CASES OF COUNTER-FEEDING IN FAS

Many phonological rules relate to one another in characteristic fashion. A particular group of phonological rule relationships has been characterized in terms of the concepts of FEEDING and BLEEDING.

In a stage-setting article, Kiparsky (1968b), suggested that diachronic change could be partly explained in terms of these relationships.

A FEEDING relationship obtains when a rule (A) increases the number of forms to which another rule (B) is applicable.

In Fas[1], for example, we have the following two rules:

1. Voiceless high vowels (only occurring word-finally) delete between consonants. (HVD)

cf.	kət	'we sleep'	kətmo	'we will sleep'
	kətị̥	'we eat'	kətmo	'we will eat'

2. Between incompatible consonants, shwa is inserted. (SHI) t and m are incompatible, so that the phonetic forms turn out to be [kətəmo][2]

Given the underlying form /kətị̥ +mo/, SHI is not applicable. HVD is, however, and once it has applied a form is derived to which SHI is now applicable. HVD is said to FEED SHI.

A BLEEDING relationship obtains when a rule (A) diminishes the number of forms to which another rule (B) is applicable.

English plural formation may do for an example. Given /z/ as the underlying suffix, two relevant rules are involved.

1. /z/ becomes /s/ following a voiceless consonant. (DV)
2. [ɪ] is inserted between two (near) identical consonants followed by a word boundary. (I-INS)

How do they apply?

	kæn+z	kæt+z	kɪs+z
I-INS	-	-	kɪsɪz
DV	-	kæts	-

As it is, DV would have applied to kɪs+z rendering kɪss after which I-INS would have produced *kɪsɪs. Prior application of I-INS, however, changes the form such that DV is no longer applicable. I-INS is said to BLEED DV.

A COUNTER-BLEEDING relationship obtains if rule A would have bled rule B had it been ordered to precede rule B. As it is ordered following rule B and can not therefore bleed it, it is said to COUNTER-BLEED rule A. If the plural of kɪs had been *kɪsɪs we would have had a counter-bleeding relationship.

A COUNTER-FEEDING relationship obtains if rule A would have fed rule B had it been ordered to precede rule B. As it is ordered following rule B and cannot therefore feed it, it is said to COUNTER-FEED rule B.

Kiparsky (1968b) further claimed that both the FEEDING and the COUNTER-BLEEDING orders are the unmarked, that is the most natural order relationships. Notice that with both FEEDING and COUNTER-BLEEDING both rules apply. The conclusion is then: RULES TEND TO SHIFT INTO THE ORDER WHICH ALLOWS THEIR FULLEST UTILIZATION IN THE GRAMMAR. The qualification TEND TO is crucial, as it suggests that languages may have a marked rule order, but should then be expected, in diachronic change, to move towards the unmarked order. The best known illustration of this process is from two American dialects and involves the pairs: 'write/writer' and 'ride/rider'.

Two rules are involved:

1. Flapping. Both t and d go to the Flap [D] following a stressed syllable and preceding a vowel. (FL)
2. Vowels lengthen preceding voiced consonants. (VL)

In dialect A we have the rules apply in the order FL, VL.

	rayt	rayt + ər	rayd	rayd + ər
FL	-	rayDər	-	rayDər
VL	-	rāyDər	rāyd	rāyDər

As illustrated by the surface form of writer FL has FED VL.

In dialect B, however, the rules apply VL, FL.

	rayt	rayt + ər	rayd	rayd + ər
VL	-	-	rāyd	rāyd + ər
FL	-	rayDər	-	rāyDər

Notice that FL is not allowed (by the imposition of order) to FEED VL. FL in fact COUNTER-FEEDS VL.

Given that it can be established that dialect B represents a conservative stage, the prediction has come true, in this particular instance.

In this article we will be merely concerned with the FEEDING and COUNTER-FEEDING relationships. Mainly because of difficulties with the BLEEDING and COUNTER-BLEEDING part of the proposal, Kiparsky extensively reformulated his principle, now known as the Opacity Principle. (Kiparsky 1971):

> A rule A→ B / C__D is opaque to the extent that there are surface representations of the form:
>
> 1. A in environment C__D
>
> or 2. B in environments other than C__D

The first part of the Opacity principle is largely equivalent to the principle which considers Counter-Feeding orders marked.

