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A Phonological Exchange Rule in Flemish Brussels*

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In his 1974 review of Chomsky and Halle's *The Sound Pattern of English* (henceforth *SPE*), McCawley observes:

> the more plausible examples that I know of of exchange rules . . . share an important characteristic: their environment is not phonological but morphological. [12: 74, fn. 33]

Recently, this observation has been worked out and advanced by Anderson [1] and Anderson and Browne [4]. The former gives an example of a morphological or, in Anderson's terminology "morpholexical" [2, 3] exchange rule in Dinka, which switches the value of the length feature in plurals [1: 53]:

(1) $\begin{bmatrix} V \\ \alpha\,\text{long} \end{bmatrix} \rightarrow [-\alpha\,\text{long}] \;/\; \overline{[\text{PLURAL}]}$

and claims that similar rules exist in Hebrew, Arabic, Luo, and Menomini. Anderson and Browne discuss purported instances of exchange rules in Wolfe [16]. They reject rules from Old Prussian and an African drum signaling system, the former because of lack of precise phonetic data and fragmentary knowledge in general, the latter, on the grounds that

> there is no obvious reason to expect that the formal properties of such auxiliary modes of communication will reflect those of natural languages in every detail. [4: 449]

A Czech rule formulated by Wolfe is reanalyzed as a non-exchange rule. Furthermore, they claim morpholexical exchange rules for several African languages (Luo, Shilluk, Alur, Adhola, Anouk, Dinka), for Digueno, and for Czech diminutive formation. On the

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basis of these examples, Anderson and Browne claim that

> the class of segmental exchange rules is limited to the domain of morpholexical processes. [4: 463]

One troublesome instance of an exchange rule for Anderson and Browne is *SPE*'s rule of Vowel Shift in English, in fact the first rule to be formulated as an exchange rule by Chomsky [5]. They comment[1]:

> The English vowel shift has remained virtually the only example of a true exchange rule which has received extensive discussion. Other authors, however, (e.g., McCawley [12]; Stockwell [15]) have questioned Chomsky and Halle's account of the vowel shift. The surface alternation patterns are clear (at least for the front vowels) but alternative accounts can be imagined that deal with these same alternations without positing a direct exchange of two elements in the same environment. In particular, if the high vowels become centralized diphthongs before lowering, and the mid and low vowels are simply raised on step, no exchange is involved. [4: 447]

I will consider *SPE*'s account of the English Vowel Shift known. The purpose of this paper will be to present data from the dialect of Flemish Brussels Dutch, data that resemble in certain respects those featured in the English Vowel Shift, and which appear to be, in fact, best accounted for by means of a phonological exchange rule. If analyzed correctly, therefore, the dialect of Flemish Brussels will give us a counterexample to Anderson and Browne's claim on the strict morpholexicality of exchange rules in phonology.

Analyses of Flemish Brussels can be found in Mazereel [11], and Van Loey [10]. According to both sources, Flemish Brussels has a rule of Precluster Shortening, which shortens a vowel followed by two or more consonants. According to Mazereel, the phonology of Flemish Brussels contains a second shortening rule, applying to

[1] In concentrating on the *rule* of English Vowel Shift, Anderson and Browne appear to "overlook" two more *phonological* exchange rules involved in *SPE*'s account of Vowel Shift. These are the rules of Rounding Adjustment, which switches the value of the feature [roundness], and the rule of Backness Adjustment, which does the same for the feature [backness]. Possibly this "oversight" could be defended by observing that this pair of rules is, in some sense, tied up closely to the rule of Vowel Shift, to the extent that a rejection of Vowel Shift as an exchange rule (or simply as *one* rule) may entail the rejection of Rounding Adjustment and Backness Adjustment as exchange rules (or as rules *per se*). But then, cf. Ladefoged [9], where Vowel Shift is a raising rule and Backness Adjustment remains a phonological exchange rule. Anderson and Browne seem to owe us an explanation here.

unstressed vowels in auxiliary verbs. Examples of these two processes are displayed in (2).[2]

