

rule, it will count here as a neutralizing feature. Sources of evidence for confirm conclusions drawn on assimilation and

in (2) is transparent to to determine that /z/ is doesn't hold. We cannot the segment /z/ is not involving F that /z/ is that low vowels block the and Sezer (1982)) need not specified at any stage in Rounding Harmony rule may which restricts spreading ls do not undergo Rounding every time they intervene al target in sequences of

specification

are. The first is that ification. A segment may e at all stages in the that labials never acquire , because anteriority is a position of the tongue e in the production of a vially underspecified for ingly and never acquire it ial source of trivial itures. I shall suggest a the sense that it either is absent altogether. I documented instances of suming that the relevant guage specific basis. es segments which lack though they acquire such It is, by and large, the cussed in the current

to suggest that trivial of the theory. On the s a useful concept, we do ch features stand in the whether the relation is f anything the difference ification follows from. o these questions, I will

suggest that the view of underspecification theory changes significantly when we take into account the possibility of trivial underspecification.

1.3.2. Distinctive and Redundant values

The second distinction drawn here is that between two types of predictable values. To make this distinction clear I will use the distribution of voicing in a segmental inventory similar to that of English:

(3)

p	t	k	s
b	d	g	z
m	n		
	l		
	r		

Voicing is partly predictable in this system. It is predictable for every sonorant, since all sonorants are voiced. Further, if we assume that only one value of [voice] is present underlyingly, then voicing is also predictable for half of the obstruents, as indicated by the analysis in (4):

(4)

	p	t	k	s	b	d	g	z	m	n	l	r
son	-	-	-	-	-	-	-	-	+	+	+	+
cont	-	-	-	+	-	-	-	+	-	-	-	+
voic					+	+	+	+				

- a. [+sonorant] → [+voice]
b. [-] → [-voice]

Rule (4)a introduces a non-underlying specification [+voice] within a segmental class, that of sonorants, where the feature is predictable: this rule is equivalent to the statement that only one value of [voice], [+voice], is present within the class of sonorant segments. Rule (4)b introduces the non-underlying feature value within a segmental class, that of obstruents, where the both of its values occur freely. I will call the values introduced by rules like (4)a Redundant values (R-values) and those introduced by rules like (4)b Distinctive values (D-values). A more precise definition of these notions is attempted below:

- (5)
- R-class of segments with respect to F: the class of segments where a feature co-occurrence constraint blocks one value of F.
 - D-class of segments with respect to F: a class of segments where both values of F are allowed.
 - R-value for F: the value of F present within its

R-class.

- D-value for F: a value of F present within its D-class.
- R-rule for F: a redundancy rule introducing an R-value.
- D-rule for F: a redundancy rule introducing a D-value.

A different classification of redundancy rules has been proposed by Archangeli (1984) and Archangeli and Pulleyblank (1986). These authors distinguish Default rules and Complement rules: the former class expresses universal restrictions on feature-cooccurrence such as [+low] → [-high]. In addition, Default rules introduce what are considered to be universally unmarked feature values such as [+high] for [high]. In contrast, Complement rules are language specific rules which introduce the opposite value of an underlying specification for F, in case no appropriate Default rule is available for the task. Roughly then, the proposed distinction is that between universal and language specific redundancy rules. In contrast, the terms defined in (5) characterize distinctive and non-distinctive assignments of feature specifications, regardless of their universality: according to (5), a feature-cooccurrence constraint need not be universal in order to define the R-class of a feature and therefore its R-value and corresponding R-rule.

1.4. Overview

I begin by showing that we have rather abundant evidence for the claim that R-values are underlyingly absent. I will then discuss the more limited evidence that D-values may also be absent. Finally, I will indicate an alternative interpretation of some of the attested patterns of underspecification, which allows us to further reduce the cases of non-trivially missing values.

2. Missing R-values

In this section I present the evidence establishing that redundant specifications are absent underlyingly.

