Underspecification in the height harmony system of Pasiego

Robert M. Vago
Queens College and The Graduate Center, City University of New York

1 Introduction

The recent phonological literature has witnessed the emergence of a significant body of research under the rubric of underspecification theory. This model of inquiry was first proposed by Kiparsky (1982), developed more deeply in Archangeli (1984), and is articulated most exhaustively in Archangeli & Pulleyblank (forthcoming a). One of the most basic assumptions advanced in these works is that for each contrastive feature one value is specified underlyingly and the other is inserted by default. Feature changing harmony, which requires both values to be underlying, is a particularly interesting challenge to this claim and appears to undermine its restrictiveness. Indeed, it figures prominently in some recent proposals, such as Steriade (1987b), to justify relaxing the theory and admit both feature values at the underlying level.

Feature changing harmony is generally acknowledged to be extremely rare (cf. Lieber 1987). Height harmony in the Pasiego dialect of Montañés Spanish, as analysed by McCarthy (1984), is widely cited as one of the most solid pieces of evidence for the reality of feature changing harmony. The main purpose of this article is to demonstrate that Pasiego height harmony is in fact not feature changing. Rather, the facts provide additional support for the strongly constrained model of underspecification which recognises only one underlying feature value.

In §2 I outline the basic facts and McCarthy's feature changing analysis. In §3 I account for the transparency of the low vowel /a/ in terms of the interaction of feature architecture and segmental underspecification. In §4 I motivate the underspecification of the feature [high], thus obviating the feature changing property of height harmony. In §5 I argue that in general the feature [high] is floating in underlying structure. In §6 I discuss the formalisms that first link and then spread the feature [high]. Finally, in §7 I summarise the major findings and draw conclusions for phonological theory.
2 McCarthy's (1984) feature changing analysis

Pasiego exhibits dual [ATR] (= McCarthy's [tense]) and [high] harmony systems operating on the following surface vowel inventory (disregarding reduced vowels):¹

\[
\begin{array}{c c}
\text{ATR} & \text{−ATR} \\
\text{High} & i & u & u & o \\
\text{Mid} & e & o & & \\
\text{Low} & a & & \\
\end{array}
\]

The domain of both vowel harmony systems is the phonological word, defined as the morphological word plus proclitics, if any.

[ATR] harmony is relatively simple to characterise. [−ATR] vocalism is morphologically conditioned: it is triggered by the masculine singular count suffix /-u/ in word-final position. Otherwise, Pasiego vowels are [+ATR]. In interpreting these facts, the non-distinctive nature of the feature [ATR] would seem to be obvious (except perhaps in the case of /u/ vs. /u/). I will assume, following McCarthy, that at the underlying level vowels are unspecified for the feature [ATR], that [−ATR] is derived lexically for the trigger suffix and subsequently spreads leftward, and that elsewhere vowels become specified for [+ATR] by default. Essential details, such as accounting for the transparency of [+ATR] /e/ in [−ATR] contexts and the form, component assignment and ordering of the rules, have no direct bearing on the focus of the present investigation and will therefore not be considered.

Height harmony is controlled by the stressed syllable: if the stressed vowel is high or mid, then the non-low vowels of the word are also high or mid, respectively. High glides in the onset of a stressed syllable are also triggers: they determine high vocalism to the left (see §4.1). These generalisations may be violated by both systematic and idiosyncratic exceptions.

Unstressed vowels in the final syllable are limited to the set /e u o a/, so that on the surface they may violate the principles of height harmony. I will assume, along with McCarthy, the operation of late reduction processes (that also supply phonetic details), so that in general we need not be concerned with height disharmony found in unstressed final syllables.

Height harmony is supported by both distributional and morphophonemic data. The forms in (2) are representative of the distributional evidence:

\[
\begin{array}{c c}
(2) \text{a. } \text{bindi}0 & \text{‘to bless’} & \text{b. } \text{xelē}0 & \text{‘fern’} \\
\text{cipūdus} & \text{‘hunchbacks’} & \text{belō}0 & \text{‘hay-rake’} \\
\text{lubukus} & \text{‘young wolves’} & \text{destor}0 & \text{‘to wring’} \\
\text{c. } \text{pr}įg0 & \text{‘pinch’} & \text{d. } \text{kontintu} & \text{‘happy’ (count)} \\
& \text{e. } \text{minōdo} & \text{‘small’ (count)} \\
\end{array}
\]

The words in (2a) have [+1 mic], and those in (2c) [−AT] are systematically excluded note 7.

Height harmony is further these occur most abundantly as in the examples in (3):

\[
\begin{array}{c c}
(3) \text{a. } \text{be}0 & \text{‘drink’}
& \text{bebė}0 & \text{‘bitter’}
\text{b. } \text{bibia} & \text{‘bold’}
& \text{bibia} & \text{‘inclement’}
\text{c. } \text{el pē}0 & \text{‘the’}
& \text{il kurdī} & \text{‘the’}
\text{d. } \text{i mē}0 & \text{‘he said’}
& \text{lo kornprō} & \text{‘he b}
\end{array}
\]

In (3a) the root vowels are observed in (3c) for the definiteness in all these cases, word-level (desinence or root) vowel.

The low vowel /a/ (both [+1 and both simply as /a/) is neutral for harmony system: it does not propagate of height values for these characteristics are apparent.

\[
\begin{array}{c c}
(4) \text{a. legatē}0 & \text{‘lizard’}
& \text{iskālāmbrōx0} & \text{‘dog-rose’}
\text{b. } \text{se kasō} & \text{‘he got r}
& \text{il mā}0 & \text{‘the log’}
\end{array}
\]

McCarthy accounts for the them from the class of segment segment H (high). This mov for that non-low vowels must be in context of a stressed low vowel forms behāmus ‘drink’ (1p subj) suggest that the verbal 1 while sintēs ‘feel’ (2pl pres s height harmony, cf. sintīr ‘feel’ Similar argumentation determines vowels in nominals like pigādā

If non-low vowels are in gen
The words in (2a) have [+ATR] high vocalism, those in (2b) [+ATR] mid, and those in (2c) [−ATR] high. On the surface, [−ATR] mid vowels are systematically excluded from occurring in stressed syllables; see note 7.

Height harmony is further evidenced in morphophonemic alternations; these occur most abundantly in verbal paradigms and nominal proclitics, as in the examples in (3):②

\[
\begin{align*}
(3) & \quad \text{a. bebë́r 'drink' koxë́r 'take' inf} \\
& \quad \text{bebë́mus} \quad \text{koxë́rus} \quad \text{1pl pres indic} \\
& \quad \text{bebë́të́} \quad \text{koxë́ré} \quad \text{1sg fut} \\
& \quad \text{bebië́} \quad \text{kuxë́ss} \quad \text{2pl pres indic} \\
& \quad \text{bebië́ria} \quad \text{kuxë́ria} \quad \text{1sg imperf indic} \\
& \quad \text{c. el pélë́ 'the hair (mass)'} \\
& \quad \text{il kordë́ro 'the lamb'} \\
& \quad \text{d. i mi dë́xu 'he said to me'} \\
& \quad \text{me lo kompró 'he bought it for me'}
\end{align*}
\]

In (3a) the root vowels are mid, in (3b) high; proclitic harmony is observed in (3c) for the definite article, in (3d) for the personal pronoun. In all of these cases, word-level vowel height is determined by the stressed (desinence or root) vowel.

