CASES OF COUNTER-FEEDING IN FAS

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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'
       kəti̥   'we eat'   kəṭmo   '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 /kəti̥ +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.

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

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

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 Prior application of I-INS, however, changes the form such that DV is no longer applicable.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 cannot 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	-	raydər	rayd	rayDər

All illustrated by the surface form of <u>writer</u> FL has FED VL. In
dialect B, however, the rules apply VL, FL.

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

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 conser-
vative 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 <u>Opacity
Principle</u>. (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 <u>do</u> <u>not</u> 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 $\longrightarrow$ 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$\rightarrow$B / C_D, then B must appear in the string CBD in the Phonetic Representation.

Koutsoudas, Sanders and Noll (henceforth 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)

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

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 [rayðar] 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
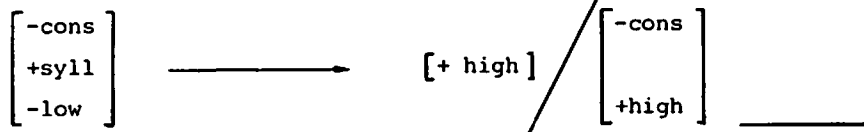may not even be all that unnatural either.

Consider the following data:

Noun	Noun+Possessive Suffix	
nɛk	nako	'a tree'
tan	tano	'centipede'
fa	fao	'child'
f	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:
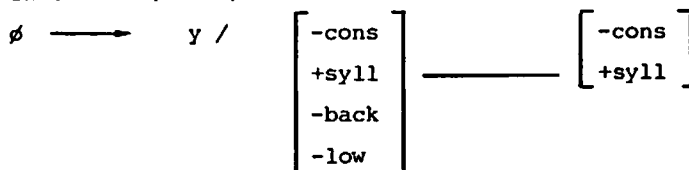
High Vowel Formation (HVF)

$$\begin{bmatrix} -\text{cons} \\ +\text{syll} \\ -\text{low} \end{bmatrix} \longrightarrow \quad [+\text{ high}] \Bigg/ \begin{bmatrix} -\text{cons} \\ \\ +\text{high} \end{bmatrix} \underline{\hspace{2cm}}$$

Now consider the following forms:

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

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

Y-Insertion (Y-INS)

$$\emptyset \longrightarrow \quad y \Bigg/ \begin{bmatrix} -\text{cons} \\ +\text{syll} \\ -\text{back} \\ -\text{low} \end{bmatrix} \underline{\hspace{2cm}} \begin{bmatrix} -\text{cons} \\ +\text{syll} \end{bmatrix}$$

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 than CAD; otherwise the application
of the rule is ALLOPHONIC".

The principle is interesting in that it reintroduces 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 /soe + 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].

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4   The term Morphophonemics in Phonology has a history of variant
     and confusing interpretations. NGP in the Hooper version also
     postulates that Morphophonemic rules precede Phonological rules.
     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])

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'*

    sɩsyɛn *'I send him'*   from /sɩsi̥ +ɛn

    sɩsuwan *'I send you'*   from /sɩsi̥+wan/

    pən   *'I go'*   ɛt   *'I build'*   tati̥   *'I shoot' (pl.obj.)*

    pənɛ   *'go!'*   ɛtɛ   *'build'*   tatyɛ̥ *'shoot!'*

    təpu̥   *'I cut'*   safu̥   *'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)

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

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

    e.g. wi̥mo   *'I will cut'*   cf. oy   *'I cut'*

          fwemo *'I will open'*   foe *'I open'*

          swɛmo *'I will exchange'*   sɔe *'I exchange'*

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

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

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

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

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

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.

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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 d̲ or t̲. 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.

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.

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.

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