2.1. The height of low vowels

The impossibility of simultaneous [+high, +low] specifications establishes that the height of low vowels is a R-value. The height of low vowels is also, frequently, a missing value in height harmony systems, both in the sense that low vowels do not spread their [-high] specifications and in the sense that low vowels are transparent to the spreading of height values from other segments. Before reviewing the evidence that low vowels are neutral in height harmony, we must however determine that low vowels do have surface specifications for [high]. This can be easily seen in cases where both mid and low vowels spread [-high]. For instance, Latin /i/ lowers to /e/ when tautosyllabic with a non-high vowel. For independent reasons, the class of tautosyllabic /Vi/ sequences reduces in Latin to /ai/ and /oi/: these assimilate in height and become /ae/ and /oe/. Phenomena of this type indicate that low vowels are as [-high] on the surface as the mid vowels. It then becomes quite significant that low vowels may lack [-high] specifications at a stage where the mid vowels are already [-high]: we observe this next.

2.1.1. Pasiego

In the Pasiego dialect assimilates non-low vowel. Low vowels do not, is, in essence, the one presented in McCarthy (of the relevant aspect distribution is also capitals.

(6)

- a. /beb/ 'drink'
bib-i's
beb-e'mus
beb-a'mus
- b. el ma'l 'the evil'
en kwe'nta 'because of
po la ka'xe 'down the

The forms in (6)a show when stressed, the height of the stem vowel surfaces as in /beb-a'mus/ and /s low vowel fails not only the preposition /po/ un across the intervening l.

The lack of trigger height harmony of Pasiego values at the stage where be underlyingly associated the fact that they represent the distribution of height

2.1.2. Menominee

The vowel system of includes a low vowel, /a tense /e/ and /o/, and /v be short or long. The /v high when followed in postconsonantal glide.

(7)

- a. ko:n 'snow'; ku:nyak 'ne:mow 'he dances'; ni
- b. mo:skamow 'he comes up

The forms in (7)a illustrate harmony; (7)b shows the triggers of height harmony rule. Given that the trigger [+high] feature, low vowel the height of other vowel harmony must be explained

: within its D-class.
 producing an R-value.
 producing a D-value.

rules has been proposed
 Alleyblank (1986). These
 element rules: the former
 feature-cooccurrence such
 all rules introduce what
 feature values such as
 element rules are language
 e value of an underlying
 appropriate Default rule is
 proposed distinction is
 lic redundancy rules. In
 characterize distinctive and
 specifications, regardless
 a feature-cooccurrence
 to define the R-class of
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abundant evidence for the
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 s may also be absent.
 interpretation of some of
 ion, which allows us to
 missing values.

ence establishing that
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gh, +low] specifications
 s a R-value. The height
 missing value in height
 low vowels do not spread
 ense that low vowels are
 ues from other segments.
 els are neutral in height
 w vowels do have surface
 sily seen in cases where
 For instance, Latin /i/
 a non-high vowel. For
 syllabic /vi/ sequences
 assimilate in height and
 type indicate that low
 the mid vowels. It then
 wels may lack [-high]
 wels are already [-high]:

In the Pasiego dialect of Montañés Spanish a harmony rule
 assimilates non-low vowels to the height of a non-low stressed
 vowel. Low vowels do not undergo, trigger or block the rule. This
 is, in essence, the analysis of the Pasiego height harmony rule
 presented in McCarthy (1984). The examples below illustrate some
 of the relevant aspects of this process. Lax vowels, whose
 distribution is also discussed by McCarthy, are written in
 capitals.

- (6)
- | | |
|-------------------------------|---------------------------------|
| a. /beb/ 'drink' | /sint/ 'feel' |
| bib-i's | sint-i's |
| beb-e'mus | sent-e'mus |
| beb-a'mus | sint-a'is |
| b. el ma'l 'the evil' | Il mAdi'rU 'the log' |
| en kwe'nta 'because of' | in il kali'xu 'in the lane' |
| po la ka'le 'down the street' | pU l ArrU'yU 'along the arroyo' |

The forms in (6)a show that both mid and high vowels trigger,
 when stressed, the height harmony rule. The underlying quality of
 the stem vowel surfaces intact only when the stressed vowel is low,
 as in /beb-a'mus/ and /sint-a'is/. The forms in (6)b show that the
 low vowel fails not only as a trigger but also as a blocker: thus
 the preposition /po/ undergoes height harmony in /pU l ArrU'yU/
 across the intervening low vowel.

