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Metaphony and two models for the description of vowel systems

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1 Introduction

Recently two interesting models have been proposed for organising vowel systems; Schane's (1984) particle phonology and Goldsmith's (1987) model for vowel systems.[1] This paper will show that neither of these models is able to deal adequately with metaphony as found in many Italian dialects. Basically, the difficulty that each of these models faces is the lack of the feature [high], which is required for an understanding of metaphony.

First, I shall discuss two types of metaphony as manifested in Italian dialects, and the necessity of the feature [high] to explain the tonic vowel alternations. Then an overview of Schane's and Goldsmith's models will be presented, followed by an attempt to apply them to the problem of metaphony.

2 Metaphony

Many Italian dialects exhibit regular tonic vowel alternations, which are considered to have originated from a phonetic rule called metaphony. Tekavčić (1972) explains that from a phonetic point of view, metaphony consists in the anticipation of the degree of openness of the following atonic vowel (generally the final vowel) during the articulation of the stressed vowel. The anticipation of the degree of openness is most often manifested in one of two ways: a closing of the tonic vowel or a diphthongisation of the tonic vowel. The phonetic environment which induces the closing or diphthongisation is a posttonic high vowel (*-i* or *-u*). The modifications of tonic vowels, as seen in (1) and (2), result from metaphony:

(1) *Closing*

é → í
ó → ú
ɛ́ → é
ɔ́ → ó

(2) *Diphthongisation*

ɛ́ → yɛ́ *or* yɛ́
ɔ́ → wɔ́ *or* wó

It is important to notice that high mid vowels do not diphthongise. Thus, there are dialects which raise all mid vowels (whether high mid or low mid) and other dialects which raise the high mid vowels, while the low

mid vowels are diphthongised. In her discussion on metaphony, Reiss (1982) refers to the metaphony which diphthongises the low mid vowels as the *napoletano* type and the one which raises all mid vowels as the *arpinate* type.[2]

2.1 Data for metaphony

An example of a *napoletano* metaphony can be found in Gioscio's (1985) description of the dialect in Calvallo, a small community in the Southern Italian region called Basilicata. Data are provided in (3) below:[3]

(3) *Metaphony in Calvello*

a. ɛ *vs.* ye				
	pɛre	'foot'	pyeri	'feet'
	leğğe[4]	'light' (f.)	lyğği	'light' (m.)
	pɛnžo	'I think'	pyenži	'you think'
b. e *vs.* i				
	mese	'month'	misi	'months'
	mette	'he puts'	mitti	'you put'
c. ɔ *vs.* wo				
	vɔsko	'forest'	vwoski	'forests'
	ɣrɔssa	'big' (f.)	ɣrwossu	'big' (m.)
	mɔvo	'I move'	mwovi	'you move'
d. o *vs.* u				
	kavrone	'carbon'	kavruni	'carbons'
	sola	'alone' (f.)	sulu	'alone' (m.)
	korre	'he runs'	kurri	'you run'

An example of *arpinate* metaphony is demonstrated in the dialect of Servigliano, found in the Marches of Italy. The data in (4) come from Camilli's (1929) article:

(4) *Metaphony in Servigliano*

a. e *vs.* i				
	metto	'I put'	mitti	'you put'
	kwesto	'this' (n.)	kwistu	'this' (m.)
b. ɛ *vs.* e				
	modɛsta	'modest' (f.)	modestu	'modest' (m.)
	predoko[5]	'I preach'	prediki	'you preach'
c. o *vs.* u				
	fjore	'flower'	fjuri	'flowers'
	sposa	'wife'	spusu	'husband'
d. ɔ *vs.* o				
	mɔre	'he dies'	mori	'you die'
	mɔša	'depressed' (f.)	mošu	'depressed' (m.)

2.2 A rule for meta

Final /-i/ and /-u/ a
traditional features t
a ɔ o u/ are employed
/u/ form a natural cl

(5) *Traditional va*

	i	e
high	+	–
low	–	–
back	–	–
round	–	–

Metaphony, therefore
tonic vowel. This rul

(6) *Metaphony R*

[+high

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(7) *Metaphony of*

a.

[–back] [–

b.

[+back][–

As seen in (5), the
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in (3) below:[3]

'feet'
'light' (m.)
'you think'

'months'
'you put'

'forests'
'big' (m.)
'you move'

'carbons'
'alone' (m.)
'you run'

rated in the dialect of
data in (4) come from

'you put'
'this' (m.)

'modest' (m.)
'you preach'

'flowers'
'husband'

'you die'
'depressed' (m.)