In their search for greater naturalness and/or constraints on the power of grammars, subsequent authors have taken Kiparsky's relative principle and given it an ABSOLUTE interpretation. In other words: COUNTER-FEEDING relationships do not occur in natural languages. Notice that such an approach implies the denial that language may simply reverse the order of two (or more) rules in diachronic change.

Natural Generative Phonology (forthwith NGP) achieves this prohibition of COUNTER-FEEDING--apart from a simple statement to the effect (Hooper 76 p.62)--by its True Generalization Condition (Hooper 76 p.16). This condition is formulated by Kenstowicz and Kisseberth as an absolute version of the Opacity Condition (1979:221):

1. If a rule of the form A -> B / C__D is to be valid, then strings of the form CAD cannot occur in the Phonetic Representation(3).
2. If B is to be derived from A by the rule A -> B / C__D, then B must appear in the string CBD in the Phonetic Representation.

Koutsoudas, Sanders and Noll (forthwith KSN) (1974) effect the prohibition by their basic principle, formulated in Koutsoudas 1978 (p.4) as:

> "An obligatory rule must apply wherever its structural description is met".

Koutsoudas furthermore notes that the principle can be falsified by showing that in a given language:

> "A pair of empirically well-motivated rules must apply in a counter-feeding order." (1978 p.8)

Notice that the proviso "obligatory" leaves them a way out. KSN, in fact, stipulate that Obligatory Rules precede Optional ones (cf. Koutsoudas 1976 p.13). Hooper (76:p.112) similarly allows for COUNTER-FEEDING rule order where rules applying in faster speech take the forms of slow(er) speech as their input. Hooper (76 p.112) claims (probably with some justification) that this is not a matter of optionality, yet it seems that both schools have a shared set of examples in mind (cf. discussion in Koutsoudas (ed) 1976 p.285ff).

To allow for [rayDər] NGP could say that the Flapping rule only applies in fast speech in dialect B, whereas it is norm in dialect A. KSN could say that the flapping rule is optional in dialect B and obligatory in dialect A. Whatever the facts, in the following section we would like to present two cases of COUNTER-FEEDING occurring in the Fas language. As neither fast speech nor optionality has been observed, the examples should show that COUNTER-FEEDING not only may occur, but may not even be all that unnatural either.

Consider the following data:

Noun	Noun+Possessive Suffix	
nək	nəko	"a tree"
tan	tano	"centipede"
fa	fao	"child"
fɛ	fɛo	"excreta"
si	siu [siyu]	"bird"
kɛy	kɛyu	"hand"
may	mayu	"Mai (name of man)"
kɔy	kɔyu	"eye"
kɔ	kɔo	"stem"
fo	foo	"handle (of axe, etc.)"
fu	fuu	"a bird"

As [+hi] segments appear to be the cause of the change we postulate -o as the possessive suffix and derive the highvowel by phonological rule. As /e/ appears to be similarly constrained in other morphemes, the generalized rule reads:

High Vowel Formation (HVF)

$$\begin{bmatrix} -\text{cons} \\ +\text{syll} \\ -\text{low} \end{bmatrix} \longrightarrow [+\text{high}] \Big/ \begin{bmatrix} -\text{cons} \\ \\ +\text{high} \end{bmatrix} \_\_\_\_$$

Now consider the following forms:

fe	feyo	"a variety of wild sugar cane"
me	meyo	"mother"
si	siyu	"bird"

It appears, in fact, that a rule is needed inserting y between e/i and any following vowel.