The lack of trigger or blocker behavior of low vowels in the
 height harmony of Pasiego indicates that these vowels lack height
 values at the stage when harmony applies. That low vowels cannot
 be underlyingly associated with any value for [high] follows from
 the fact that they represent the R-class of segments for [high]:
 the distribution of height values is defective in this class (1).

2.1.2. Menomini

The vowel system of Menomini (Bloomfield 1939, Cole 1986)
 includes a low vowel, /a/, three mid vowels, the lax /E/, and the
 tense /e/ and /o/, and two high vowels /i/ and /u/. Each vowel may
 be short or long. The mid tense long vowels /e:/ and /o:/ raise to
 high when followed in the word by a high vowel or by a
 postconsonantal glide.

- (7)
- | |
|------------------------------------------------------------------------|
| a. Ko:n 'snow'; ku:nyak 'lumps of snow' |
| ne:mow 'he dances'; ni:mit 'when he dances' |
| b. mo:skamow 'he comes up from under water'; mu:skamit 'if he emerges' |

The forms in (7)a illustrate alternations resulting from height
 harmony; (7)b shows that a low vowel intervening between the
 triggers of height harmony and its targets will not block the
 rule. Given that the trigger of Menomini height assimilation is a
 [+high] feature, low vowels will understandably have no effect on
 the height of other vowels. However, their transparency to height
 harmony must be explained. The explanation is the same as for

Pasiego: R-values for height are absent when harmony applies (2).

2.1.4. Ngbaka

A height disharmony operates in Ngbaka, a Central African language analyzed by Thomas (1963) and Ito (1984). The Ngbaka vowels are: /e(:)/, /E(:)/, /o(:)/, /O(:)/, /a(:)/, /i(:)/, /u(:)/. Within a single morpheme, vowels of the same height may occur only if they are entirely identical: thus the two high vowels /i/ and /u/ are incompatible with each other, although each may co-occur with itself in morphemes of the form CiCi, CuCu. Similarly, distinct mid vowels may not co-occur morpheme-internally. The only pair of non-high vowels exempted from this restriction is formed by the low vowel /a/ and any one of the mid set (e,o,E,O): /kaD/ 'chain', /mona/ 'navel', /kakpe/ 'slave'. Following Ito (1985), one can assume that the tautomorphic V(C)V sequences with identical vowels involve multiply linked vocalic autosegments rather than distinct but identical ones. Given this, the height disharmony system of Ngbaka could be formulated as the prohibition against [αhigh][αhigh] sequences in underlying representations. But in order to explain the neutrality of /a/, the fact that /a/ may co-occur with a mid vowel even though both are [-high], we must assume that /a/ lacks underlying specifications for [high].

The Ngbaka data is also interesting in that it suggests that both values of [high] occur underlyingly within the D-class for [high], that of non-low vowels. In order to exclude underlying sequences of [+high] [+high], or [-high] [-high], both D-values for this feature must be present at the stage where the disharmony constraint is active: the stage of underlying representations.

2.2. The backness of /a/ in triangular systems

Many vowel systems have a single low vowel, both in the sense that no other vowel is phonetically low and in the sense that this low vowel does not have any direct counterpart for features such as [back], [round] or [ATR]. Trubetzkoy (1939) refers to such systems as triangular vowel systems.

In a triangular system, the backness of the low vowel will be predictable from its [+low] specification and thus will qualify as a R-value. The present section will show that this R-value is absent underlyingly.

The low vowels discussed next are those of Ainu and Tamil, both of which have triangular five-vowel systems. It is not entirely clear whether these low vowels display trivial or non-trivial underspecification for [back]: I have no information as to whether these low vowels are front, back, central or of contextually varying backness. For present purposes, however, this distinction is of secondary importance: I will concentrate only on the underlying absence of redundant [back] specifications. It will matter little how this absence is resolved on the surface.