The low vowel /a/ (both [−ATR] /a/ and [−ATR] /â/; I will refer to both simply as /a/) is neutral (transparent) with respect to the height harmony system: it does not alternate in height and is impervious to the propagation of height values from a stressed high or mid vowel. Both of these characteristics are apparent in the following examples:

\[
\begin{align*}
(4) & \quad \text{a. legatérá 'lizard'} \\
& \quad \text{iskálámbró́xu 'dog-rose'} \\
& \quad \text{se kasó 'he got married' (Penny 1969b)} \\
& \quad \text{il mádró 'the log'}
\end{align*}
\]

McCarthy accounts for the transparency of low vowels by excluding them from the class of segments that can be associated with the autosegment H (high). This move, McCarthy argues, has the consequence that non-low vowels must be underlyingly specified for height, since in the context of a stressed low vowel both high and mid vowels appear. Thus, the forms bebë́mus 'drink' (1pl pres subj) and koxë́rus 'take' (1pl pres subj) suggest that the verbal roots in (3) are underlyingly mid vocalic, while sintë́s 'feel' (2pl pres subj) implies underlying high vocalism (for height harmony, cf. sintë́r 'feel' (inf) and sentë́mus 'feel' (1pl pres indic)). Similar argumentation determines the underlying height of non-low vowels in nominals like pigë́ba 'magpie' and ontë́rga 'lard'.

If non-low vowels are in general underlyingly specified for the feature
Robert M. Vago

[high], then, clearly, height harmony must be a feature changing operation. McCarthy proposes the following mirror image rule:

(5) [high] Harmony

\[
\begin{array}{c|c|}
\text{H} & \text{a} & \text{H} \\
\mid & \mid \\
\text{[−str]} & \text{[+str]} \\
\end{array}
\]

Rule (5) deletes the H feature of an unstressed vowel in the context of a stressed vowel specified for H. The stressed vowel must be non-low, since low vowels are not specified for H. As a consequence, underlying height contrasts remain if the stressed vowel is low. The mirror-image formulation of [high] Harmony accounts for the distribution of non-low vowels in the relatively scarce proparoxytone words in which height harmony obtains to the right of the stressed vowel. Some examples are provided in (6):

(6) a. andibula ‘jaw’
    b. trêbede ‘lawn’
    c. dêhamo ‘tenth’
    rikštko ‘rickety’

Following the application of [high] Harmony, the H feature of the stressed non-low vowel spreads to an unstressed non-low vowel by convention. (7) is a slightly modified version of McCarthy’s sample derivation (19):

(7) Underlying

\[
\begin{array}{c|c|}
\text{H} & \text{H} & \text{H} \\
\mid & \mid & \mid \\
\text{bebris} & \text{sintémus} \\
\end{array}
\]

[high] Harmony (5)

\[
\begin{array}{c|c|}
\text{H} & \text{H} \\
\mid & \mid \\
\text{bebris} & \text{sintémus} \\
\end{array}
\]

Spreading

\[
\begin{array}{c|c|}
\text{H} & \text{H} \\
\mid & \mid \\
\text{bebris} & \text{sintémus} \\
\end{array}
\]

Surface

\[
\begin{array}{c|c|}
\text{H} & \text{H} \\
\mid & \mid \\
\text{bebris} & \text{sintémus} \\
\end{array}
\]

In summary, McCarthy treats height harmony in feature changing terms and the transparency of low vowels by means of a filter. I will take these positions to constitute an appropriate entry level for a reexamination of the facts from the perspective of underspecification theory.

3 Neutral /a/

In the tradition of autosegmental phonology three distinct approaches have been employed in the analysis of neutral segments. In the earliest proposal, neutral segments subject to a late neutralisatic theory, neutral segments are harmony rule and are specified ways: by a late default rule, of the harmonic autosegment ABSTRACT, DEFAULT and DUPL.

McCarthy’s account of ne

This analysis derives the ti alternations from the fact the universally that +L may not low /a/ does not become high non-alternating. Furthermor Lexical Phonology (Kiparsky, vowel specified as +L, sin specified; this explains why /i/ of H values. In brief, /a/ is as its +H specification by a lat rule(s) spreading the feature.

On the face of it, the default of the transparency of /a/. He position untenable on a prime the theory need be appealed to Condition. I will briefly disci

Recent research lends stron which features are hierarchi hierarchical feature geometry (1985), Sages et al (1986), Schein (1987, forthcoming a, b) unc publications differ in precise d all is the idea that terminal fe arrayed on independent tier hierarchy in (8) will suffice:

(8) \[
\begin{array}{c|c|}
\text{N} \mid \text{N} \\
\mid \mid \\
\text{Skele} & \text{Root} \\
\mid & \mid \\
\text{Supri} & \text{Place} \\
\mid & \mid \\
\text{Dorsa} & \text{H} \\
\mid & \mid \\
\text{B} & \text{L} \\
\mid & \mid \\
\text{A} & \text{X} \\
\mid & \mid \\
\end{array}
\]
a feature changing operation.

In the context of a stressed vowel, the underlying vowel must be non-low, and consequently, the stressed vowel is low. The mirror-image distribution of non-low vowel words is that height features are derived from the segmental features of the word. For example, the stressed non-low vowel in the word "lawn" is denoted as /a/, while the unstressed vowel in "wasp" is /a/. McCarthy's account of neutralisation of segments falls within this category. This analysis derives transparency in the feature /a/ with respect to height alternations and the specification of /a/ as +L (+low). It is true universally that +L may not co-occur with -H, which explains why /a/ does not become high in H harmony contexts, i.e., why /a/ is non-alternating. Furthermore, in the structure preservation principle of Lexical Phonology (Kiparsky 1985) precludes the association of -H to a vowel specified as +L, since -H is never distinctive for vowels. This explains why /a/ neither triggers nor blocks the propagation of H values. In brief, /a/ is associated with +L, underlyingly and receives its -H specification by a late default rule, applying crucially, after the rule(s) spreading the feature H.

On the face of it, the default analysis appears to be a reasonable account of the transparency of /a/. However, underspecification theory makes this position untenable on a principled basis. To see this, two assumptions of the theory need be appealed to: general feature geometry and the Locality Condition. I will briefly discuss these in turn.