Y-Insertion (Y-INS)

$$\emptyset \longrightarrow y \Big/ \begin{bmatrix} -\text{cons} \\ +\text{syll} \\ -\text{back} \\ -\text{low} \end{bmatrix} \_\_\_\_ \begin{bmatrix} -\text{cons} \\ +\text{syll} \end{bmatrix}$$

Notice now that the rules HVF and Y-INS stand in a COUNTER-FEEDING relationship. Y-INS would have FED HVF had it been ordered before it.

cf.		fe+o		fe+o
	Y-INS	feyo	HVF	-
	HVF	*feyu	Y-INS	feyo

One may wonder whether *feyu is indeed what one should expect. Y-Insertion seems to be a late phonetic process and for such a late phonetic process to cause neutralization between following non-low vowels does not seem entirely natural.

Consider another process illustrated by the following data:

Verb/Noun	+ thematic vowel or possessive affix	
pən	pəno	'go'
ɛt	ɛto	'build'
su	su u	'burn'
ni	niyu	'they shoot'
nɛy	nɛyu	'(I) go outside'
nɔw	nɔwu	'(he) goes outside'
yay	yayu	'(I) go inside'
tae	tayo	'(I) do'
nae	nayo	'(I) take'
sɔe	sɔyo	'(I) change'
sɔy	sɔyu	'eagle'
kɔy	kɔyu	'eye'

Rule: e ---> y / V__V (GLIDE FORMATION - GLF)

Once again we see that a rule with feeding potential has to be ordered after the rule it could have fed. In other words, GLF COUNTER-FEEDS HVF.

Koutsoudas, actually, also proposed a principle which, presumably, takes precedence over the one prohibiting COUNTER-FEEDING : (1978 p.24)

The Morphophonemic-Allophonic Principle (MAP)[4]

"A morphophonemic rule application must always take precedence over an allophonic rule application.

Given a rule A→B/C__D applicable to a form CAD, the application of this rule is MORPHOPHONEMIC if there are strings of the form CBD which could be derived from a source other that CAD; otherwise the application of the rule is allophonic".

The principle is interesting in that it re-introduces into Generative Phonology the distinction Morphophonemic/Allophonic without positing a phonemic level. This is achieved by focussing on the nature of a rule in regards to a particular form. Thus it is possible for one reading of the rule to be morphophonemic and another to be allophonic. For example, the voicing rule in Dutch changes /p/ and /t/ to the phonemes /b/ and /d/ before voiced consonants. It changes [k] to [g] but as [g] is only an allophone of /k/, the latter rule application is allophonic and the former morphophonemic.

Returning to the Fas data, it appears that both Y-INS and GLF are hybrid rules. y in e.g. [feyo] 'a variety of wild sugar cane' can only be derived by insertion as any underlying y would have caused the following o to go to u. In its application to e.g. /ana ne+a/ 'I am speaking' it is morphophonemic, as the resulting [neya] could also have been derived from e.g. /ne +ya/ '(I) spoke + emph.'

GLF is allophonic in deriving [sɔyo] from /sɔe + o/ 'exchange + thematic vowel' but morphophonemic in deriving [(ana) sɔya] from /ana sɔe + a/ 'I am exchanging', as [sɔya] could be derived from /sɔ + ya/ 'flower+emph.'

HVF is purely morphophonemic in that the high vowels have an alternative source e.g. /key + in/ 'I went down and planted' [keyin].

As the forms involving allophonic application of the Y-INS and BLF rules are precisely the ones in which these rules are counterfed by HVF, it appears that the situation is correctly predicted by the MAP principle.

We will adduce one more case of COUNTER-FEEDING in Fas. Rounding of front vowels is an across the board phenomenon in Fas and it appears to affect vowels both preceding and following w.

cf.	oy	'I cut'		ney	'I shoot'	nɛy	'I go outside'
	ow	'he cuts'		now	'he shoots'	nɔw	'he goes outside'
	sɪsyɛn	'I send him'	from /sɪsi +ɛn/				
	sɪsuwan	'I send you'	from /sɪsi+wan/				
	pən	'I go'		ɛt	'I build'	tati	'I shoot'(pl.obj.)
	pənɛ	'go!'		ɛtɛ	'build!'	tatyɛ (s)	'shoot!'
	təpu	'I cut'		safu	'I hold'		
	təpwɔ	'cut!'		səfwɔ	'hold!'		