2.2.1. Ainu

Ito (1984) discusses the following pattern of vocalic dissimilation in Ainu: transitive verbal stems take the form CV_1C-V_j , where V_j is either a copy of the preceding vowel (as in

/tem-e/ 'to measure', value for backness is vowel. This second CV_1 /pok-i/ 'to lower', involving a single, CV_1 cases (e.g. /pok-i/) dissimilation: it is specification. Signif that it cooccurs with /ram-u/ to think'.

We need, as Ito not analysis of the Ainu CV_1 /a/ lacks backness sp why, of the five vowe backness values. The i.e. a R-value, only

2.2.2. Tamil glide-

According to Christe not occur underlyingly phonological rules app back vowels (o,u) occ back glide /w/. In c occur underlyingly aft the disharmony const attributable to th specifications.

The interest of the of the Ngbaka height d underlying representati could be ordered rela constraint on underlyin all redundancy rules. vocoids (e,i,y) and th backness at the underly our terms, this shows t underlyingly. The exte appears then to be lim /a/.

2.3. Redundant [back

Hungarian has a mucl feature [back]. Within the two sets (o(:),u(:) vowels of a third set (i with any vowel: /peida/ /rövid/ 'short'. This neutral. Non-native co-occurrence: /büro:/

Suffixal vowels agree when this vowel is /parfüm-nek/ 'perfume-Df stem vowel belongs to

when harmony applies (2).

gbaka, a Central African
Ito (1984). The Ngbaka
/o(:)/, /a(:)/, /i(:)/,
vowels of the same height may
co-occur: thus the two high vowels
/i/ and /e/ are neutral, although each may
co-occur with the form CiCi, CuCu.
/a/ may not co-occur
with non-high vowels exempted
from the vowel /a/ and any one of
/e/, /o/, /u/, /mona/ 'navel', /Kakpe/
/a/ can assume that the
identical vowels involve
rather than distinct but
disharmony system of Ngbaka
on against [high][high]

But in order to explain
/a/ may co-occur with a mid
vowel must assume that /a/ lacks

in that it suggests that
/a/ is within the D-class for
/a/ to exclude underlying
[+high], both D-values for
/a/ where the disharmony
systeming representations.

systems
/a/ vowel, both in the sense
and in the sense that this
/a/ part for features such as
'39) refers to such systems

of the low vowel will be
/a/ and thus will qualify as
/a/ show that this R-value is

of Aino and Tamil, both
/a/. It is not entirely
/a/ trivial or non-trivial
/a/ information as to whether
/a/ neutral or of contextually
/a/ however, this distinction
/a/ concentrate only on the
/a/ specifications. It will
/a/ depend on the surface.

ng pattern of vocalic
/a/ stems take the form
/a/ when the preceding vowel (as in

/tem-e/ 'to measure', /yok-o/ 'to aim') or else a high vowel whose
value for backness is distinct from that of a preceding non-low
vowel. This second category includes stems like /sir-u/ 'to rub',
/pok-i/ 'to lower'. Ito analyzes the cases like /yok-o/ as
involving a single, multiply linked vowel. In the second class of
cases (e.g. /pok-i/) the suffixal vowel is high and undergoes
dissimilation: it is [-back] in the context of a stem [back]
specification. Significantly, /a/ is neutral in this process in
that it cooccurs with both /u/ and /i/: /kar-i/ 'to rotate' and
/ram-u/ 'to think'.

We need, as Ito notes, one assumption in order to simplify the
analysis of the Aino melodic dissimilation: the assumption is that
/a/ lacks backness specifications. Beyond this, we must explain
why, of the five vowels of Aino, it is precisely /a/ which lacks
backness values. The reason is that backness is non-distinctive,
i.e. a R-value, only in the low range.

