Dual vowel harmony systems in a Montañes Spanish dialect

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DUAL VOWEL HARMONY SYSTEMS IN A MONTANES SPANISH DIALECT

John J. McCarthy

1. Introduction

The tense/lax vowel harmony system of Andalusian Spanish has deservedly attracted considerable attention in the generative phonological literature (Clements 1980; Hooper 1976; Zubizarreta 1979). There has, however, been no comparable analysis of the far more complex and interesting harmony phenomena of Montañes Spanish. In Montañes we find, in addition to an exceptionless tense/lax harmony, a concomitant fully-developed system of harmony along the high/mid parameter. Of even greater significance is the existence of neutral vowels in both systems, of dominance assigned to stressed syllables, and of interaction between the two harmony processes and of each with more local phonological rules. These phenomena are evidenced extensively in alternations as well as in purely distributional facts.

My examples are all drawn from the Pasiego Montañes dialect, in particular the speech of four villages located in the Cantabrian mountains in the south-central portion of the province of Santander in north-central Spain. Pasiego has been described in exhaustive detail in several studies by Ralph J. Penny. Penny (1969a) is a monograph treatment of primarily lexicographic and comparative problems with many valuable synchronic observations as well. It also contains a list, in narrow phonetic transcription, of all of the more than 6000 different tokens collected by Penny. Against this list I have tested and confirmed the analysis.

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1 An early version of this article was scheduled for presentation to the conference on distinctive feature theory held at SUNY Stony Brook in June, 1982, but illness prevented me from attending. Morris Halle, James Harris, and Ellen Broselow have provided me with much useful advice during the preparation of this article. This work was supported by the National Science Foundation under Grant number BNS-8121002.
presented here. Penny (1970) presents the history of the mass/count noun distinction that is based on the tense/lax harmony system. Most important, Penny (1969b) is a modified taxonomic phonemic description of all the Pasiego vowel harmony phenomena as well as some aspects of their interaction with other features of the vowel system. The analysis presented here is, to some extent, indebted to that treatment.2

I will assume a theory of phonology with the familiar autosegmental characteristics (Goldsmith 1976; Clements 1977a, 1977b, 1980, 1981; Vergnaud 1980; Halle and Vergnaud 1981; Kiparsky 1981). Phonological features may be treated prosodically; that is, they can be represented on separate autosegmental tiers, associated in a systematic way with units on the segmental level. Following Clements (1980), I will refer to the autosegmentalized features as P-segments and to the segments with which they are associated as P-bearing elements. In general, also, P-bearing elements may be underspecified in lexical representation with respect to certain features, this underspecification to be resolved by association with some P-segment or by some other means.

The orchestration of temporal organization between the synchronous P-segmental and P-bearing levels is accomplished by certain association conventions drawn from Clements (1981) and Clements and Ford (1979). These provide first that free P-segments are associated one-to-one from left to right with free P-bearing elements. Second, a free P-segment will associate with all accessible (without lines crossing) P-bearing elements. Third, associated P-segments will associate preferentially with unassociated P-bearing elements on their right. In the discussion below, I will refer to these association conventions anecdotically as "spreading rules", since their role in these vowel harmony systems is largely confined to that relatively straightforward operation.

There are three major descriptive problems that emerge in the analysis of Pasiego, and these have substantial theoretical import as well. The first point concerns the distinction between the common automatic and the much rarer feature-changing vowel harmony processes. It will emerge that [tense] harmony in Pasiego is fully automatic while [high] harmony is feature-changing, an empirical distinction that must be reflected in quite different formal statements. Second, the feature-changing [high] harmony process assigns dominance to stressed syllables, spreading the value of [high] from both vowels and glides alike. On the basis of these two observations, I will argue for an extension of the theory of vowel harmony in which the feature-changing harmony rule stipulates the autosegmentalization of the value of [high] from the stressed syllable, and in which this derived P-segment spreads to all nonneutral vowels, overriding their inherent lexical specification for [high].

Finally, the point of greatest interest in Pasiego vowel harmony is the correct representation of neutral vowels. It will be demonstrated that the neutral vowel in the tense/lax system must undergo this harmony rule at an intermediate stage of the derivation to account for interactions with the high/mid system and with certain optional phonological rules. Thus this analysis supports more abstract treatments of neutral vowels (Vago 1976, Clements 1977b). On the other hand, the neutral vowel of the high/mid harmony system is demonstrably excluded from the purview of this harmony process entirely, therefore supporting as well the treatment of neutral vowels by their exclusion from the P-bearing class of the harmonizing feature.

The rest of this article is organized as follows. In section 1 I present a comprehensive survey of the facts germane to the description of Pasiego vowel harmony. This section is intended as a largely pretheoretical introduction to the analysis. Section 2 takes up the formal description of the two vowel harmony systems, concentrating particularly on the differences between them. Neutral vowels and the formal issues peculiar to them are the focus of section 3. Section 4 collects remaining questions of Pasiego vowel harmony and includes a summary and an ordered list of rules.

2. Summary of the Phenomena

The systematic phonetic vowel system of Pasiego appears in (1):
In addition to the obvious distinctions of backness and height, this vowel system exploits a contrast between peripheral (i, u, e, o, a) and central (I, U, O, A) vowels. I will identify this distinction with the values of the feature [tense] distributed as in (2):

(2) a. [+tense]  
    i    u    I    U  
    e    o    O    A  

b. [-]:tense]  
   a

Clearly the precise identity or definition of this feature is of little relevance ([ATR] would do as well from a purely phonological standpoint), but it is essential that the feature system recognize a basic difference between the two classes of vowels in (2). The contrast, of course, is not perfect; there is a gap reflected in the absence of a lax mid front vowel E.