Recent research lends strong support to a model of segment structure in which features are hierarchically organised. Arguments in favour of this model include advanced in such works as Clements (1985), Sagey (1986), Schein & Steriade (1986), Archangeli & Pulleyblank (1987, forthcoming a, b) and Steriade (1987a). The proposals for these publications differ in precise detail, but a common thread running through is that terminal features and higher level class nodes are each arrayed on independent tiers. For present considerations, the partial hierarchy in (8) will suffice:

(8)  

\[ N \quad \text{Nucleus} \]
\[ \quad \text{Skeleton} \]
\[ \quad \text{Root node} \]
\[ \quad \text{Supralaryngeal node} \]
\[ \quad \text{Place node} \]
\[ \quad \text{Dorsal node} \]

Recent research lends strong support to a model of segment structure in which features are hierarchically organised. Arguments in favour of this model include advanced in such works as Clements (1985), Sagey (1986), Schein & Steriade (1986), Archangeli & Pulleyblank (1987, forthcoming a, b) and Steriade (1987a). The proposals for these publications differ in precise detail, but a common thread running through all is the idea that terminal features and higher level class nodes are each arrayed on independent tiers. For present considerations, the partial hierarchy in (8) will suffice:
Of particular interest to us here is the internal organisation of the dorsal node: as seen in (8), it dominates terminal feature tiers for the dorsal articulator features [back], [high], [low] and [ATR].

In addition to hierarchical feature structure, the argument against the default analysis of neutral /a/ relies crucially on the following constraint of underspecification theory:

(g) **Locality Condition** (Archangeli & Pulleyblank 1987)

A rule can apply only if a specified target is adjacent to a specified trigger.

According to Archangeli & Pulleyblank (1987, forthcoming a), for spreading purposes the Locality Condition is computed on one of two levels: on the tier that dominates the spreading feature, or on the highest level of syllabic structure on which the target is represented. The former is called minimal scanion, the latter maximal scanion. Since minimal, but not maximal, scanion is what is required for transparency, that is what we need to assume for the subject matter at hand.

On the relatively uncontroversial assumption that the features [low] and [high] dock onto the same tier, i.e. the dorsal tier in (8), and accepting the claim that the Locality Condition is well motivated, deriving the transparency of /a/ in the Pasiego height harmony system from its [+low] specification is not possible. To see this, consider the putative representation of the last word in (4) if +H were to spread to the unstressed proclitic vowel through the intervening low vowel, analysed in terms of [+low] (irrelevant tiers are omitted):

(10) ı l mādīru

\[\text{Skeleton} \quad \begin{array}{c} x \quad x \quad x \quad x \quad x \\ +L \\ +H \end{array} \quad \text{Dorsal node}\]

We note first that /a/ is an ineligible target for spreading: the +L specification precludes association with +H. In view of this, spreading +H from the stressed vowel through /a/ to the proclitic vowel violates the Locality Condition: the trigger and target nodes are not adjacent on the tier that is scanned for rule application, namely the dorsal tier. Representation (10) is therefore disallowed.

The Locality Condition has the following consequences for the analysis of low vowels in height harmony systems where the spreading feature is [high]. It predicts that low vowels which are associated with [+low] will block the spreading of [+high]. This then is an entirely appropriate characterisation of low vowels which are opaque to height harmony, as in Kikuria (David Odden, personal communication) obtains. On the ıh height harmony, as is the case in Kera (Ebert 1974), must not have any ass dorsal tier, at least at the stative place. Finally, low vowels ı in low vowels ı in Kera (Ebert 1974), are linked to the dorsal tier.

As far as the analysis of system Kim is concerned, underspecification for the features [high], [back] top onto the dorsal tier. That is thus assumed that at the derivational level where the /a/ is represented on the surface is not associated with any representation on the dorsal target proclitic vowel will have example ıl mādīro. The Loca +H through the ‘intervening’

(11) ı l mādīro

\[\begin{array}{c} x \quad x \quad x \quad x \quad x \\ +H \end{array}\]

Another possible view mig is commonly, though not unit assumed, [round] attaches to dominated by the place tier purview of the dorsal tier. However, this alternative sh (i) [round] is otherwise not (ii) maximal underspecified internally.

To sum up, underspecification constrained manner. In which conceived by Archangeli & F further in Vago (in preparation, language-specific underspecified by universal grammar).

4 The underspecified

The vowel inventory of Pasiego
Kikuria (David Odden, personal communication); alternatively, maximal scanion obtains. On the other hand, low vowels which are transparent to height harmony, as is the case in Pasiego and Menemini (Cole & Trigo 1987), must not have any associations on tiers that are dominated by the dorsal tier, at least at the stage when spreading from the [high] tier takes place. Finally, low vowels which participate in height harmony, as in Kera (Ebert 1974), are linked to some feature other than [low] that is dominated by the dorsal tier.

As far as the analysis of neutral /a/ in the Pasiego height harmony system is concerned, underspecification theory precludes any specification for the features [high], [back], [low] and [ATR], all of which, ex hypothesi, dock onto the dorsal tier. This forces maximal underspecification. I will thus assume that at the underlying level, and at least through the derivational level where the [high] Harmony rule or its equivalent applies, /a/ is represented on the skeletal tier with an empty node, i.e. one that is not associated with any tier below the skeleton. If /a/ has no representation on the dorsal tier, then the trigger stressed vowel and the target proclitic vowel will have adjacent dorsal nodes in the representative context. The Locality Condition will therefore allow spreading +H through the ‘intervening’ low vowel, as in (11):

\[
(11) \quad \text{Skeleton} \\
\quad \text{Dorsal node}
\]

Another possible view might be to specify /a/ only as [−round], if, as is commonly, though not universally (cf. Archangeli & Pulleyblank 1987) assumed, [round] attaches to a separate labial tier which is immediately dominated by the place tier. In that case, /a/ would fall outside the purview of the dorsal tier within which the feature [high] spreads. However, this alternative should be rejected, for at least two reasons: (i) [round] is otherwise not distinctive for Pasiego, as shown in §4.3; (ii) maximal underspecification is the preferred alternative on theoretical grounds.

To sum up, underspecification theory explains transparency in a highly constrained manner. In what we may call the geometric analysis, conceived by Archangeli & Pulleyblank (forthcoming a) and advocated further in Vago (in preparation), transparent behaviour falls out from the language-specific underspecification of features whose architecture is fixed by universal grammar.

4 The underspecification of [high]

The vowel inventory of Pasiego reveals that the feature [high] is distinctive
in this language. On the assumption that this feature has binary values, the specification of [high] can be analysed in one of three ways.  

(12) a. \(-H \text{ Default Hypothesis: } +H \text{ is specified lexically; } -H \text{ is derived by a default rule applying after the [high] Harmony rule.}\)

b. \(+H \text{ Default Hypothesis: } -H \text{ is specified lexically; } +H \text{ is derived by a default rule applying after the [high] Harmony rule.}\)

c. \text{Feature Changing Hypothesis: both } +H \text{ and } -H \text{ are specified lexically and both are targets of the [high] Harmony rule.}\)

The \(-H \text{ Default Hypothesis} \) can be falsified by showing that \(-H \) must spread in the lexical phonology, the \(+H \text{ Default Hypothesis} \) by showing that \(+H \) spreads lexically, both under the general conditions of [high] Harmony. Neither of these cases would falsify the Feature Changing Hypothesis. It is thus fair to assert that the Feature Changing Hypothesis is the most powerful of the three analyses in (12), the adoption of which is justified if and only if evidence is shown to exist that contradicts the claims of both the \(+H \) and \(-H \text{ Default Hypotheses}.\)

In this section I intend to show that in the Pasiego height harmony system there is abundant evidence for the raising of mid vowels, i.e., for spreading \(+H \), and further, that solid evidence supporting the lowering of high vowels, i.e., for spreading \(-H \), is non-existent. These facts are automatically explained by the \(-H \text{ Default Hypothesis}.\) Therefore, there is no justification for analysing the height harmony system in feature changing terms.