2.2.2. Tamil glide-vowel sequences

According to Christdas (1986), the Tamil front vowels (e,i) do
not occur underlyingly (i.e. morpheme-internally, before
phonological rules apply) after the front glide /y/. Nor do the
back vowels (o,u) occur in underlying representations after the
back glide /w/. In contrast, the unique low vowel of Tamil can
occur underlyingly after both /y/ and /w/. The behavior of /a/ in
the disharmony constraint discussed by Christdas is again
attributable to the absence of its redundant [back]
specifications.

The interest of the Tamil data extends further: as in the case
of the Ngbaka height disharmony, the Tamil constraint holds of the
underlying representations. It is not a phonological rule, which
could be ordered relative to a redundancy rule, but rather a
constraint on underlying segment sequences: as such it must precede
all redundancy rules. Christdas points out that both the front
vowels (e,i,y) and the back ones (o,u,w) must be specified for
backness at the underlying stage when this disharmony applies. In
our terms, this shows that both D-values for [back] must be present
underlyingly. The extent of underspecification for [back] in Tamil
appears then to be limited to the absence of the R-value: that of
/a/.

2.3. Redundant [back] values in Hungarian

Hungarian has a much discussed rule of harmony involving the
feature [back]. Within native roots vowels may belong to either of
the two sets (o(:),u(:),a(:)), (ö(:),ü(:)) but not to both. The
vowels of a third set (e(:),i(:)) may co-occur within native roots
with any vowel: /peida/ 'example', /tömeg/ 'crowd', /bika/ 'bull',
/rövid/ 'short'. This third set is generally referred to as
neutral. Non-native roots have no restrictions on vowel
co-occurrence: /büro:/ 'bureau', /parfüm/ 'perfume'.

Suffixal vowels agree with the backness of the last stem vowel,
when this vowel is non-neutral: /büro:-nak/ 'bureau-DAT',
/parfüm-nek/ 'perfume-DAT'. Matters are more complex when the last
stem vowel belongs to the set of (e(:),i(:)). Kontra and Ringen

/ or /i(:)/ preceded by a
 /papir-naK/ 'paper-DAT',
 /e:it-naK/ 'meeting-DAT'.
 of lexical items and for
 absolutely. On the other
 ich contain back vowels
 nt suffixes. Kontra and
 earlier findings (1978,
 it transparent to [back]
 : /i(:)/, /e:/ are.

should be a disparity
 ort neutral segments of
 hile long /e:/ is. The
 i between D-values and

Long vowels		
front		back
-R	+R	
i:	ü:	u:
e:	ö:	o:
		a:

disparity between the long
 the low and mid short
 (=e/) opposed to [ɔ] (=o)
 ng vowel system has no
 direct back counterpart
 l, in both the long and
 non-distinctive among
 /i:/ have direct back

is not neutral: /e/ is
 longs to the D-class of
 erpart and it therefore
 ystems studied so far,
 ically belong to the
 e neutral, because they
 el. In this case too,
 tral behavior.

a:/ as belonging to the
 ct that /a:/ does not
 s fact one may have to
 be established between
 owels of Hungarian all
 l vowels of this class
 s of Hungarian harmony

along the following lines:

(9)

Stage a: Underlying representations: all D-values for [back] are present. Vowels specified at this stage:

(a, e, o, ö, u, ü, o:, ö:, u:, ü:).

Stage b: R-rule 1: [+low] → [+back]

Vowels specified at this stage:

all of the above plus /a:/.

Stage c: Harmony (iterative, feature-changing):

[αback] [βback]

U ... U

Stage d: R-rule 2: [-low, -round] → [-back]
 (affects /i/, /i:/, /e:/)