The vowel system is considerably reduced in unstressed final syllables; it is limited only to the segments in (3):

(3) Unstressed Vowels in Final Syllables

u  
U  
E  
a

Therefore the only [-tense] vowel possible in a final unstressed syllable, closed or open, is U, while any of the three [+tense] vowels u, e, or a may occur under the same conditions.

The first vowel harmony phenomenon we will consider concerns the distribution of the feature [tense]. All vowels in a word -- final or nonfinal, stressed or unstressed -- must without exception agree in the value of [tense]. This is exemplified by the various alternations in (4):

(4)  

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. abilianus  'hazels'  AblíanU 'hazel'</td>
<td></td>
</tr>
<tr>
<td>soldanus  'soldiers'  soIđánU 'soldier'</td>
<td></td>
</tr>
<tr>
<td>kastánus  'chestnut trees'  kástánU 'chestnut tree'</td>
<td></td>
</tr>
<tr>
<td>sartínus  'small frying-pans'  sárťínU 'small frying-pan'</td>
<td></td>
</tr>
<tr>
<td>pulukus  'young chickens'  púłúku 'young chicken'</td>
<td></td>
</tr>
<tr>
<td>kantarús  '5 gal. jugs'  kántärU '5 gal. jug'</td>
<td></td>
</tr>
<tr>
<td>simpátikus  'congenial (pl.)'  sImpátIkU 'congenial (sg.)'</td>
<td></td>
</tr>
</tbody>
</table>

b. pitrína  'waistband'  pIrínu 'id. (dim.)' |
| pusítiya  'the scab'  pUsítiyu 'id. (dim.)' |
| tripó  'belly'  trípu 'id. (of a child)' |
| kampanía  'small cow-bell'  kámpáníyU 'id.' |
| kanástra  'large cave'  kánastrU 'cave' |
Lax vocalism is an invariable concomitant of the stressless suffix -U, and it is only with this desinence that lax vowels can occur. The morpheme -U marks count noun singulars (4a) and diminutives derived from feminine nouns (4b). It also contrasts with the [+tense] mass suffix -u in adjectives and nouns capable of mass or count interpretation (4c), and it has a role in natural gender as well (4d).

We see, then, that lax harmony occurs always in the presence and only in the presence of the suffix -U. Thus, all forms without this desinenence, finite verb forms in particular, have only tense vowels. The vowel e is always tense as well; it lacks a [-tense] counterpart in Pasiego. In other words, e is neutral with respect to laxing harmony and can occur in words of both classes without affecting the propagation of [tense] in any way:


<table>
<thead>
<tr>
<th></th>
<th>Words</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>ermanús</td>
<td>'brothers'</td>
<td>ermanúU 'brother'</td>
</tr>
<tr>
<td>poñáskus</td>
<td>'cliffs'</td>
<td>poñáskú 'cliff'</td>
</tr>
<tr>
<td>bedánus</td>
<td>'small wood-</td>
<td>bedánuU 'small wood-</td>
</tr>
<tr>
<td></td>
<td>chisels'</td>
<td>chisel'</td>
</tr>
<tr>
<td>komensorañus</td>
<td>'confessional'</td>
<td>komensorañúU 'confes-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sional'</td>
</tr>
<tr>
<td>kampeñánus</td>
<td>'noble (pl.)'</td>
<td>kampeñánúU 'noble (sg.)'</td>
</tr>
</tbody>
</table>

Neutral e, then, is apparently ignored in the determination of [tense] domains.

Pasiego has a second vowel harmony rule, one which affects height. This process partitions the vowel system as in (6):

```
(6)  a. [+high]  b. [-high]

  I        U

  e         o
```

As a first approximation we can say that all nonlow vowels in a word must agree in the value of the feature [high]. There is one major systematic exception to this distribution: vowels in unstressed final syllables, which are drawn from the severely reduced set in (3), are in apparent violation of the height harmony process. We will return to this issue in section 4.2.

These observations about height harmony are illustrated by the distributional data in (7); we shall turn to more perspicuous evidence from alternations shortly:

(7)  a. [+high]  b. [-high]

<table>
<thead>
<tr>
<th>Words</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>bindíoír 'to bless'</td>
<td>xeléca 'fern'</td>
</tr>
<tr>
<td>kusída 'lunch'</td>
<td>sospréza 'surprise'</td>
</tr>
<tr>
<td>čtípús 'hunch-backed (pl.)'</td>
<td>belórtá 'hay-rake branch'</td>
</tr>
<tr>
<td>lubúkus 'young wolves'</td>
<td>kolor 'color'</td>
</tr>
<tr>
<td>destótor 'to wring'</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Words</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>pIñtíí 'pinch'</td>
<td>kúngintú 'happy (sg. count)'</td>
</tr>
<tr>
<td>míñýí 'small (sg. count)'</td>
<td>lubúk 'young wolf'</td>
</tr>
</tbody>
</table>

Neutral e, then, is apparently ignored in the determination of [tense] domains.
The forms in (7a) show the typical distribution of [high] in tense-voweled words without neutral a (ignoring, here and subsequently, final unstressed syllables). (7b) shows the same for lax-voweled words. In (7c) and (7d) height harmony appears in tense and lax words that include neutral a/A. The neutral vowel occurs freely in words of both height harmony classes. The absence of words with [-high, -tense] vocalism (that is, the gap on the right in (7b) is lawful and will be explained shortly.