McCarthy's conclusion that height harmony in Pasiego is feature changing is based on data that are of two sorts: distributional evidence, namely cooccurrence restrictions between high and mid vowels that hold intrarhophonemically, and alternations observed chiefly in nominal proclitics and verbal inflectional suffixes. Of these, distributional evidence is weaker: in principle, it is compatible with any of the three analyses of lexical height given in (12) above. As regards alternations, proclitics are generally dependent on the height of the host words. Height alternations in the conjugation system, however, are quite revealing. It is this evidence that I would like to examine now; I will take up proclitic alternations and stem-internal harmony in §5.

Verbal roots in Spanish, as is well known, are assigned to one of three conjugation classes. Verbal stems are formed with one of the vowels \(/i/, /e/ \text{ or } /a/; \) the choice is determined by the conjugation class classification of the root. As far as height harmony in Pasiego is concerned, the height of root vowels and that of the stem vowel agree in general; low \(/a/ \text{ can, of course, mix with either the high or low set. I will first consider contexts in which mid vocalic roots are raised, and then environments in which high vocalic roots are lowered.}\)

4.1 Raising contexts

The principal inflectional paradigms of indicative, present subjunctive, and imperative, present subjunctive. In (13) I list the paradigms of to be representative of mid vowel raising.

(13) a. Present indicative
   1sg kwéxu
   2sg kwéxes
   3sg kwéxe
   1pl koxénum
   2pl kuxís
   3pl kwéxen

d. Perfect
   1sg kuxí
   2sg kuxíste(s)
   3sg kuxió
   1pl kuxínus
   2pl kuxístes
   3pl kuxjén

It can be readily observed that the preceding desinence vowel is low or mid, both the root vowel and stem vowels appear in the context of vocalic underlyingly.

The mid root (and stem) vowel of the high stressed vowel preceding a stressed vowel. TI suffixes appearing in the paradigm

(14) a. -is 2pl present indicative
b. -í imperfect
c. -i perfect
d. -is 2pl future
e. -í conditional

Past participles are further inst.

Evidence in support of raising
4.1 Raising contexts

The principal inflectional paradigms of finite verbs are as follows: present indicative, present subjunctive, imperfect, perfect, future and conditional. In (13) I list the paradigms of the verb *hoxér* 'to take', which we may take to be representative of mid vocalic verbal stems (Penny 1969a):

<table>
<thead>
<tr>
<th></th>
<th>a. Present indicative</th>
<th>b. Present subjunctive</th>
<th>c. Imperfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1sg</td>
<td>kwéxu</td>
<td>kwéxa</td>
<td>kuxía/kuxjá</td>
</tr>
<tr>
<td>2sg</td>
<td>kwéxes</td>
<td>kwéxas</td>
<td>kuxías/kuxjás</td>
</tr>
<tr>
<td>3sg</td>
<td>kwéxe</td>
<td>kwéxa</td>
<td>kuxía/kuxjá</td>
</tr>
<tr>
<td>1pl</td>
<td>koxémus</td>
<td>koxámus</td>
<td>kuximáus/kuxjámus</td>
</tr>
<tr>
<td>2pl</td>
<td>kuxís</td>
<td>koxáis</td>
<td>kuxíais/kuxjáis</td>
</tr>
<tr>
<td>3pl</td>
<td>kwéxén</td>
<td>kwéxan</td>
<td>kuxíán/kuxján</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d. Perfect</th>
<th>e. Future</th>
<th>f. Conditional</th>
</tr>
</thead>
<tbody>
<tr>
<td>1sg: kuxí</td>
<td>koxeré</td>
<td>kuxiría</td>
</tr>
<tr>
<td>2sg: kuxístes</td>
<td>koxerás</td>
<td>kuxíras</td>
</tr>
<tr>
<td>3sg: kuxió</td>
<td>koxerá</td>
<td>kuxiría</td>
</tr>
<tr>
<td>1pl: kuxímus</td>
<td>koxeremús</td>
<td>kuxirimáus</td>
</tr>
<tr>
<td>2pl: kuxístes</td>
<td>kuxirís</td>
<td>kuxirieís</td>
</tr>
<tr>
<td>3pl: kuxjén</td>
<td>koxerán</td>
<td>kuxirían</td>
</tr>
</tbody>
</table>

It can be readily observed that the height of the stressed vowel determines that of the preceding vowels. In particular, if the stressed desinence vowel is low or mid, and is not preceded by a high glide, then both the root vowel and stem vowel show up as mid. The fact that mid vowels appear in the context of /á/ argues for analysing the root as mid vocalic underlyingly.

The mid root (and stem) vowel becomes high in two general contexts: before a high stressed vowel and before a high glide immediately preceding a stressed vowel. The following is a list of the high vowel suffixes appearing in the paradigms of (13), all of which induce raising:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(14) a. -is 2pl present indicative</td>
<td>b. -i imperfect</td>
</tr>
<tr>
<td>c. -i perfect</td>
<td>d. -is 2pl future</td>
</tr>
<tr>
<td>e. -i conditional</td>
<td></td>
</tr>
</tbody>
</table>

Past participles are further instances of raising before a stressed high vowel: cf. for example *bibhú, kambu*, derived from *bēbēr* 'to drink'/*kemér* 'to eat' (Penny 1969b).

Evidence in support of raising induced by the high glides /j/
in the onset of a stressed syllable runs deep. Some representative data are
given in (15):

(15) a. belòrta ‘hay-rake’
   ménu ‘less’
   kornèx ‘crow’

   b. Infinitive

   bòxèr
   kornèr
   bebèr
   c. se kàsò ‘he got married’
   lo màlú ‘the bad thing’
   el gànàu ‘the cattle’
   d. ràsàrjù ‘backbone’
   rekàpó ‘bee-swarm’
   médjjas ‘middle’ (fem pl)

   bilúrijàr ‘carry by hay-rake’
   mingwàr ‘to lessen’
   kumixjàr ‘to caw’

   subjunctive

   kusjèndu ‘take’
   kumjèr ‘eat’
   biljèr ‘drink’ (Penny 1969b)
   si kumjè ‘it’s been eaten’
   il mjèu ‘the worst thing’

As seen, mid vocalic roots become high vocalic if the onset of the
stressed syllable contains a high glide, regardless of whether the stressed
vowel is low (15a) or mid (15b); the perfect forms kusjèr and kusjèrì and
the alternant imperfect forms of the paradigms in (13) are additional
examples. The alternations in (15c) establish that glide triggered raising
extends to proclitics as well. (15d) demonstrates that a high glide in an
unstressed syllable does not determine high harmony to the left.