Aside from the relative order between harmony and the redundancy rules of Hungarian, the analysis above relies on a number of assumptions that need spelling out. First, I adopt Farkas and Beddor's (1987) conclusion that both [+back] and [-back] must be spread by harmony: Farkas and Beddor show that harmony must take place both in forms like /büro:-tol/ and in forms like /parfüm-tol/. In each of these cases, the last stem vowel - one belonging to the D-class for [back] - is the one determining the backness of suffixal vowels. If both [+back] and [-back] values belonging to the D-class are present when harmony operates, harmony must be feature-changing. This conclusion had already been reached earlier by Vago (1976). Second, I follow Ringen (1980) and Kiparsky (1981) in assuming that neutralizing applications of harmony are prohibited morpheme internally by the Alternation/Strict Cycle Condition: this is why /büro:-töl/ becomes /büro:-tol/, rather than /*buro:-tol/. Third, I assume that structure preservation prohibits harmony from affecting the vowels of the R-class (cf. footnote 1). Finally, in order to account for the fact that stems consisting exclusively of neutral vowels take in general front suffixes (cf. Kontra and Ringen's (1986) experimental results), I assume that Hungarian suffixes are in the unmarked case specified as [-back].

2.4. The rounding of back vowels

In some of the most common vowel systems, the non-low vowels must be specified for either rounding or backness underlyingly but not necessarily for both. If the system is a standard triangular one (a,e,o,i,u), the rounding of (o,u) can be predicted from their backness by a rule such as [+back] → [+round] (3); alternatively, backness can be predicted from rounding by the inverse statement [+round] → [+back]. It appears however that, when there is a choice, one must count [round] values as redundant and [back] values as underlying rather than vice versa. I sketch next a demonstration of the fact that [round] is missing in such systems from derivationally early representations.

2.4.1. Maori

Like other Malayo-Polynesian languages, Maori (Krupa 1968) prohibits the morpheme-internal co-occurrence of labial segments: morphemes of the shape /mʌpʌ/, /mʌwʌ/, /wʌpʌ/, /whʌmʌ/, /wʌwhʌ/, /pʌmʌ/ do not occur.

Within the triangular vowel system of Maori, the roundness and backness of (o,u) stand in the mutually predictable relation mentioned above: they can be analyzed as being either basically round or as basically back, with derived rounding, or, denying underspecification, as underlyingly both round and back. The ban against co-occurring labial segments provides us with grounds for choosing between analyses. A first relevant fact is that the rounded vowels (o,u) are not incompatible with tautomorphic labials and not incompatible with each other. A second observation is that a sequence of labial consonants separated by a rounded vowel is as ill-formed as one in which the labials are separated by unrounded vowels: neither /*mawa/ nor /*mowa/ occur. Both observations suggest strongly that the labiality of (o,u) is simply absent at the stage when the constraint against morpheme-internal labial sequences is active. Given the possibility to analyze the vocalic labiality as an R-value, its underlying absence is not surprising.

Evidence confirming this suggestion comes from Cantonese, a language in which redundant rounding coexists with distinctive rounding.

2.4.2. Cantonese

The following is a summary of Yip's (1987) account of Cantonese Labial disharmony, with a few added comments of my own concerning the status of various [round] specifications.

Cantonese has a set of labial segments (p,f,m,w), a set of front rounded vowels (y, ö, Ö) and a set of back rounded vowels (u, U, o, O). (Capitals, as before, designate lax vowels.) The vowel inventory of Cantonese includes, in addition, the front unrounded (i, I, e, E), and the low tense and lax vowels (a, A). Note that all non-low back vowels are rounded but not all rounded vowels are back in this language. So the statement [+back] → [+round] is still appropriate, while the statement [+round] → [+back] is not, or at least not as a statement about directly observable distributional restrictions. Cantonese is then a language in which the rounding of back vowels is transparently and unambiguously an R-value. It is also, as Yip shows, a language in which redundant rounding is absent underlyingly.

There are three apparently distinct Labial disharmony constraints operating within a Cantonese syllable: an onset Labial may not be followed by a front rounded vowel (Ö, ö, y); a rounded vowel, front or back, may not be followed by a Labial consonant; an onset Labial may not be followed by a coda Labial. The first constraint rules out syllables like /pö/ but allows /po/. The second rules out /öp/ as well as /op/. The third eliminates sequences like /pam/. Yip argues that a single constraint underlies all three prohibitions:

(10)
* [...Lab Lab...]₀

This constraint is active at the relevant segment specifications are introduced into the front rounded vowel deduced from their back syllables are formed, the labial values present at ill-formed while /po/ is acceptable. Next, the R of this stage both /o/ and incorporation of codas consonant cannot be incorporated into a /pʌ/

The important point here of syllabification, when the front vowels (Ö, ö, labiality. The redundant absent at that stage.