Evidence from alternations for the vowel height harmony phenomenon is also forthcoming — consider in particular the verb forms in (8). Other, more extensive height harmony alternations appear below in (11), (13), and (14).

(8) [+high] Verbs

a. bibiria (1st sg. ind.)
   bibia (1st sg. impf. ind.)
   bibia (1st sg. impf. subj.)
   bibia (past ppl.)
   bibiaU (past ppl. masc. sg. count)

b. sintir 'to feel'
   sintais (2nd pl. subj.)
   sintis (2nd pl. ind.)
   sintia (1st sg. impf. ind.)
   sintiu (past ppl.)

[-high] Verbs

c. afluxis (2nd pl. subj.)
   afluxis (1st pl. ind.)
   afluxis (1st pl. subj.)
   afluxis (2nd pl. subj.)

d. kuxis (2nd pl. ind.)
   kuxis (1st sg. impf. ind.)
   kuxia (1st sg. perf.)
   kuxia (1st sg. subj.)
   kuxia (1st pl. perf.)
   kuxia (1st pl. fut.)
   kuxirais (3rd pl. cond.)

A preliminary analysis of these forms is quite enlightening. In cases like bibiria/beber or sintir/sentir, we see that the height of the root vowel is determined by the height of the vowel of the desinence. (Remember that the reduced set of unstressed vowels in final syllables is irrelevant to the operation of height harmony.) But there must be a contrast between high and mid root vowels to account for the vocalism in words with only neutral a/A in the desinence (bebamus, sintais), where the underlying root vocalism shows up. Therefore the underlying verb roots in (8) must be /babil/ (cf. bebamus), /sint/ (cf. sintais), /aflux/ (cf. afluxis), and /kox/ (cf. kuxia). The final case, the neutral-voweled root /sal(s)/ is invariant under harmony and therefore uncontroversial.\(^3\) Height harmony propagates from the stressed

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vowel and vowels in unstressed final syllables are ignored. In effect, the stressed vowel is dominant, imposing its value for [high] on the other vowels in the word. If the stressed vowel is neutral a/Á, we find that the underlying height of other vowels emerges, an underlying height distinction that is neutralized when the stressed vowel is high or mid.

Height harmony is unbounded and bidirectional. Its unbounded character is shown by (11), (13), and (14) below, by the distributional evidence in (7), and by alternations in longer verb forms like merebér ‘to merit’, miriglis (2nd pl. pr. ind.) or aborreber ‘to bore’, aburribé (past ppl.). The bidirectionality of height harmony is not entirely self-evident, since most Spanish words are oxytone or paroxytone and thus cannot show the rightward propagation of vowel harmony. There are, however, proparoxytones words that give some distributional support for rightward vowel harmony. These appear in (9), phonologically organized like (7):

(9) Proparoxytones with Rightward Harmony

[+high]  [-high]

a. andibula ‘jaw’  ëmedus ‘humid (pl.)’
antigwisumu ‘oldest’

b. diðimú ‘tenth’
sičimú ‘seventh’
rÍKÍTÍKÍU ‘rickety’

c. agíla ‘eagle’
arguna ‘gorse’
bitakula ‘tavern’

b. Abkíng ‘south wind’
Agí’U ‘eaglet’
gwífrAnü ‘orphan’

The distributional facts in (9), which exactly parallel leftward height harmony in (7), are consistent with saying that height harmony is rightward as well, initiated by the stressed vowel. Moreover, nothing is gained by stipulating that height harmony is solely leftward. We shall therefore consider it to be a bidirectional process.

Although height harmony is exceptionless in lax-voweled words, there are words disharmonic in height in the tense-voweled class. According to Penny (1969b), these exceptions break down into two types. The first, illustrated in (10a), includes derived nouns with suffixal -éra, -éte, -éa, -ór, or -ósus. The second type, of which the list in (10b) should be exhaustive, includes only utterly unsystematic exceptions. Many of these have regularly harmonic doubles (like antoxil, miléxina, legatérra, dígír, mego lu) and some may be dialect loans from Castilian. In (10c) we have a few proparoxytones disharmonic postintonically.

(10) a. batidéra ‘hoe’
libréta ‘notebook’
insiméra ‘wall stones’
urmigadéra ‘itching’
bibidéra ‘hovel’
listón ‘tall, thin’
pisárósus ‘penent person’
marmuxon ‘mutterings’
fruçon ‘hearth’

b. meleóna ‘medicine’

b. meleóna ‘medicine’
antoxil ‘meadow plant’
loberí a ‘band of wolves’
xostíyus ‘bodies’

xostíyus ‘bodies’

xostíyus ‘bodies’

xostíyus ‘bodies’
pressá ‘rennet’
enkoránadúra ‘(pair of) horns’

orúgá ‘caterpillar’
dinéru ‘money’
ginéya ‘foothill’

orúgá ‘caterpillar’
dinéru ‘money’
ginéya ‘foothill’