In sum, the evidence for [+ high] vowels and glides which spread their
height values is compelling. That the spreading process is lexical is
underscored by the fact that it has exceptions; an apparently complete set
of exceptional forms (to both vowel and glide induced harmony) can be
found in McCarthy’s article.7

4.2 Lowering contexts

A glance through the paradigms given previously in (13) reveals that the
imperfect, perfect and conditional paradigms are formed either with a
stressed high desinence vowel or have a high glide in the onset of the
stressed syllable. Since in both cases right-to-left raising obtains, the
patterning of high vocalic verbal stems in these paradigms is of no
consequence. I give below the potentially revealing paradigms of the verb
sintèr ‘to feel’, representing the class of high vocalic verbal stems:8

(16) a. Present

   indicative
   sintu
   sintes
   sintè
   sentèmùs
   sintèis
   sinten

   subjunctive
   sintà
   sintás
   sintà
   sintámus
   sintàis
   sintàn

   c. Future

   sintèr
   sintiràs
   sintirà
   sintirèmus
   sintirèis
   sintiràn

It will be observed that the only tradi(7) tory behaviour: in sintèr of the high root vowel (that [i] with a stressed low vowel), but
it does not. As a matter of fact, lowering of the root vowel in some roots belonging to the [i]
the 1pl. present indicative inflection
and saímus, derived from sali
of the -ir class do not assimilate
vowel, either obligatorily or o
iskyàpà ‘to spit’ (Penny 1969b)
say’ (Penny 1969a).

It appears then that the 1p
roots are unstable and subject to
region: some verbs harmonise
(iskyàpàmus), some do so opt
variations in the stressed vowel
that -ir and -dr verbs do not
indicative.

There are thus reasons to see
-ir verbs not to be represent
harmony. There might even be
not the expected //i/: Penny (1)
the 1pl. perfect inflection, m
homonymy. In any event, the r
-enus is highly limited: the gre
(Penny 1969a), where the pres
set of verbs in which lowering is
remembered.

As far as I have been able to
suffixed in Pasiego with a mid vow
lowering of an inherently high
which there is strong suppor
motivate general vowel lowering in terms of under
vowels are unspecified for [hig]
Underspecification theory ad
metric patterning of stressed
provides an explanation for t
harmony: stressed mid-vowel
with high vowels (cf. McCarthy;
(stressed) mid vowels are unspec
feature to high vowels. Both of
Feature Changing Hypothesis.
It will be observed that the stressed mid vowel /e/ exhibits contradictory behaviour: in sentémus (1pl pres indic) it induces the lowering of the high root vowel (that [+high] is basic) shown by the inflections with a stressed low vowel), but in sintiré (3sg fut) and sintirémus (1pl fut) it does not. As a matter of fact, there are strong indications that the lowering of the root vowel in sentémus is an aberration. For one thing, some roots belonging to the [+high] class have high vocalic variants in the 1pl present indicative inflection: e.g. Penny (1969a) cites both salémus and salimus, derived from salí to 'leave'. For another, some verbal roots of the -ir class do not assimilate their high vowels to the stressed mid vowel, either obligatorily or optionally: cf. for example iskupémus, from iskuír to 'spit' (Penny 1969b) and ibémus/ebémus, from (d)íbír/(d)íbír 'to say' (Penny 1969a).

It appears then that the 1pl present indicative forms of high vocalic roots are unstable and subject to a great deal of variation across the dialect region: some verbs harmonise in height to /e/ (sentémus), some do not (iskaipémus), some do so optionally (ibémus/ebémus), and some show variation in the stressed vowel (salémus/salimus). A relevant point here is that -ir and -ér verbs do not exhibit such variation in the 1pl present indicative.

There are thus reasons to consider the 1pl present indicative forms of -ir verbs not to be representative of the regular patterns of height harmony. There might even be a functional reason why the stem vowel is not the expected /i/: Penny (1969a: 123) conjectures that since sintirémus is the 1pl perfect inflection, mid vocalism in the 1pl indicative avoids homonymy. In any event, the number of verbs that assimilate in height to -émus is highly limited: the great majority of verbs belong to the -ér class (Penny 1969a), where the present indicative forms have /a/. In brief, the set of verbs in which lowering applies in the context of -émus can simply be memorised.

As far as I have been able to determine, there appears to be no other suffix in Pasiego with a mid vowel, stressed or unstressed, that triggers the lowering of an inherently high vowel. If correct, then we have a system in which there is strong support for vowel raising, but no evidence to motivate general vowel lowering. These facts, surely, are tailor-made for analysis in terms of underspecification: high vowels are [+high], mid vowels are unspecified for [high].

Underspecification theory accords a principled account of the asymmetric patterning of stressed high and mid vowels in suffixes. It also provides an explanation for a set of systematic exceptions to height harmony: stressed mid-vowel nominal derivational suffixes freely mix with high vowels (cf. McCarthy 1984: 207 for a complete list). Clearly, if (stressed) mid vowels are unspecified for [high], they cannot spread this feature to high vowels. Both of the above facts remain curious under the Feature Changing Hypothesis.
4.3 The underspecified vowel system

We are now in position to set up the underlying representations of the Pasiego vowels. First, it will be recalled that the feature [ATR] is not distinctive: [−ATR] vocalism is morphologically conditioned, [+ATR] vocalism is derived by default. I have suggested that /e/ and /o/ lack specification for the feature [high], /i/ and /u/ do not. We also know that /e/ and /o/ must be specified for at least one of the features [low], [back]: these vowels are targets of the [high] Harmony rule, so they must have a dorsal node. By the same reasoning, neutral /a/ will lack values for each of the features in the set ([high], [low], [back]). These three dorsal features are jointly sufficient to distinguish the five underlying vowels, so that the feature [round] is not distinctive either. The proposed underlying vowel system is thus arrived at:

(17)   i e u o a
         high + +
        low – –
       back – –

The following default specifications are applicable:

(18) Default Rules
a. [ ] → [+back]    e. [ ] → [−round]
 b. [−back] → [−low]  f. [ ] → [−high]
 c. [ ] → [+low]     g. [ ] → [+ATR]
 d. [+back]
    [−low] → [+round]

As claimed by the theory, none of the above orderings is extrinsic. (18a, b) precede (18d), since the latter applies to the output of the former. I also assume that the ‘Elsewhere Condition’ (Kiparsky 1982) sequences (18b) before (18c) and (18d) before (18e).

5 Floating [high]

I have argued in the preceding section that only the + specification of the feature [high] is evidenced in the Pasiego lexicon. The following question is of immediate concern: how is the feature [+high] represented in underlying representations? Suppose we take what perhaps represents the conventional view, that it is the property of individual segments. In that case, every underlyingly high vowel is linked to +H on the [high] tier of the feature hierarchy. Below I give four arguments against what I will dub the LINKED ANALYSIS.

First, it is not immediately obvious that the notion ‘morpheme-internal harmony’ has any satisfactory interpretation. Any account of height harmony must state that as a rule, high and mid vowels do not mix in polysyllabic morphemes. Thus, but (19c) is generally not (ign
ger)

(19) a. i i b. +H

It might be possible to say that represented on the dorsal tier (i.e., to +H or none are. But such a

Secondly, if height specifici

It fact is not explained that in verb agree in height, disregarding lo

stem vowel is /e/ are mid vocali

e-r, sent-i-r, where the morpholo

g facts are fortuitous.