2.5. R-values for ATR

If a vowel system utilizes a low vowel with two high vowels, a front [+ATR]. We have then two of ATR: one is expressed other by [+high] → [+ATR] the ATR value of low applies, the ATR value both statements may apply (1986) discuss the case neutrality in ATR harmful [+ATR] specifications. language in which the absent.

2.5.1. Kinande

Recently, Schindwein language spoken in Zaire which low vowels are in triangular, with ATR dist

(11)
i u
I U
e o
E O
 a

There are two ATR harm

es, Maori (Krupa 1968)
ence of labial segments:
/wʷpʷ/, /whʷmʷ/, /wʷwhʷ/,

Maori, the roundness and
lly predictable relation
s being either basically
ed rounding, or, denying
round and back. The ban
ides us with grounds for
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comes from Cantonese, a
oexists with distinctive

987) account of Cantonese
ents of my own concerning
ns.

(p,f,m,w), a set of front
: rounded vowels (u, U, o,
ax vowels.) The vowel
tion, the front unrounded
vowels (a, A). Note that
ot all rounded vowels are
t [+back] → [+round] is
round] → [+back] is not,
out directly observable
; then a language in which
ntly and unambiguously an
nguage in which redundant

inct Labial disharmony
syllable: an onset Labial
owel (Ō, Ǫ, ʸ); a rounded
by a Labial consonant; an
coda Labial. The first
/ but allows /pʷ/. The
/. The third eliminates
at a single constraint

(10)
*[...Lab Lab...]_g

This constraint is activated in different ways depending on when the relevant segments are syllabified and when their Labial specifications are introduced. Thus, the underlying Labials are the front rounded vowels (the vowels whose rounding cannot be deduced from their backness) and the labial consonants. When CV syllables are formed, the first stage in syllabification, the only labial values present are the underlying ones: this is why /pʷ/ is ill-formed while /pʷ/ (a /p/ followed by a mid back vowel) is still acceptable. Next, the R-rule specifies back vowels as round: after this stage both /o/ and /ō/ will count as Labials. The syllabic incorporation of codas takes place after this stage: a labial consonant cannot be incorporated into a /Cō/ or /Co/ syllable, because this would now violate (10). Nor can a labial coda be incorporated into a /pʷ/ syllable, for the same reason.

The important point here is the fact that at the earliest stage of syllabification, when CV units are formed, only the rounding of the front vowels (Ō, Ǫ, ʸ) is incompatible with consonantal labiality. The redundant [round] value of the back vowels is absent at that stage.

2.5. R-values for ATR

If a vowel system utilizes ATR distinctions and has a single low vowel, the low vowel will be [-ATR]. If a vowel system has only two high vowels, a front and a back one, both will invariably be [+ATR]. We have then two potential limitations on the distribution of ATR: one is expressed by the statement [+low] → [-ATR], the other by [+high] → [+ATR]. If the first statement is appropriate, the ATR value of low vowels is redundant; if the second one applies, the ATR value of high vowels is redundant. Obviously, both statements may apply to any given language. Cole and Trigo (1986) discuss the case of Bari suffixal high vowels, whose neutrality in ATR harmony can be related to their predictable [+ATR] specifications. I will examine here the facts of Kinande, a language in which the redundant [-ATR] value of low vowels is absent.

2.5.1. Kinande

Recently, Schlindwein (1987) has shown that Kinande, a Bantu language spoken in Zaire, has an ATR harmony rule with respect to which low vowels are transparent. The Kinande vowel system is triangular, with ATR distinctions among the non-low vowels:

(11)

i	u
I	U
e	o
E	O
	a

There are two ATR harmonies, but only one displays the effect of

interest here. This rule spreads [+ATR] leftward onto mid and high vowels. It does not affect a low vowel, nor is it blocked by it.