orúgá ‘caterpillar’
dinéru ‘money’
ginéya ‘foothill’
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(11) a. [+high, +tense] [+high, +tense]
Phrases Phrases
el kweru 'the leather
(mass)'
el mIntIrUlU 'the
lamb'
Il kUrDIU 'the
lamb'
Il mAdIrU 'the
lamb'
el mal 'evil'
el ganau 'the cattle'
Il mAdIrU 'the
log'
kU nI mAyIrUlU 'with
the teacher'
kon nI:s 'with us'

unlabi o 'a ball of
yarn'
po la kale 'down the
street'
pU I kAmInUlU 'along
the path'
Il kUrDIU 'the
lamb'
Il mAdIrU 'the
lamb'
po aIa 'over there'
pU I ArrDiUlU 'along
the arroyo'
Il mAdIrU 'the
lamb'

pa mi 'for me'
pa ke 'for what?'
pA I sUbIrUlU 'for
the nephew'
Il kUrDIU 'the
lamb'

pa nI:s 'for us'
ne yo 'nor I'
nI I nUlU nI I UIrUlU 'nor
the other'
Il kUrDIU 'the
lamb'
Il mAdIrU 'the
lamb'

ne la casa 'nor the
house'
en kwenta 'because of
the lane'
Il kAlIUlU 'in
the lane'

i mi dixU me lo kompro 'and he said 'he bought it
to me'
Il mI kUoU 'my
ebrow'
Il mI kUoU 'my
elbow'

Il mI kUoU 'my
elbow'
Il sU tiyUlU 'his
uncle'
Il mI eRaMaUlU
'my brother'
Il tU kUmpAriUlU
'your companion'

Given the limited distribution of exceptions of the first type and the tiny number of exceptions of the second type (as against the remaining, regularly harmonic forms in Penny's (1969a) list of more than 6000 different tokens), we can obviously conclude that height harmony is a fully-justified process of Pasiego, though we will ultimately want to take formal notice of the morphologically systematic exceptions in (10a). The fact that many exceptional forms in (10b) have harmonic doublets or may be dialect borrowings supports this conclusion.4

Both [tense] harmony and [high] harmony apply in sandhi as well as word-Internally. From the sparse phrasal evidence available, it is difficult to be precise about many aspects of this application, however. The results of harmony are, in a few examples, unexpected, and there are many cases where harmony fails to apply in sandhi (possibly due to speech rate or style differences). Furthermore, the domain of sandhi harmony application is not clear. It is apparent that proclitics follow the harmony class of the head of the construction (11a), but it appears as well that some stressed function words also participate (11b):

4Penny (1969b) cites several disharmonic verb forms that I have been unable to locate in his monograph (1969a). These are the two 1st sg. fut. forms Pingi 'and iskupire 'epit', as well as the lat pl. pr. ind. of the latter (though not the former — cf. (8b)) iskupiUus.
This exclusion of stressed mid vowels in lax words underlies a large number of regular alternations in Pasiego. The stressed mid vowels are neutralized with the high vowels in [-tense] domains:

\[
\begin{align*}
11 \varepsilon \text{ (mass)} & \quad 11 \text{ kW} \text{Kr}\varepsilon \text{ (count)} \\
\text{el pelu 'hair (mass)} & \quad \text{Il pl} \text{HU 'id. (count)} \\
\text{lexera 'light (mass)} & \quad \text{Il} \text{Hx} \text{HU 'id. (count)} \\
\text{floxu 'limp (mass)} & \quad \text{fl} \text{HU 'id. (count)} \\
\text{rrabjosu 'bitter (mass)} & \quad \text{rr} \text{Abju} \text{HU 'id. (count)} \\
\text{rrergerus 'good fields} & \quad \text{rr} \text{gIrU 'id. (sg)} \\
\text{pexera 'pelts} & \quad \text{pl} \text{IXU 'id. (sg)} \\
\text{konekosu 'rabbits} & \quad \text{kU} \text{nIrU 'id. (sg)} \\
\text{mekosu 'pocket} & \quad \text{mU} \text{kIrU 'id. (sg)} \\
\text{handkerchiefs} & \quad \text{pl} . \\
\text{golosus 'curious} & \quad \text{gU} \text{UsU 'id. (sg)} \\
\text{Cerokosu 'bolt} & \quad \text{C} \text{IrUsU 'id. (sg)} \\
\end{align*}
\]

The morphologically-based alternation between tense and lax vowels (depending on the presence of the suffix -U) triggers several phonological alternations. All of the forms in (13) must have underlying mid vowels, which then surface unchanged in the tense forms of (13a). But with laxing induced by suffixal -U in (13b), the stressed mid vowel must raise to high, yielding I or U. Moreover, this newly high vowel itself triggers [high] harmony, raising any other mid vowels in the domain. Of special interest is the fact that both e and o raise in lax words, although the former is itself neutral to laxing harmony, so only the latter has an occurring lax counterpart in Pasiego.

Another point of relevance to the topic here is the behavior of the high glides I and U. In a word or sandhi domain, a I or U in the stressed syllable, with few exceptions, induces [high] harmony to its left despite a following (stressed) [high] vowel. That is, the high glides can stand at the boundary within a stressed syllable between high and nonhigh harmonic regions. This observation is supported indirectly by distributional data (like \text{bintjucu 'twenty-eight}, \text{mirienda 'snack}, \text{mpwes 'after}, \text{ugwexa 'sheep}) as well as directly by the alternations, including many
alternations under verb inflection, in (14a). The data in (14b) show that unstressed (posttonic) /j/ and /u/ do not raise the stressed vowel or any other vowels to their left (Penny 1969a: 53).