2.2 A rule for metaphony

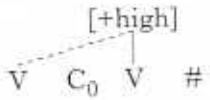
Final /-i/ and /-u/ are responsible for the effects of metaphony. If the traditional features to differentiate the seven underlying vowels /i e ɛ a ɔ o u/ are employed as shown in (5) below, then it is seen that /i/ and /u/ form a natural class, in that both are [+high] vowels:

(5) *Traditional values for the underlying vowels*[6]

	i	e	ɛ	a	ɔ	o	u
high	+	−	−	−	−	−	+
low	−	−	+	+	+	−	−
back	−	−	−	+	+	+	+
round	−	−	−	−	+	+	+

Metaphony, therefore, can be described as the spreading of [+high] to the tonic vowel. This rule is given in (6):

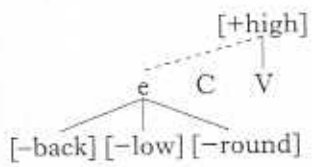
(6) *Metaphony Rule*

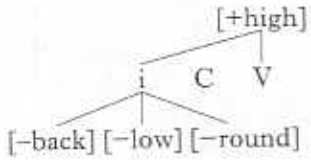


If the underlying vowel is a closed mid vowel, /e/ or /o/, then the addition of the feature [+high] easily produces the raised [i] or [u] respectively. (7) demonstrates this:

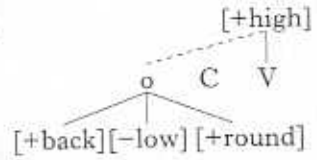
(7) *Metaphony of closed mid vowels*

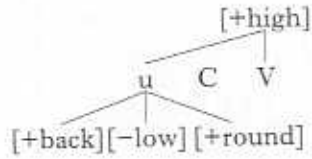
a.





b.

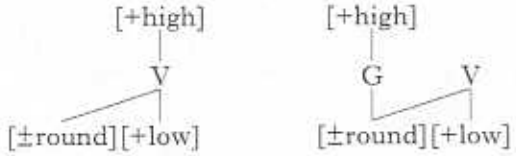




As seen in (5), the features that define the open mid vowels are [−high], [+low], [±back] and [±round]. Therefore, spreading the [+high] feature to the open mid vowels initially creates a vowel which must be both [+high] and [+low]. This is a contradiction in terms. *Napoletano* and *arpinate* type metaphonies deal with these contradictions differently.

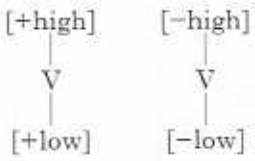
In order to solve the *napoletano* problem, Calabrese (1987: 85) proposed a linearisation rule. The rule in (8) is an adaptation of Calabrese's rule. Essentially, linearisation separates the conflicting features and associates them to two different elements on the CV tier.[7]

(8) *Linearisation Rule*



The solution proposed by Calabrese (1987) for *arpinate* dialects is a negation rule. Basically, the values of the conflicting features are negated to resolve the conflict. Thus, [+high] becomes [−high] and [+low] becomes [−low]. Vowels that are both [−high] and [−low] are /e/ and /o/; that is, the high mid vowels, which are the attested result of metaphony for the low mid vowels in Servigliano. (9) is a formulation of the negation rule:

(9) *Negation Rule*



3 Metaphony and particle phonology

Schane (1984) developed particle phonology in an attempt to obtain a notation for phonology that 'mirrored' the process described. To illustrate what he means by 'mirroring', Schane (1984: 129–130) gives this example:

> The palatalisation of a consonant in the vicinity of a high front vowel is generally viewed as the relationship between the 'palatalised' aspect of the consonant and the 'palatalising' environment of the vowel that we wish to record. Chomsky & Halle (1968: 305–308), in discussing their vowel features, note how these features describe secondary articulation in consonants. They compare their treatment of palatalisation, which utilises the features [+high, −back], with the older feature [+sharp]. The rules of (i) state that a consonant is palatalised before a high front vowel. Rule (i.a) requires independent, unrelated features; (i.b) does not.

(i) a. C → [+

b. C → [+h
[−h

Although both r
second is more re
there is a direct r
'palatalising' envi

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and **u**. In isolation,
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other than [a], [i]
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The canonical fiv
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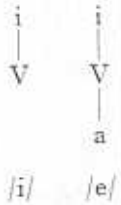
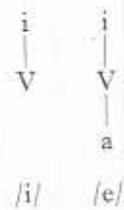
(10) *Five-vowel*



In order to obtain th
proposes that two **a**
make the respective
to define the open
and one **a** particle
the Calvello or Ser
in (11):

(11) *Seven-vowe*



(i) a. $C \rightarrow [+\text{sharp}] / - \begin{bmatrix} V \\ +\text{high} \\ -\text{back} \end{bmatrix}$

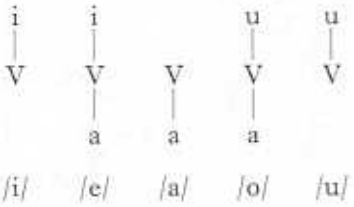
b. $C \rightarrow \begin{bmatrix} +\text{high} \\ -\text{back} \end{bmatrix} / - \begin{bmatrix} V \\ +\text{high} \\ -\text{back} \end{bmatrix}$

Although both rules are sufficient for describing palatalisation, the second is more revealing of the assimilation process to the extent that there is a direct mirroring between the 'palatalised' features and the 'palatalising' environment.