Thirdly, the linked analysis polysyllabic roots whose stress

to Penny (1969b), these roots fall

with high vowels, those that cooc

doubt forms. The non-low voice

of related forms: in other cases, I consequently the root has altern

(20) a. lindáška ‘embankment

  ‘helpful’

  áyudhù ‘vinegar’

  ‘to pull’

  b. akambáu ‘curved’

  ‘cowardly’

  ‘fish-what’

  ‘to comb one

  c. soldánu/solánu ‘st

  xaránu/xarásu ‘h

  piruxál/peroxál ‘w

  kukárača/kokaráča ‘be

What is hard to understand in

doublets like those in (20c) shoul

stressed vowel is low allow double

harmonic roots whose stressed v

behaviour of disharmonic roots, v

and frequently have harmonic dou

a stressed low vowel.

Finally, if a morpheme has two

is predictable from that of the oth
polysyllabic morphemes. Thus, (19a) and (19b) are possible structures, but (19c) is generally not (ignoring neutral /a/ and back /u/ and /o/):

(19) a. i i b. e e c. i e

- Dorsal node
  + H + H

It might be possible to say that of those vowels of a morpheme that are represented on the dorsal tier (i.e. high and mid vowels), either all are tied to +H or none are. But such a statement is awkward and unrevealing.

Secondly, if height specifications are determined individually, then the fact is not explained that in verbs stem vowels and root vowels generally agree in height, disregarding low vowels. Thus, in general, roots whose stem vowel is /e/ are mid vocalic, those with /i/ are high vocalic, e.g. *akš-e-, *sint-i-r*, where the morphology is [root–stem vowel–infinitive]. Rather, these facts are fortuitous.

Thirdly, the linked analysis is hard put to explain the patterning of polysyllabic roots whose stressed syllable contains neutral /a/. According to Penny (1969b), these roots fall into three categories: those that cooccur with high vowels, those that cooccur with mid vowels, and those that have doublet forms. The non-low vocalism can often be established on the basis of related forms; in other cases, however, no such relationship exists, and consequently the root has alternant forms:

(20) a. *lindasko* ‘embankment’ (cf. *łinde* ‘boundary’)
    *āyodā* ‘helpful’ (cf. *ayūda* ‘help’)
    *bināgre* ‘vinegar’ (cf. *būnu* ‘wine’)
    *tirār* ‘to pull’ (cf. *tira* ‘strip’)

b. *ākombāo* ‘curved’ (cf. *kombā* ‘curve’)
    *āpokāo* ‘cowardly’ (cf. *poku* ‘little’)
    *sedāl* ‘fishing-line’ (cf. *sēda* ‘silk’)

    *pendāse* ‘to comb one’s hair’ (cf. *pënde* ‘comb’)

b. *salān/a* ‘sunny’
    *xorāk/a/xorāko* ‘hole’
    *piruxāl/peroxāl/ ‘wild pear-tree’
    *kukarača/kokarača* ‘beetle’

What is hard to understand in the linked analysis of +H is: (a) why doublets like those in (20c) should exist at all; (b) why only roots whose stressed vowel is low allow doublets with any degree of frequency, but not harmonic roots whose stressed vowel is mid or high; and (c) how the behaviour of disharmonic roots, which contain both high and mid vowels and frequently have harmonic doublets, can be related to that of roots with a stressed low vowel.

Finally, if a morpheme has two or more high vowels, the height of one is predictable from that of the other. The linked analysis, however, denies
this redundancy, and runs counter to the strong claim of underspecification theory (among others) that predictable values should not be specified underlyingly.

Suppose we say that each morpheme can have at most one linked high vowel underlyingly; height harmony would then propagate from that vowel. In some cases the choice as to which of several high vowels should be underlyingly linked would be arbitrary, though, as in [H₁...H₂...a...H₃], where H is a high vowel. One might get around the arbitrariness problem by restricting linked [+high] features to stressed positions only. But this will not work if the stressed vowel is low or in those cases where stress might be assigned by rule, rather than assumed to be underlying.

I have considered and dismissed above several versions of the linked analysis of height, one in which spreading is initiated by vowels which are linked to +H. I would like to suggest instead that in the regular cases height is the property of morphemes. Accordingly, we may conceive of two sets of morphemes: those that contain an unassociated, i.e. floating, +H feature on the [high] tier, and those that have no such feature. The former represent formally the class of high vocalic morphemes, the latter either mid vocalic morphemes or disharmonic morphemes, which contain individually specified, i.e. opaque vowels. These classifications are schematised in (21), using front vowels as examples:

\[ \begin{array}{cccc}
V & V & V & V \\
+H & +H & +H & +H \\
\end{array} \]

High glides that occur in the onset position of stressed syllables will also be associated with [+high], since they control [+high] harmony to the left; a rule can be assumed to derive such predictable opacity.

The objections to the linked analysis of height given above cease to be problematical. The fact that ordinarily high and mid vowels do not cooccur intramorphemically is an automatic consequence: there is only one morpheme-sized floating +H feature per morpheme, or none at all. As regards the harmony between the root vowel(s) and the stem forming vowel of verbs, only one of them will be classified as high vocalic, and its +H feature will spread to the other under the general conditions of height harmony. The fact that disharmonic roots tend to have harmonic alternants makes perfect sense: in Pasiego, +H is morpheme-sized (floating), so the removal of segment-sized (linked) +H values is a case of regularisation. Finally, the unstressed non-low vowels of roots whose stressed vowel is low will be analysed as opaque in case they are high (20a), unspecified in case they are mid (20b), or optionally opaque in the case of free variation (20c). There is thus a uniform explanation for the existence of doublets in disharmonic roots and in harmonic roots with a stressed low vowel: in both cases opacity is reduced.

But crucially, there is evide

6 The Association of [hi:j]

In the preceding section I hr harmony system of Pasiego is introduces a mechanism needed to link th vowel; of course, this step is vowels (in disharmonic roots a linked [+high] must spread to a domain. In this section I will con harmony system of Pasiego b: procedures for +H.

6.1 Linking

The generalisation that [+high] the stressed syllable of the word. That the stressed syllable is the p values is particularly salient in the pattern of high glides: in both stressed syllable. The significance manifested in the fact that non-low stressed vowel of the stem is low hence they cannot be triggers of.