We lack evidence of we -> wo, but as [we] does not occur apart from being amongst the class of examples about to be discussed, we will generalize the rule as follows:

Rounding (Rnd)

$$\begin{bmatrix} -\text{cons} \\ -\text{syl} \\ -\text{back} \\ -\text{round} \end{bmatrix} \longrightarrow [+\text{rnd}] \; / \; w$$

Now a number of examples occur showing both [we], [wɛ], and [wi].

e.g.	wimo	'I will cut'	cf.	oy	'I cut'
	fwemo	'I will open'		foe	'I open'
	swɛmo	'I will exchange'		sɔe	'I exchange'

Positing a COUNTER-FEEDING rule relationship, all the counter examples to Backing can be interpreted as having underlying oy/oe/ɔe. Also non-complex forms could then be thus interpreted:

mwɛna	/mɔena/	'ear'
wema	/oema/	'first-born (child)
wima	/oyma/	'a banana'

The rule is formalized as follows: (W-Formation - WF)

$$\begin{bmatrix} -\text{cons} \\ +\text{syl} \\ +\text{back} \\ \alpha\text{low} \end{bmatrix} \quad \begin{bmatrix} -\text{cons} \\ +\text{syl} \\ -\text{back} \\ -\text{round} \end{bmatrix} \longrightarrow \quad [-\text{syl}] \quad [\alpha\text{low}] \;/\; \underline{\qquad} \text{CV}$$

As [w + back vowel] can also be naturally derived from underlying /w + back vowel/ c.f. /nɔw + o/ [nɔwu] , this rule has a morphophonemic application. [w + front vowel] only results from rule WF which rule therefore has an allophonic interpretation.

It appears then that MAP correctly accounts for the COUNTER-FEEDING cases in Fas. Notice that this solution does not apply in the writer/rider case.(6)

Notice also that in case of a hybrid rule it is implied that given another relevant rule, the hybrid rule feeds the given rule in its morphophonemic application and counter-feeds it in its allophonic application. It is in this respect that the principle may well meet with serious counter-evidence.

We conclude then that COUNTER-FEEDING situations do exist in natural languages, that these tend to be restricted to situations where the counter-feeding rule has (for the relevant forms) allophonic application. We are not yet ready to concede that MAP is an absolute constraint on natural languages.

FOOTNOTES

(1) Fas is spoken in the West Sepik Province. There are about 1600 speakers. I am indebted to Kias Sawoi, Sugu Aya, and Yetin Usfani and the villagers of Kilifas for teaching me their language and providing all the relevant information.

(2) Only fricative or nasal plus homorganic stop appear to be compatible in Fas, that is, only these are not broken up by shwa. Forms containing compatible consonant clusters show that [i̯] cannot change directly to ə.

c.f. [nɛsi̯] 'I put (in my hair)'
a nɛsi̯ ta [anɛsta] 'I am putting (in my hair)'

(3) Actually K&K say 'cannot systematically occur' as they want to allow for the possibility of a few isolated lexical exceptions. Whether Hooper really intends such proviso is not clear.

(4) NGP in the Hooper version also postulates that Morphophonemic rules precede Phonological rules. The term Morphophonemics in Phonology has a history of variant and confusing interpretations. In Hooper (76) it refers to those rules which apart from their phonological content also crucially contain non-phonetic information. (e.g. [+Verb] or [Class 3])

(5). Fas has no voiced stop phonemes. Stops occurring before voiced non-syllabics exhibit a voiced allophone, which is not indicated in this paper.

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(6) We have interpreted MAP in this paper according to what seems to be its spirit, by considering rules allophonic in their application if the input form remains recoverable. Under this interpretation the flapping rule in dialect B is allophonic in that the underlying form of rayDər can only be raytər. As the vowel length rule is clearly allophonic, MAP does not apply. Under the more litteral interpretation of MAP, flapping would be morphophonemic in that a flap between a stressed syllable and a vowel (without taking more precise information about the context into account) could be derived from either d or t. This interpretation would provide a counter-example to MAP. It would also render the Fas rules (Y-Ins) and (GLD) morphophonemic throughout, and consequently render MAP inapplicable in these instances. The exact implications of either interpretation are still under investigation.