when the environment of Vowel Assimilation is not satisfied lexically but would seem to be satisfied postlexically, after the deletion of a final stop renders the possible target vowel word-final. The postlexical deletion of a final consonant has no effect on the applicability of the rule, however: /čakuř-ak dis/ [čakuřa tis], *[čakuře tis] '(they) are dogs' (see Hualde (1987; 1988) for this rule simplifying sequences of stops). I was reminded of this fact by an anonymous reviewer.

[3] If we assumed that only those morphological boundaries that remain after all affixation operations constitute word boundaries, and we labeled the boundary in the environment of Vowel Assimilation as a word boundary, then the noncyclic character of the rule would not be obvious. In a cyclic analysis, the structural description of the rule would simply not be met until after all rules of affixation had a chance to operate. This view, which I do not adopt, requires the existence of some special mechanism by which word boundaries are inserted or certain preexisting boundaries are given a special status. In the view presented here, on the other hand, the morphological boundaries to which Vowel Assimilation is sensitive are simply those that remain (that is, have not been erased as a result of morpheme concatenation) at the point where the rule applies.

[4] That the copula /da/ (not to be confused with the homophonous suffix /-da/ that appears in the example /aři-ka-da/ in (5d) and is mentioned below) is a clitic can be deduced from the fact that it undergoes all stratum 1 rules. In Basque, suffixation takes place at stratum 1 and compounding at stratum 2 (see Hualde (1988)). The examples show that

On the other hand, clitics can undergo Vowel Assimilation themselves. In fact, the application of other suffixational phonological rules creates inputs for Vowel Assimilation to apply to clitics, as shown in the examples in (10), where the reduction of certain vowel sequences created by suffixation permits the application of Vowel Assimilation to the copula /da/:[5]

(10)

/buru-a da/	[burure]	'it is the head'
/baso-a da/	[basure]	'it is the forest'
/eče-a da/	[ečire]	'it is the house'
/alaba-a da/	[alaβire]	'it is the daughter'

Thus, Vowel Assimilation has a chance to apply twice: once after all suffixation and once after cliticization. This is evidence that clitic groups are formed at a later stage than morphologically complex words, as one would expect. Once a clitic group is formed by syntactic concatenation, it is sent back to stratum 1 of the lexicon, where the rules of this stratum get a second chance to apply. Consider the derivation of [ečire] 'it is the house' and [layunera] 'it is the friend' (irrelevant rules are ignored):[6]

(11)

	[eče] a] [da]	[lagun] a] [da]
Suffixation	ečea	laguna
Mid Vowel Raising	ečia	——
Vowel Deletion	eči	——
V Assimilation	——	lagune
Cliticization	ečida	laguneda
V Assimilation	ečide	——
	[ečire]	[layunera]

Clitic groups, which are formed in the syntax, revert to stratum 1 and undergo the rules of this stratum, including Vowel Assimilation. The rule of Vowel Assimilation thus applies twice in the phonology of Ondarroa Basque, after suffixation and after cliticization, but it applies noncyclically after all operations of suffixation.

I have shown that the Derived Environment Constraint and cyclic application are not in a relation of reciprocal implication,

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the copula undergoes a rule that changes intervocalic /d/ to /r/. This is an optional but preferred rule that applies morpheme-internally (/bide/ [bire] 'path') and in suffixation (/aři-ka-da/ [ařikara] 'throwing of a stone') but not across word boundaries (/saspi domeka/ *[saspiromeka] 'seven Sundays') or in compounding (/espata-dantsari/ *[espatarantsari] 'sword-dancer').

[5] For the rules responsible for the treatment of vowel sequences, see Hualde (1988).

[6] My conception of the interaction between the syntax and the lexicon is in the spirit of Pulleyblank and Akinlabi (1988) and Pranka (1983). However, this particular view of cliticization is in no way crucial for the argument in this squib.

and in particular that there are noncyclic rules whose application is restricted to morphologically derived environments (against the claims in Booij and Rubach (1987), Kiparsky (1985), and Halle and Mohanan (1985)). The conclusion must be either that cyclic application and restriction to derived environment are two independent properties of rules or that cyclic application of a rule implies that it is subject to the Derived Environment Constraint, but not vice versa.[7]

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[7] The claim that cyclic rules are necessarily restricted to derived environments has been shown to be false for a class of cyclic rules in Klamath that crucially refer to syllabification (Clements and Keyser (1983)). This supports the conclusion that we are dealing with two independent properties of rules. Neither property would necessarily imply the existence of the other.

Scope Interpretation and the Syntax of Psych-Verbs

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May (1985) draws attention to a subject-object asymmetry in the interpretation of pairs like the following:

(1) a. What did everyone bring?
    b. Who brought everything?
(2) a. Who did everyone talk to?
    b. Who talked to everyone?

As May observes, the (a) sentences, with a quantified NP in subject position and *wh*-trace in object position, are ambiguous, having either a "single-question" or "family-of-questions" reading. Thus, (1a) can be understood as asking either 'What is the thing such that everyone brought IT?' or 'For each person *x*, what is the thing that *x* brought?'. On the other hand, the (b) sentences, with a quantifier in object position and *wh*-phrase in subject position, are unambiguous, having only a single-question reading.

May analyzes the results in terms of a path theory of scope relations (see Pesetsky (1982) for path theory). In brief, his account rests on three points:[1]

(i) Ā-moved elements generate a path to their traces.
(ii) Paths may not cross.
(iii) A "family-of-questions" reading is possible for WH and Q only when Q adjoins to the highest S in the S′ containing WH.

Given (i)–(iii), a family-of-questions reading will be possible in sentences like (1a) and (2a) in which Q c-commands WH in underlying form. The relevant LF representation will involve no crossing paths. Schematically:

(3) [$_{S'}$ WH [$_{S}$ Q [s . . . e . . . t . . .]]]

We are grateful for comments and suggestions from James Higginbotham, Becky Kennedy, Susumu Kuno, Howard Lasnik, Robert May, and an anonymous *LI* reviewer. They do not, however, necessarily agree with us, and all errors are our own.

While this squib was in press, we discovered work by Stroik (1987) that discusses similar facts and proposes a path-theoretic analysis based on a rather different structure than the one adopted here. See Stroik (1987) for details and for a variety of interesting additional data.

[1] Point (iii) is not an actual assumption made by May (1985) but rather a descriptive consequence of his theory of scope. The major elements of this theory are listed in (a)–(c):

(a) α has scope over β only if α c-commands β.
(b) α c-commands β iff all maximal projections including α include β.
(c) α includes β iff every segment of α dominates β.

Taken together, (a)–(c) entail assumption (iii), since if NP is adjoined to S under S′, the smallest maximal projection including NP will be S′, which also includes WH.