(14) a. [+high] / [-high]

<table>
<thead>
<tr>
<th>Verb</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>amfeštär</td>
<td>'to infect'</td>
</tr>
<tr>
<td>kornexa</td>
<td>'crow'</td>
</tr>
<tr>
<td>bošedär</td>
<td>'to yawn'</td>
</tr>
<tr>
<td>sepnör</td>
<td>'sir'</td>
</tr>
</tbody>
</table>

b. / [-high] / [+high] /j/ /u/ / [-high]

<table>
<thead>
<tr>
<th>Verb</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>amfijön</td>
<td>'infection'</td>
</tr>
<tr>
<td>kurnijär</td>
<td>'to eat'</td>
</tr>
<tr>
<td>bušiñär</td>
<td>'id.'</td>
</tr>
<tr>
<td>sipunjär</td>
<td>'to address as Usted'</td>
</tr>
</tbody>
</table>

moljer  | 'to grind'           |
beber  | 'to drink'           |
komär  | 'to eat'             |
koxär  | 'to take'            |
menus  | 'less'               |
me lo kompró  | 'he bought'         |
se kiso  | 'he got married'    |
lo malu  | 'the bad thing'      |
el ganaü  | 'the cattle'         |


<table>
<thead>
<tr>
<th>Verb</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>rrosärjus</td>
<td>'id. (pl.)'</td>
</tr>
<tr>
<td>iglesja</td>
<td>'church'</td>
</tr>
<tr>
<td>medjas</td>
<td>'middle (f. pl.)'</td>
</tr>
</tbody>
</table>

Other points of interest concern local phonological processes that interact with harmony. We have already noted the first of these, that the reduction evidenced in (2) renders height harmony opaque in final unstressed syllables. Second, the unround [+tense] vowels are in free variation word-initially before /n/ and /s/, regardless of the height-harmonic class of the word, as shown in (15a). Third, there is similar free variation between unstressed /e/ and /i/ or /ɪ/ adjacent to /r/ and /rr/, exemplified in (15b).

(15) a. askina  | eskina  | iskina   | 'corner'          |
| astongas  | estongas  | istongas  | 'then'            |
| andrina  | endrina  | indrina   | 'sloé'            |
| enrriddus  | inrriddus  |          | 'naughty'         |

b. rrebültus  | rrabantus  | 'disobedient' |
rrendir  | rrindir     | 'to give in'  |

In both kinds of alternations illustrated in (15), although the /e/ variant is harmonically neutral, the high and low vowel variants harmonize in tenseness with the rest of the form.

Except for a few small points that will emerge later, this completes the summary of the Pasiego vowel harmony system and the phenomena that interact with it. We will now turn to a formal characterization of these complex facts.

3. Fundamentals of Pasiego Harmony: Analysis

In this section we will take up the formal analysis of the data and generalizations presented above, though confining ourselves to the vowel harmony processes proper. The important issues of neutral vowels and their place in the two rules of harmony are the subject of a later section.

3.1. [tense] Harmony

The harmonic class [−tense] has a highly skewed distribution; it is limited exclusively and exhaustively to words or clitic phrases with desinential +U, a suffix that marks various masculine singular noun and adjective subcategories. All other words, including all finite verb forms, belong to the [+tense] class. We ought, then, to predicate [−tense] harmony on the presence of the suffix +U and to consider [+tense] harmony to be an unmarked,
elsewhere case in the absence of that suffix.

Formally, all vowels in all words or morphemes of Pasiago are lexically unspecified for the feature [tense], and vowels are the P-bearing elements for this feature. Since neither true consonants nor glides harmonize in tenseness, they will have full, appropriate specification of this feature in the lexicon. In particular, the vowels of clitic forms, which also participate in tenseness harmony, are lexically underspecified. The sole exception to this overall regularity is the masculine singular suffix +u, which will be represented as in (16) (here and subsequently, archisegments unspecified for tenseness on the tier containing them are indicated by \( \_ \)):

(16) Masculine Singular Suffix

\[
\begin{array}{c}
[-\text{tense}] \\
\_ \\
\end{array}
\]

We will also say that all vowels are P-bearing with respect to the feature [tense]. The [-tense] feature value of (16) must then spread autosegmentally to spell out the tenseness of the other (underspecified) vowels in the same domain (word or clitic group). Vowels which are not associated with [-tense] by virtue of this spreading are then specified as [+tense]. We may assume, following Kiparsky (1981), that unassociated \( V \rightarrow [+\text{tense}] \) is part of the universal marking mechanism, though nothing crucially hinges on this slight simplification of the grammar.

Some representative examples and their derivations appear in (17); I notate archisegments unspecified for tenseness by \( \_ \):

(17) a. b.

\[
\begin{array}{c}
\text{Underlying} \\
\text{Representation} \simpatikus \\
\text{Spreading} \\
\_ \\
\text{Unassociated} \\
\end{array}
\]

The autosegmental spreading here is entirely automatic and conventional. Since there is at most one autosegment per word, it must associate with all P-bearing elements (that is, vowels) in its domain. In this case, the domain includes the clitic phrase as well as the word.\(^6\)

[tense] harmony, then, is at its core an example of the relatively simple type of nondirectional, non-feature-changing harmony, also known as symmetric harmony. It is straightforwardly analyzed by partial specification of vowels in the lexicon with the concomitant stipulation that vowels are P-bearing for the feature [tense], the suffix in (16), and spell-out of unassociated vowels as [+tense].