(2)	a.	i:r	'gentleman'	irke	'little gentleman'
		spi:kə	'to spit'	spiksəl	'saliva'
		bi:n	'leg'	bintše	'little leg'
	b.	ly:pə	'to walk'	lypkə	'a turn'
		y:kə	'to itch'	yksələ	'to keep itching'
		dry:mə	'to dream'	drymt	'dreams'
	c.	mu:kə	'to make'	gəmokt	'made'
				moksəl	'manufacture' (N)
		sxu:mə	'to be ashamed'	sxomtə	'shame'
		vlu:mink	'Fleming'	vloms	'Flemish'
	d.	ze:k	'ill'	ziktə	'illness'
		gre:kə	'Greek' (PL)	griks	'Greek' (ADJ.)
		ne:t	'not'	niks	'nothing'
	e.	zø:kə	'to search'	zykt	'searches'
		mø:r	'wall'	myrkə	'little wall'
		ø:r	'hour'	yrkə	'small hour'
	f.	vo:t	'foot'	vutšə	'little foot'
		do:n	'to do' (STR)	dun	'to do' (unstr)
		mo:tə	'must' (STR)	mut	'must' (unstr)

Concentrating on vowel quantity and disregarding quality for a moment, the two shortening rules involved in the alternations of (2) can be formulated as in (3) and (4).

(3) Precluster Shortening

$$V \rightarrow [-long] \; / \; \_\_ C_2$$

(4) Auxiliary Verb Reduction

$$V \rightarrow [-long] \; / \; \begin{bmatrix} -stress \\ AUX \end{bmatrix}$$

Actually, there may be additional constraints on the specific contents of "C_2" (only an obstruent is allowed as the rightmost C; if the leftmost is a liquid, the second is a plosive), and possibly Precluster

[2] *i, e, u, o* are the usual high and mid, front and back vowels. *y* and *ø* are front round, and high and mid, respectively.

Shortening ought to be formulated in terms of mora-loss, given the specific shortenings of diphthongs. These details, however, will not concern me here.[3]

Let us then review the vocalic alternations in (2) as regards their quality. In the first place, there is no qualitative change at all in two of the six paradigms. That is, the high front vowels change in quantity only. Furthermore, the long mid front vowels alternate with short high ones, while among the back vowels *u:* alternates with *o*, and *o:* with *u*. Suppose, therefore, that the phonetic vowels of (5a) derive from the underlying vowels of (5b).

(5) a. i. i:/i ii. y:/y iii. u:/o
iv. e:/i v. *ɸ*:/y vi. o:/u

b. i. i: ii. y: iii. o:
iv. e: v. *ɸ*: vi. u:

Under this assumption, Precluster Shortening will have to exhibit raising of mid front vowels as a side effect. This side effect is attested in many Flemish dialects (cf. [7]), and is possibly a reflection of a universal tendency (cf. [13: 234] vs. [14]). The proposed rule of shortening will therefore be that of (10).

(6) Precluster Shortening (revised)

$$\begin{bmatrix} V \\ +long \\ <-back> \end{bmatrix} \rightarrow \begin{bmatrix} -long \\ <+high> \end{bmatrix} / \_\_\_\_ C_2$$

This rule derives, for instance, *griks* from /gre:ks/, *zykt* from /zɸ:kt/, and *sxomte* from /sxo:mtə/.

Secondly, for back vowels the value of the height feature must be changed in order to derive the phonetic vowels of (5a, iii–vi) from the underlying ones in (5b, iii–vi). This task must be fulfilled by the following rule of Back Vowel Shift:

(7) Back Vowel Shift

$$\begin{bmatrix} V \\ +long \\ +back \\ \alpha high \end{bmatrix} \rightarrow [-\alpha high] / \begin{bmatrix} \_\_\_\_ \\ -low \end{bmatrix}$$

[3] Precluster Laxing as such is attested in many Flemish dialects. Cf. Goemans [8], Devos and Taeldeman [7]. As far as I am aware, there is only one dialect, that of Mechelen mentioned in Goemans [8] where the long low vowel does not shorten to a low vowel. In Mechels long *a:* alternates with short *o*.

This rule derives, for instance, *mu:ke* from /mo:kə/, and *do:n* from /du:n/.[4]

As is easily observed, Back Vowel Shift is a rule *exchanging* the height feature for long, nonlow back vowels. But the real point of the proposed analysis is, of course, that the dialect of Flemish Brussels appears to present us not only with an exchange rule, but rather with a *phonological*, that is, *nonmorpholexical* exchange rule. If correct therefore, the analysis provides us with a counterexample to the claim made by Anderson and Browne that exchange rules are restricted to the area of morpholexical rules. It is also important to point out that the escape route suggested by Anderson, McCawley, and others for excluding English Vowel Shift as an exchange rule, involving centralization, diphthongization, and lowering of high vowels independently of raising of nonhigh vowels, does not appear to make much sense in the present case: high vowels lower to mid vowels corresponding in backness and roundness, and the other way around, without centralization coming into question. The conclusions we may reach, therefore, are twofold: In the first place, the claim that exchange rules in phonology are exclusively morpholexical is not borne out in Flemish Brussels Dutch. At the same time, at least one counterargument to Chomsky and Halle's account of Vowel Shift in English seems to lose much of its force.