With this goal in mind, Schane posits three primitive elements – **a**, **i** and **u**. In isolation, they correspond to the vowels [a], [i] and [u]; in combination they represent phonological traits – aperture or openness for **a**, palatality or frontness for **i**, and labiality or roundness for **u**. Vowels other than [a], [i] and [u] as well as diphthongs are composed of combinations of particles.

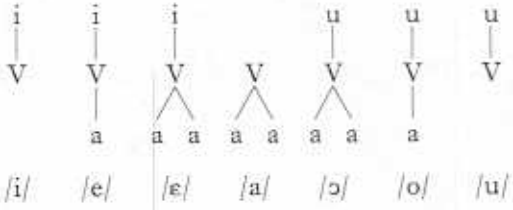
The canonical five-vowel system is represented by the particle combinations represented in (10):

(10) *Five-vowel vocalism as represented in particle phonology*



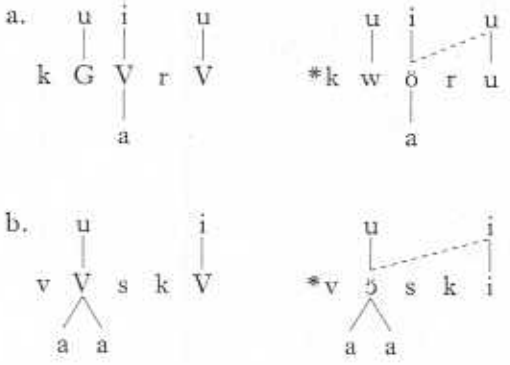
In order to obtain the open mid vowels of a seven-vowel vocalism, Schane proposes that two **a** particles and an **i** particle or an **u** particle combine to make the respective vowels /ɛ/ and /ɔ/. Since two **a** particles are required to define the open mid vowels, two **a** particles without **i** or **u** define [a] and one **a** particle defines [ə]. Thus the seven underlying vowels of say the Calvello or Servigliano dialect are represented by the combinations in (11):

(11) *Seven-vowel vocalism as represented in particle phonology*



Since there is no particle that represents height alone (only lowness; **a**), it becomes impossible to write a rule that mirrors the raising of tonic vowels due to the spreading of a particle of the final vowel to the tonic vowel. In fact, spreading the one respective particle that defines final /i/ or /u/ to the tonic vowels produces incorrect results. For example, (12) illustrates the spreading of the particle **u** of underlying /kwer-u/ to the tonic vowel which produces a front rounded tonic vowel [ö]:

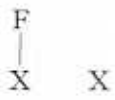
(12) *Incorrect derivations from particle spreading*



4 Metaphony and Goldsmith's model for vowel systems

Goldsmith (1987) suggests a slightly different approach, in which the features that define vowel systems are either equipollent or privative. Privative features imply a binary opposition as in (13). Equipollent features produce a ternary system as illustrated in (14):

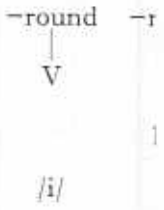
(13) *Privative features*



(14) *Equipollent features*

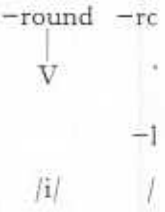
Whether or not a feature is privative or equipollent is language-specific, according to Goldsmith. In order to define the canonical five-vowel system, Goldsmith (1987: 121) uses an equipollent feature [±round], and one privative feature, [low], on separate tiers, as seen in (15). A schwa is formed by no features being associated to a V on the CV tier:

(15) *Five-vowel sy*



In order to define an
Calvello or Serviglian
features [±round, ±l

(16) *Seven-vowel*



A schwa is defined by
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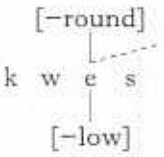
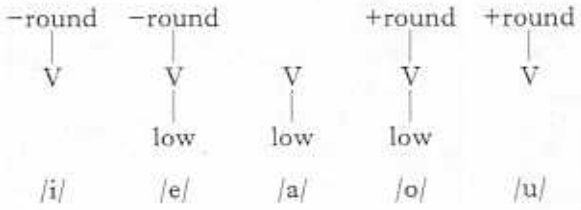
(17) *Incorrect der*