3.2. [high] Harmony

In contrast to [tense] harmony, [high] harmony is both dominant and feature-changing, and it requires correspondingly greater formal power in the analysis. It is contextually dominant because the value of [high] for all vowels in each word or clitic group is determined by the stressed vowel. Height harmony is feature-changing because underlying vowel height contrasts remain in

\(^6\)This account of feature spreading is, of course, equally compatible with Halle and Vergnaud's (1981) proposal that only unlinked features spread. In that case, we would minimally amend the representation in (16) by eliminating the lexical association between archisegment u and [-tense]
environments where the neutral vowel a/A is stressed, although they are neutralized in other contexts. This is demonstrated clearly by the alternations in (8).

This feature-changing dominant harmony cannot be described in terms of the minimalist archisegment and feature-spreading model adduced in the previous section. Rather, it requires a mechanism which permits deliberate specification of the segment or segment class from which a feature spreads and which allows the spreading feature value to overwrite or replace the lexical ones. Here I suggest a reasonable extension of autosegmental theory capable of accounting for the Pasiego facts while minimizing to the extent possible the formal differences between the two types of harmony. I will ignore the reduced vowel set occurring in final unstressed syllables, assuming that such syllables harmonize regularly, only to be transformed further by processes discussed in section 4.2.

Clearly the vowels are the P-bearing elements with respect to the feature [high], though we will have occasion later in section 3.2 to be more precise about this. But the locus of [high] spreading must also be designated. The height of all vowels in a harmonic domain (word or clitic group) is determined by the height of the stressed vowel (unless it is neutral a/A). We will therefore stipulate that the value of [high] for the stressed vowel is autosegmentalized (Goldsmith 1980) — that is, it is realized on an autosegmental tier and is associated with the stressed vowel. This rule is expressed formally in (18)

\[(18) \ [\text{high}] \text{ Harmony}\]
\[
[\text{\text{[+high]}}, \quad [\text{-high}] \\
[\text{\text{[high]} \text{ Harmony}}], \quad [\text{\text{bebi:s}}], \quad [\text{sintemus}] \\
[\text{\text{[+high]}}, \quad [\text{-high}] \\
[\text{\text{Spreading}}], \quad [\text{\text{bebi:s}}], \quad [\text{sintemus}] \\
[\text{\text{Phonetic}}], \quad [\text{\text{Interpretation}}], \quad [\text{\text{bebi:s}}], \quad [\text{\text{sentemus}}]
\]

Unlike the situation with [tense] harmony, rule (18) must explicitly indicate the source of the autosegmental feature, since all vowels are in fact specified for the feature [high] in underlying representation. For this reason as well, we must assume, following the autosegmental morphological analyses in McCarthy (1982), Harantz (1982), Lieber (1982), and Halle and Vergnaud (forthcoming), that the autosegmental value of [high] associated with a vowel overrides its inherent lexical segmental specification for that feature. It follows, then, that the automatic spreading of [high] to vowels engendered by (18) has a feature-changing effect. In other words, the phonetic interpretation of the harmony structures gives precedence to the autosegmental feature specification.

Some representative derivations appear in (19):

\[(19) \quad a. \quad b. \]

Underlying

Representation bebi:s sintemus

[+high] \quad [-high]

[high] Harmony bebi:s sintemus

[+high] \quad [-high]

Spreading bebi:s sintemus

Phonetic

Interpretation bebi:s sentemus

This analysis can be readily extended to the harmonic behavior of the high glides exemplified in (14). u and j in a stressed syllable block the expected leftward propagation of [-high] (and vacuously [+high]) from the stressed vowel. Furthermore, they induce the spread of [+high] to their left, while they do not themselves harmonize.

The analysis of u and j is a straightforward extension of rule (19). Both vowels and glides in the stressed syllable may initiate spreading of the feature [high]. The fact that the glide's height spreads leftward, blocking the spreading of the stressed vowel's height, follows simply from the prohibition against crossing association lines. Since the values of [high] for both the vowel and the glide autosegmentalize and remain linked to their respective segments, their respective association lines must bound the two high domains. The generalized harmony rule appears in (20):
4. Neutral Vowels

Several extremely interesting issues are presented by the vowels that are neutral with respect to [tense] harmony or [high] harmony. It emerges that formally distinct mechanisms are needed to account for the behavior of neutral vowels in these two systems. We will consider each process in turn.

4.1. Neutral e in [tense] Harmony

The vowel e does not appear to undergo and does not impede the spreading of [tense] harmony; there is no lax E, although e functions like one in lax-vowed words. The usual proposals in the autosegmental literature for dealing with a phenomenon of this sort have a stipulation to the effect that the mid front vowel (unlike other vowels) is excluded from the P-bearing class of the autosegmental feature [tense]. It receives its specification as a tense vowel either redundantly in the lexicon or by marking conventions applying to unassociated vowels.

There is, however, a remaining, more traditional alternative. The mid front vowel may in fact undergo [tense] harmony like any other vowel, passing through an abstract intermediate stage with an e/E contrast, only to be neutralized to e in all contexts by rule (22):

\[+\text{high}][-\text{high}] \quad \rightarrow \quad [+\text{tense}]

Various aprioristic objections can be made to this solution, though I know of no empirical arguments against it or equivalent treatments. Here I claim that the solution incorporating the abstract intermediate stage is in fact necessary.