In the light of the relevance of [hi:j], the target for the lin the stressed vowel of the word:

\[ \begin{array}{c}
+H \\
\end{array} \]
strong claim of underspecifiable values should not be
have at most one linked high then propagate from that
if several high vowels should
rough, as in [H₁...H₂...á...]
et around the arbitrariness
to stressed positions only.
low or in those cases where
assumed to be underlying.
veral versions of the linked
initiated by vowels which are
ad that in the regular cases
ingly, we may conceive of
unassociated, i.e. floating,
have no such feature. The
scal morphemes, the latter
morphemes, which contain
These classifications are
amples:

\[
\begin{array}{c}
V \ V \mu \\
+H \\
\end{array}
\]

Of stressed syllables will also
of [+high] harmony to the
edicable opacity.
igh given above cease to be
mid vowels do not concur
quence: there is only one
pheme, or none at all. As
(s) and the stem forming
ified as high vocalic, and its
general conditions of height
and to have harmonic alter-
pheme-sized (floating),
+H values is a case of
low vowels of roots whose
in case they are high (20a),
onally opaque in the case of
planation for the existence
onic roots with a stressed low
But crucially, there is evidence that no analysis of the Pasiegio height
harmony system can outright deny the assumption of a floating +H.
Consider the prediction the linked analysis makes for proclitic harmony in
case the root contains only low vowels in tonic and pretonic positions.
The expectation is that a proclitic vowel will be mid vocalic by default, since
the low vowels of the root are not specified for [+high]. In point of fact,
height alternation is countenanced, e.g.:

(22) a. po ál y a 'over there'
     b. po l prá o 'through the field'

Positing a floating +H feature for roots of the type in (22b) would seem
to be unavoidable.

6 The association of [high]

In the preceding section I have suggested an analysis of the height
harmony system of Pasiegio in which the underspecified feature [+high]
is in general unassociated at the underlying level. If this is the case, a
mechanism is needed to link the floating [+high] feature to a particular
vowel; of course, this step is bypassed for segmentally specified high
vowels (in disharmonic roots and in roots with /á/). In either case, the
linked [+high] must spread to eligible target vowels within the harmonic
domain. In this section I will complete my proposed account of the height
harmony system of Pasiegio by motivating the linking and spreading
procedures for +H.

6.r Linking

The generalisation that [+high] values initiate harmonic domains from
the stressed syllable of the word seems undeniable to the language learner.
That the stressed syllable is the preferred focus for the propagation of +H
values is particularly salient in the verbal inflectional system and with the
patterning of high glides: in both cases [+high] spreads outward from the
stressed syllable. The significance of the stressed syllable is further
manifested in the fact that non-low vowels often alternate freely in case the
stressed vowel of the stem is low: low vowels are not bearers of [+high],
hence they cannot be triggers of height harmony.

In the light of the relevance of the stressed syllable for the propagation
of [+high], the target for the linking of a floating [+high] feature will be
the stressed vowel of the word:

(23) H-Linking

\[
\begin{array}{c}
+ \text{stress} \\
+ \text{H} \\
\end{array}
\]

Dorsal node
The feature [stress] is purely interpretive and has no theoretical significance. I will assume that in statements like the above only the broken line is taken to constitute the structural change. That is, an association line is inserted between an already existing +H feature and the dorsal node. In particular, the dorsal node is not obtained through node generation (Sagey 1986), so that neutral /a/, which has no dorsal node, is not a target.

As discussed in detail in such works as Harris (1969, 1983) and Cressey (1978), the primary stress of Spanish words usually falls on any one of the final syllable (oxytones), penultimate syllable (paroxytones) or ante- penultimate syllable (proparoxytones). Of these, penultimate stress represents the unmarked pattern. For present purposes, I will assume that penultimate stress is assigned by rule, that final and antepenultimate stress is marked underlyingly.

As a consequence of the preceding assumptions, the linking of floating [+high] features must follow penultimate stress assignment in the case of paroxytones. Since the stress assignment rule is often fed by the morphology, e.g. a number morpheme containing syllabic segments is added to the nominal stem, linking sometimes will take place on suffix cycles. But with oxytone and proparoxytone nominal stems, where stress is underlyingly indicated, linking is activated on the root cycle.

In the present analysis, H-Linking is needed only for morphemes whose stressed vowel is high: only these have a floating +H feature. Morphemes whose stressed vowel is mid are underspecified; high vowels in disharmonic roots and morphemes whose stressed vowel is low are underlyingly linked to +H. What about nominal roots that contain only low vowels? We saw in (22b) that one such class triggers raising in proclitics. I will assume, without further discussion, that such roots have a floating +H feature which becomes linked to a proclitic vowel in the postlexical phonology.

6.2 Spreading

Once linked, [+high] spreads by the following rule:

(24) H-Spread (mirror image)

\[
\begin{align*}
\text{[-stress]} & \quad \text{Dorsal node} \\
+H &
\end{align*}
\]

I assume that H-Spread is a cyclic rule; I am aware of no data that suggest otherwise. In that case the Strict Cycle Condition can be invoked to explain the failure of H-Spread to apply morpheme internally in disharmonic roots. For the details of this approach, see Kiparsky (1985) and Pulleyblank (1986).

As formulated, both stressed are of H-Spread. The evidence is ov induce raising, as will be recalled about opaquely [+high] unstress vowel is low? The available evide regards right-to-left spreading, tic and uncontroversially, and there of an inherently linked high vowel a preceding stressed low vowel +

\[/a/\], it is of no consequence, for tv followed by at most two unstressed syllables undergo re- postonic syllables occur only, as t the case of proparoxytone nomina takes place anyway.

The mirror image formulation paroxytones, where +H spread directions. If H-Spread is bidirec restricted to unstressed syllables, which constitute evidence in su inflections such as *\text{simr} \text{'I will} vowels, as in bôjëndu 'drinking', \text{lindera} 'hillside'. In each case, stressed mid vowel.

The above facts force the linkim on which suffixes with stressed \text{n} Linking would associate a floating high vowels. One immediate impl root or the stem vowel should be cycle; since in -\text{ir} verbs both root: neutral /a/), the height of at least underspecified. I will assume that stem vowel of -\text{ir} verbs is linked vowels on the stem forming cycle, high root vowels, if any, that are no high vowels in verbal inflections tl as having a floating +H.

In the final analysis, Pasiego het metric or dominant vowel harmonic Nilotic languages, among others, which exerts its control over the harma phonological distinctions like root ex

7 Conclusion

This work has examined the character harmony system from the persep
As formulated, both stressed and unstressed high vowels will be triggers of H-Spread. The evidence is overwhelming that stressed high vowels induce raising, as will be recalled from the discussion in §4. But what about opacity [+high] unstressed vowels, as in roots whose stressed vowel is low? The available evidence poses no obstacles to this view. As regards right-to-left spreading, the [+high] feature will spread to proclitics uncontroversially, and there does not appear to exist a genuine case of an inherently linked high vowel suffix that could spread +H through a preceding stressed low vowel. As for left-to-right spreading through /a/, it is of no consequence, for two reasons: (i) stressed syllables can be followed by at most two (unstressed) syllables, and (ii) vowels in final unstressed syllables undergo reduction, including height. Non-final posttonic syllables occur only, as far as I have been able to determine, in the case of proparoxytone nominal stems, where stem-internal spreading takes place anyway.

The mirror image formulation of H-Spread is suggested by proparoxytones, where +H spreads from the stressed syllable in both directions. If H-Spread is bidirectional, then the target vowels must be restricted to unstressed syllables. There are at least three general contexts which constitute evidence in support of this conclusion: (a) future inflections such as sinüre 'I will feel'; (b) high glides followed by mid vowels, as in bibjêndu 'drinking'; (c) mid-vowel derivational suffixes, e.g. lindêra 'hillside'. In each case, +H cannot spread rightward to the stressed mid vowel.