5 Summary

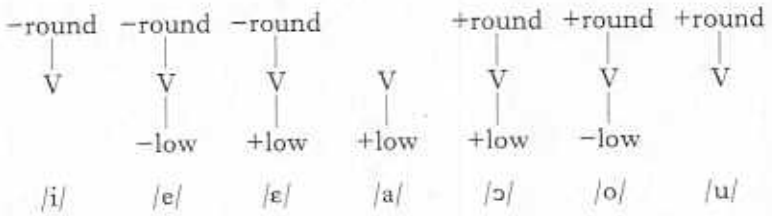
It has been demonstr
/-i/ and /-u/. The im
which are responsibl

(15) *Five-vowel system with equipollent and privative features*



In order to define an underlying seven-vowel system, similar to that of Calvello or Servigliano, Goldsmith (1987: 124) employs two equipollent features [±round, ±low], as in (16):

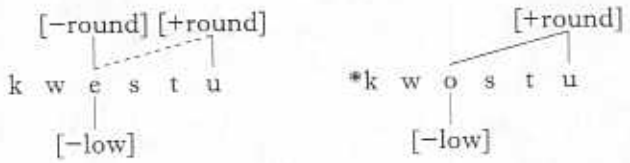
(16) *Seven-vowel system with equipollent features*



A schwa is defined by the association of [−low] alone to a V on the CV tier. Another vowel that is not part of the vowel inventory of Calvello's dialect can also be defined from these features; if no feature whatsoever is associated to a V, then a high central vowel [ɨ] is created.

Again the feature [high] does not play a role in defining the seven underlying vowels. This produces the same problem as with the particle model; there is no feature [high] to spread to the tonic vowel which accounts for the metaphonic alternations. To spread the one feature that defines the high vowels – either [−round] for /i/ or [+round] for /u/ – again results in incorrect derivations, as seen in (17):

(17) *Incorrect derivations from Goldsmith's vowel system*



5 Summary

It has been demonstrated that metaphony is triggered by underlying final /-i/ and /-u/. The important feature that unifies the two posttonic vowels, which are responsible for the tonic vowel alternations, is [+high]. The

spreading of this feature to the tonic vowel accounts for metaphony. Vocalisms defined without the feature [high], such as those of particle phonology and Goldsmith's model, fail to mirror the metaphony process.

NOTES

[1] Two other models incorporating similar sets of vocalic primes are those proposed by Anderson & Ewen (1987) and Kaye *et al.* (1985).

[2] Other types of metaphony may also be discussed in which *napoletano* and *arpinate* dialects also raise low tonic /a/; or a fronting metaphony and a lowering metaphony. See Kaze (1989) for further details. Since these different metaphonies are not necessary to the question at hand (i.e. the problem that Schane's and Goldsmith's vowels systems face in regards to raising metaphony) they will not be included in the discussion of this paper.

[3] There is a low-level rule which neutralises posttonic vowels in this dialect to [ə]. The presence of the high underlying final vowels, as recorded in (3), is attested in certain syntagmas where neutralisation is blocked. For example *sandə* 'saint' *vs. sandu pyetrə* 'Saint Peter' or *kwirə* 'that/those' *vs. kwiru kanə* 'that dog' and *kwiri kanə* 'those dogs'.

[4] The symbol [ǧ] represents a voiced palatal affricate.

[5] This dialect has the added phenomenon that all posttonic vowels are identical to the final posttonic vowel.

[6] This set of features is presented in Cressy (1978: 23). An alternative model uses the feature [tense] instead of [round]. In this model the low mid vowels [ɛ] and [ɔ] are specified as [−tense] and all other vowels are specified as [+tense].

[7] The diphthongs created by this linearisation are [yɛ] and [wɔ], with open mid vowels (the diphthongs of many southern Italian dialects, although not those of Salentino nor Calvello), while the diphthongs realised in Calvello's dialect are [ye] and [wo] with closed mid vowels. In other words, the feature [+low] seems to be competely disassociated from the diphthong.

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On ich-Laut, ach Preservation

Talke Macfarland
Janet Pierrehumber
Northwestern Univer

Hall (1989) introduces a which, he claims, poses servation in Lexical Phc claim is based on the obs it respects morpheme b distinctive feature, thus not appreciated the forc which suggests that assi with respect to marking arguments in Kiparsky (constraint on the interp rules out the applicatio Thus, contrary to Hall' example to Structure Pr this constraint for a nu light of the theory of While some analyses st constraining assimilato

First, let us summar fricatives [f], [s], [ʃ] and [ç] and aeh-Laut [x]. T is palatal ([+high, −b sounds agree in all oth

Although the featu distinctive for fricatives only with respect to ba however, are often dis

(1) a. Kuhchen [k
b. Kuchen [k

In these examples, one morpheme *-chen*, a din other word, however, noun. No true minima [x], exist in German, language.