Although the neutral status of e with respect to tense harmony is by itself insufficient to select among the alternative

---

7In fact, it is by no means obvious that rule (22) is excluded by the Alternation Condition of Kiparsky (1973). The Alternation Condition, in its strong form, prohibits the application of obligatory neutralization rules in underived contexts. Although rule (22) is certainly obligatory, it is also the case that it will apply nonvacuously only in words derived by the desinence +H. Furthermore, it is not a neutralization rule, if we accept that the archisegment e unspecified for tenseness is distinct from the fully specified output of (22). (This depends on the "pairwise" notion rather than the "submatrix" notion of subsegment identity in Chomsky and Halle (1968: 382). Later versions of the Alternation Condition that prohibit only nonautomatic rules of neutralization are clearly inappplicable, since (22) is fully exceptionless.
analyses, additional observations do determine the choice. It is a fact, evidenced by both distributional data and alternations, that the mid vowels are neutralized to high under stress in lax-voweled words only (cf. (12), (13)). They subsequently trigger [+high] harmony exactly like underlying stressed high vowels. The treatment of ə is straightforward on the surface; it raises to ñ when stressed, though stressed ə and unstressed ə remain unchanged. The stressed vowel ə raises to ñ in lax words, but it does not raise in tense words or when unstressed.

If neutral ə goes through an intermediate stage as ñ in lax-voweled words, then a homogeneous treatment of raising in both the front and back mid vowels is possible. This analysis appears in (23):

\[
V \rightarrow [+\text{high}] \\
\begin{array}{c}
\underline{\text{-tense}} \\
\underline{\text{-low}} \\
\underline{\text{+stress}}
\end{array}
\]

ñ, then, undergoes Raising like stressed ə, but unstressed ə (which remains) is subsequently retensed to ə by rule (22) ə-Tensing. Raising bleeds away all stressed ñ from the purview of ə-Tensing. The abstract intermediate representation for the neutral vowel is therefore crucial to the context-free formulation of Raising in (23).

Some representative derivations appear in (24) (as before, V indicates a vowel archisegment unspecified for [tense]):

\[
\begin{array}{c}
\text{Underlying Representation} \\
\text{Spreading} \\
\text{Raising} \\
\text{Phonetic Interpretation}
\end{array}
\]

It is possible to construct an alternative analysis without the rule of ə-Tensing, but only at a considerable loss of explanatory force. Lacking the intermediate stage where tense and lax ə are distinct entities, we are forced to formulate the raising rule with a context /[\text{C-V}][-\text{tense}]/. Although this environment is entirely superfluous in the case of ə, it is needed in this alternative analysis to distinguish ə in lax words from the same vowel in tense words. This environment, then, is purely an artifact of our failure to recognize the intermediate lax stage through which ə passes.

Further evidence in support of this abstract account of the
neutral vowel comes from certain optional rules of vowel raising. There is free variation among the unstressed unround vowels a ~ e ~ i or A ~ E ~ I word-initially before a or e, regularly in tense words and occasionally in lax ones (cf. (15a)). The unstressed front vowels e ~ i or E ~ I are also in free variation adjacent to r, regularly in both tense and lax words (cf. (15b)). We can assume that these two neutralizations are effected by processes that simply collapse classes of distinct vowels into freely varying units, though in fact nothing hinges on that decision. Two plausible rules appear in (25):

(25) Allophone Rules

a. V
   [a high] /# [+cor]
   [-rnd] [-allow] [+nas]
   [-str] [ -oback] [+cont]

b. V
   [a high] % [+cor]
   [-back] [+cont]
   [-str] [+son]

\( \alpha = \pm \) or -, in free variation

There is interesting evidence that this vowel height variation is not merely a low-level phonetic phenomenon. Rather, we can show that the optional Allophony rules in (25) are ordered at a particular relatively abstract stage of the derivation, and that they interact in a crucial way with the e-Tensing rule (22). Two observations are relevant. First, the free variation induced by the Allophony rules introduces surface violations of [high] Harmony (e.g., istiənbas, endrōna); that is, these rules are opaque with respect to [high] Harmony. Second, the free variants observe the [tense] harmony regularities, so the Allophony rules are transparent with respect to [tense] harmony. Thus the e variant occurs in both tense and lax words and the a/A and i/I variants are distributed appropriately between words of the two classes.

From the first observation -- the opacity of the interaction between the Allophony rules and [high] Harmony -- it follows that the Allophony rules must be ordered after [high] Harmony. The second observation -- the transparency of the interaction between the Allophony rules and [tense] harmony -- seems to admit of two possible explanations. The first and most obvious solution is that the Allophony rules precede the harmonic spreading of [tense]. But the spreading of [tense] is accomplished by automatic conventions, necessarily applying at the beginning of the derivation, so the Allophony rules could not be ordered before [tense] spreading. Moreover, we just showed that the Allophony rules follow [high] Harmony, and [high] Harmony demonstrably follows Raising which must itself follow [tense] spreading (cf. (23)). Therefore, by virtue of transitivity of ordering this solution is untenable.