The above facts force the linking of high vowels to +H before the cycle on which suffixes with stressed mid vowels are derived: otherwise, H-Linking would associate a floating +H to the stressed mid vowel, yielding high vowels. One immediate implication is that in verbal stems either the root or the stem vowel should be linked by the end of the stem vowel cycle; since in -ê verbs both root and stem vowels are high (disregarding neutral /a/), the height of at least one is predictable and thus should be underspecified. I will assume that -ê verbs bear no +H feature, that the stem vowel of -ê verbs is linked to +H which will spread to the root vowels on the stem forming cycle, and that in the case of -ê verbs it is the high root vowels, if any, that are segmentally linked to +H. The stressed high vowels in verbal inflections that we saw in §4.1 can safely be treated as having a floating +H.

In the final analysis, Pasiego height harmony is reminiscent of asymmetric or dominant vowel harmony systems, such as [ATR] harmony in Nilotic languages, among others: the lexical value of the harmonic feature exerts its control over the harmonic domain, without regard to morphological distinctions like root vs. affix.

7 Conclusion

This work has examined the challenging facts of the Pasiego height harmony system from the perspective of the general framework of
underspecification theory. Two major points were advanced that have theoretical import: transparency was claimed to be analysable in geometric terms and full (binary) lexical specification was shown not to be a necessary condition for the description of height harmony.[11] In contrast, it is not obvious if any approach that denies underspecification in the height harmony system could provide principled accounts for facts like the following: (a) the distributional restrictions of vowel height that hold intramorphemically; (b) the asymmetric patterning of high and mid vowels in height alternations; (c) the systematic disharmony of stressed mid-vowel derivational suffixes; (d) the general transparency of low vowels.

McCarthy's specific proposals, in particular, need to be augmented for many of the problems enumerated above, as well as for three additional reasons. First, spreading only from linked stressed vowels predicts, incorrectly, that proclitic vowels do not alternate preceding low vowel nominal stems. Second, delinking followed by automatic spreading is dubious in light of Pulleyblank's (1986) strong arguments against automatic spreading in tone systems. And third, the Locality Condition, if accepted, renders illicit the spreading of [+high] beyond /a/ if that vowel is specified as [+low]; rather, it forces /a/ to block spreading.

If correct, the results might be interpreted in the strongest possible terms: as general constraints on the class of possible harmony phenomena. One such constraint might proscribe feature changing analyses altogether; another might prescribe one and only one description for transparency, namely segmental underspecification interacting with immutable feature geometry.[12] An important direction for future research might be to test these strong claims of underspecification theory on a wide assortment of empirical data.

NOTES

[1] The Pasiego dialect is spoken in the Cantabrian mountains, located in the south-central area of the province of Santander in north-central Spain. Penny's (1960a) grammar is the primary source material; Penny (1960b) concentrates on the patterns of vowel harmony. Both descriptions are in traditional terms and form the basis of McCarthy's painstaking investigation.

Unreferenced Pasiego forms used in this study are cited in McCarthy's article; those taken from Penny (1960a, b) are so identified.


[6] Some authors, such as Archangeli & Pulleyblank (1987), include a secondary place tier mediating between the place tier and the dorsal articulator features. Others, e.g. Steriade (1987a), dock [ATR] on a separate velar tier. As far as I can tell, these modifications have no effect on the analytical points raised in this paper.

[7] An anonymous referee has pointed out that the Locality Condition is not an inalienable part of underspecification theory, but that a theory of underspecification that incorporates it is much more constrained than one which does not.

REFERENCES


were advanced that have been analyzable in geometric was shown not to be a form of harmony. In contrast, underspecification in the held accounts for facts like s of vowel height that hold genuine of high and mid
disarrangement of stressed
tonal transparency of low

, need to be augmented for well as for three additional stressed vowels predicts, many preceding low vowel by automatic spreading is arguments against automatic duality Condition, if accepted, would /a/ if that vowel is lock spreading.

In the strongest possible sible harmony phenomena, analyzing analyses altogether; scription for transparency, ng with immutable feature research might be to test ry on a wide assortment of


[7] In [-ATR] contexts stressed mid vowels become high and trigger raising to their left; see McCarthy’s discussion of what he calls Rising. These then would constitute still additional instances for the spreading of [+ high].

[8] A few of the forms given in (1b) are cited neither in McCarthy’s article nor in the primary source materials (Penny 1969a, b). Rather, I have constructed them on the basis of the conjugation of the verb *salir* ‘to leave’ (whose root vowel is low, it should be noted, so that it is uninteresting as regards height harmony), given fully in Penny (1969a: 108f). Within the context of the discussion immediately below, the correctness of the two future inflections *sintére* and *sintéremus* and the 1pl present indicative form *sinteum* is of critical importance. In this regard it must be borne in mind that both *sintére* and *sentíamus* are cited by Penny (1969b: 150), as well as McCrath. Thus, the only attested form that *sintére* (1sg) fut; however, given the attested form *sintére* (1sg fut) (cf. also *iskupe* from *iskup* ‘to spit’ (Penny 1969b: 150)), its correctness is all but assured.

[9] The idea that harmonic features in vowel harmony systems may be assigned morphemic status is not new: it is advocated within underspecification theory by Archangeli & Pulleyblank (forthcoming b) for Yoruba, and in a different, much less constrained autosegmental framework by Vago (1984) for Finnish and Hungarian, Steinhberger & Vago (1987) for Barì, and Vago & Leder (1987) for Turkana.

[10] Forms like *iskupéma* ‘spit’ (1pl pres indic), discussed in §4.2, are further examples.

[11] A third fact also has theoretical relevance. It is generally assumed, e.g. Archangeli (1984), Archangeli & Pulleyblank (forthcoming a), that in the unmarked case [-ATR] and [+high] are the distinctive values, [-ATR] and [+high] the redundant ones. The fact that in Pasiego the marked case obtains argues strongly against theories that admit single-valued features only (e.g. van der Hulst & Smith 1986).

[12] For an approach along these lines, see Vago (in preparation). Oddéen (1988) is a fresh proposal to presh the feature changing analysis of non-associative phenomena.

\* \* \*

REFERENCES


Archangeli, D. & D. Pulleyblank (forthcoming b). *Yoruba vowel harmony. II.*


 Contributors

Diana Archangeli
Department of Linguistics
Douglas 200 East
University of Arizona
Tucson, AZ 85721
U.S.A.
(arbch@arizrvx.bitnet or
arch@rvx.ccit.arizona.edu)

Charles E. Carns
Department of Linguistics
Queens College
City University of New York
Flushing, NY 11367-0904
U.S.A.

Wim G. de Haas
Onderzoeksinstituut
voor Taal en Spraak
Rijksuniversiteit te
Utrecht
Trans 10
3512 JK Utrecht
The Netherlands

Larry M. Hyman
Department of Linguistics
2337 Dwinelle Hall
University of California, Berkeley
Berkeley, CA 94720
U.S.A.

Patricia A. Keating
Department of Linguistics
University of California,
Los Angeles
405 Hilgard Avenue
Los Angeles, CA 90024-1543
U.S.A.
(imk1pat@uclamvs.bitnet)