[4] Of course, an alternative account posits as underlying vowels the following:

(i) e: (ii) ɸ: (iii) o:
(iv) i: (v) y: (vi) u:

which obviates the need for the feature [+back] in Vowel Shift. This is clearly irrelevant to the present argument, however.

REFERENCES

1. Anderson, S. R. 1974. On the typology of phonological rules. *Papers from the Parasession on Natural Phonology*. A. Bruck, R. A. Fox, and M. W. LaGaly, eds. Chicago: Chicago Linguistic Society. pp. 1–12.
2. ———. 1974. *The Organization of Phonology*. New York: Academic Press.
3. ———. 1975. On the interaction of phonological rules of various types. *Journal of Linguistics* 11: 39–62.
4. Anderson, S. R. and Browne, W. 1973. On keeping exchange Rules in Czech. *Papers in Linguistics* 6: 446–82.

5. Chomsky, N. 1967. Some general properties of phonological rules. *Language* 43: 102–28.
6. Chomsky, N. and Halle, M. 1968. *The Sound Pattern of English*. New York: Harper and Row.
7. Devos, M. and Taeldeman, J. 1974. Vokaalverkorting in het Westvlaams. *Taal en Tongval* 269:5–45.
8. Goemans, L. 1931. Een Phonetische Puzzle. *Isidoor Teirlinck Album*. Leuven: De Vlaamsche Drukkerij, pp. 99–105.
9. Ladefoged, P. 1971. An alternative set of Vowel Shift rules. *UCLA Working Papers in Phonetics* 17: 25–28.
10. van Loey, A. 1933. Historiese Lange-vokaalverschuiving in het Brusselse Dialekt, *Handelingen van de Koninklijke Commissie voor Toponymie en Dialectologie* 7: 309–28.
11. Mazereel, G. 1931. *Klank- en Vormleer van het Brusselsch Dialect*. Leuven: De Vlaamsche Drukkerij.
12. McCawley, J. D. 1974. Review of *SPE*. *International Journal of American Linguistics* 40: 50–88.
13. Nichols, B. 1974. A rationale for Vowel Shift. *Towards Tomorrow's Linguistics*, R. Shuy and C.-J. N. Bailey, eds. Washington: Georgetown University Press. pp. 226–38.
14. Stockwell, R. P. 1961. The Middle English 'long close' and 'long open' mid vowels. *Texas Studies in Literature and Language* 2: 529–38; reprinted in *Readings for the History of the English Language*, C. Scott and J. L. Erickson, eds. Boston: Allyne and Bacon. 1968. pp. 196–205.
15. ———. 1972. Problems in the interpretation of the great English Vowel Shift. In *Studies in Linguistics in Honor of George L. Trager*, M. Estellie Smith (ed.), Mouton, The Hague; 344–62.
16. Wolfe, P. M. 1970. Some theoretical questions on the historical English Vowel Shift, *Papers in Linguistics* 3: 221–35.

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Why Argue about Rule Ordering?*

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There is currently a debate over whether transformations should be ordered with respect to each other. (Some of the positions are referenced below.) While two major types of rule ordering mechanism are available in syntax—intrinsic ordering and extrinsic ordering—the major dispute involves various approaches to extrinsic ordering. A proof is presented here both formally and informally which demonstrates that unless a concept of naturalness of transformations can be incorporated into grammatical theory, the debate seems to be one of conflicting methodology, taste, and terminology.

This discussion presupposes the validity of transformations within a generative framework. It will be assumed without argument for the purposes of this discussion that the rules referred to here are transformations.

1. A PROOF

The following sections present some simple constructions to show that there is no evidence or presently available metric to decide between the total linear ordering proposal and the total unordering proposal.

1.1 DESCRIPTION OF AN ORDERED SYSTEM

Imagine that we have developed a set of linearly extrinsically ordered rules. We can consider that the linear ordering can be expressed by assigning a positive integer as the *index* of each transformation. The ordering mechanism, then, is a device which checks the index of each transformation to ensure that a transformation with a low index will not be applied after a transformation with a higher index. This index-checking device should also be useful for ensuring that every obligatory transformation is applied as long as its

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