The second solution to the transparency of the Allophony rules with respect to [tense] harmony fares rather better. Suppose we order these rules after [high] Harmony but before e-Tensing, which restores neutral e from the abstract intermediate stage E. Therefore, whether the Allophony rules yield e or E, the result will be neutralized to e. But if they produce a/A or i/I, then nothing further happens in the derivation. In other words, the e-Tensing rule and the corresponding abstract analysis of the neutral vowel are necessary to get the correct interaction with the Allophony rules in (25). Without e-Tensing, there is no place in the derivation at which the Allophony rules could apply and still yield the observed results.

The following derivations demonstrate the validity of these proposed rule interactions:
stage of the derivation. Thus, a/A in absolutely no way participates in [high] harmony.

The most straightforward solution in this case is to exclude a/A entirely from the P-bearing class of the autosegmental feature [high]. In other words, a [+low] vowel may not be any terminal node of a tree rooted on [high] in a representation of the sort in (27). We simply add this stipulation by further revising [high] Harmony to (27):

(27) [high] Harmony (Final Version)

a. [a/high]

[+high]

[+cons]

[+str]

b. [+low] is not P-bearing with respect to [high]

By this adjustment in the formulation of the rule, low vowels may not appear in the target position for the height harmony process; rather, they are simply ignored. This is, of course, a familiar property of neutral vowels. But in one important respect the analysis goes beyond the usual expectations. If the stressed vowel is [+low], then no [high] harmony tree is formed so no harmony process is initiated, and therefore the underlying height contrasts emerge. These conditions in which harmonic neutralization always are not explicitly noted in the grammar; rather, they emerge out of the interaction of two independently necessary properties: the neutral status of low vowels and the fact that height harmony is triggered only by stressed vowels, indicated formally by the autosegmentalization rule (27a).

Some representative derivations appear in (28):
forms could be exceptions to. Since vowels are lexically unspecified for [tense] and since they must be spelled out on the surface as tense or lax, there is no room in the analysis for disharmonic words.

There are, however, two classes of exceptions to [high] harmony (cf. (10)). In the larger, relatively more productive class (10a) there is a disharmony in the feature [high] at the boundary of one of the suffixes -éra, -éte, -ór, -órr, and -órrs. Since the domain of [high] harmony is, in any case, bounded by the juncture associated with words and clitic groups, we might reasonably presume that these suffixes bear a pseudo-juncture of that category as well. That is, the separate harmonic domains in words with such suffixes are determined by essentially grammatical rather than phonological considerations.

The other class of disharmonic forms is simply a short, closed list of unpredictable words (10b). These may simply be lexical exceptions to the [high] Harmony rule. In many cases, such exceptionality is apparently variable, since many of the disharmonic forms of this type have regularly harmonic doublings.

5.2. Atomic Ultimas

Vowels in unstressed final syllables are considerably reduced as compared to the inventory of other stressless syllables or stressed syllables. The only vowels possible in unstressed ultimas are those in (3), regardless of the harmonic class of the host word.

Here again we have to deal with representations opaque with respect to [high] Harmony. It follows, then, that the rules responsible are ordered after [high] Harmony.

5.3. Rule Summary

The rules proposed in this analysis and their order of application appear in (29); for clarity of presentation, (29) deliberately confounds certain universal (29a) or putatively universal (29c) conventions with the remaining language-particular ones:
(29) a. Autosegmental conventions
   (apply throughout derivation)

b. Tense Harmony

   [+syll] is P-bearing with respect to [tense]

c. Unassociated V \rightarrow [+tense]

d. Raising

   \[ V \rightarrow [+\text{high}] \]
   \[
   \begin{array}{c}
   [\text{+tense}] \\
   [\text{-low}] \\
   [\text{+stress}] \\
   \end{array}
   \]

e. [high] Harmony

   i. [a\text{high}]
      \[
      \begin{array}{c}
      [\text{+cons}] \\
      [\text{+str}] \\
      \end{array}
      \]

   ii. [+low] is not P-bearing
      with respect to [high]

f. Allophony Rules

1. \[ V \rightarrow \begin{array}{c}
       a \text{ high} \\
       \text{+cor} \\
       \text{+cont} \\
    \end{array} \]
   \[
   \begin{array}{c}
   \text{+nas} \\
   \text{+str} \\
   \end{array}
   \]

2. \[ V \rightarrow \begin{array}{c}
       a \text{high} \\
       \text{+cor} \\
       \text{+cont} \\
    \end{array} \]
   \[
   \begin{array}{c}
   \text{+son} \\
   \text{+str} \\
   \text{-back} \\
   \end{array}
   \]

\[ \alpha = + \text{ or } - , \text{ in free variation} \]

g. α-Tensing

   \[
   \begin{array}{c}
   V \\
   \rightarrow [\text{+tense}] \\
   \end{array}
   \]

\[
\begin{array}{c}
[-\text{high}] \\
[-\text{back}] \\
\end{array}
\]

Several significant theoretical points have emerged in the course of the discussion. Two distinct treatments of neutral vowels -- one involving a neutralization rule and the other excluding association of neutral vowels with the harmonizing feature -- were justified in connection with the different harmony rules. Second, although extremely reduced mechanisms account for automatic harmony, considerably richer and more explicit devices, including an explicit rule autosegmentalizing a feature from a designated segment and the overriding of a segmental feature by an autosegmental one, are needed to account for a triggered, feature-changing harmony rule. The interaction of these various parts of Pasiega harmony with each other and with local phonological rules yield a rich variety of alternations that are highly instructive for the theory of vowel harmony.
REFERENCES