(12)

a. s010m - irE --> solom - ire 'harvest-past'
 | |
 +ATR +ATR

b. s010m - an - irE -> solom - an - ire 'harvest-reciprocal-past'
 | | |
 +ATR +ATR +ATR

For lack of space, I cannot discuss here Schindwein's analysis of this process. My own suggestion is that the neutral status of Kinande /a/ follows from the distinction between D-values and R-values proposed here: in Kinande, the ATR specification of the low vowel is redundant because no ATR contrast exists within the relevant height range. Moreover, Kinande /a/ is the only vowel with a redundant specification for ATR: all other vowels are "paired" in their ATR values and thus belong to the D-class. Confirming this is the observation that /a/ is never transparent in systems where it has a [+ATR] counterpart, such as Igbo (Ringen 1979) and Bari (Hall and Yokwe 1978).

2.6. R-values for [anterior]

A clear instance of missing R-values is found in the sibilant harmony rule of Ineseño Chumash. My source on this language is Poser (1982), whose data comes from the unpublished dissertation of R.B. Applegate.

Chumash has a lexical contrast between /s̥/ and /s/: the differentiating feature is, according to Poser, [anterior]. There is no corresponding contrast between the Chumash coronal stops: /t/, /l/ and /n/ come in only one variety, all three being alveolar.

Within a word, the rightmost sibilant, /s̥/ or /s/, triggers [anterior] harmony onto preceding sibilants:

(13)

- a. k-sunon-us 'I obey him' : k-s̥unon-s̥ 'I am obedient'
 b. us̥la 'with the hand: us̥la-siq 'to press firmly by hand'
 c. uqsti 'of throwing': s̥-ux̥sti-meš 'throw over to'

Intervening segments are transparent to the sibilant harmony. In particular, the coronals /t/, /n/, and /l/ fail to block or trigger the rule:

(14)

- a. s̥-api-t̥s̥o-it 'I have good luck'; s-api-tso-us 'he has good luck'
 b. k-s̥unon-s̥ 'I am obedient'; k-sunon-us 'I obey him'
 c. ha-s-xintila 'his Indian name'; ha-s̥-hintila-was̥ 'his former Indian'

Note that underlying /s̥/ is turned to /s/ (as in (13)b) and

underlying /s/ is indicates that both harmony operates. If the [+anterior] feature is transparent at the sibilant that in the Chumash R-class for [anterior] formula [+coronal, emerges again as a mi

2.7. R-values for

The distribution of of sonorants in segments lack obstruents with sonorants, the vocoic that lateral airflow than that defining, universally perhaps, one class of segments associate: the cons liquids. This is the feature co-occurrence obstruents as R-class.

Consider now the w the adjectival suffix /-aris/ when preceded /milit-aris/ 'militar fails only when the intervening /r/: /fio /litor-alis/ 'of the liquids inside the stem in /reticul-aris/ 'of I assume, as elsewhere adjacency between elements of [lateral] specificity non-lateral segments dissimilation applies value blocks dissimilation stem and suffixal /l/

(15)

[+lat] [-lat]
 | |
 l i t o r -

Since no other non-block dissimilation, c for [lateral]. This non-liquids are red [-lateral] specificity reason why the non-l Latin should ever be

that this is a case of trivial underspecification.

2.8. Redundant laryngeal features

The redundant status of sonorants relative to the feature [voice] has already been mentioned here. I will outline now the evidence that R-values for [voice] are missing underlyingly.

2.8.1. Lyman's Law and Rendaku in Japanese

Ito and Mester (1986) have provided an explicit argument that sonorants are unspecified for [voice] in Japanese. The Japanese consonant inventory is identical in relevant respects to (3) above: only voiced sonorants occur. Ito and Mester's argument is based on the interaction between a voicing dissimilation (Lyman's Law, LL) and a rule which voices stem-initial obstruents in the second member of compounds (Rendaku, R). Lyman's Law is responsible for the fact that no two voiced obstruents can surface within a stem; and for the apparent failure of Rendaku in precisely the case where its output would contain a stem-internal sequence of two voiced obstruents. The latter fact is illustrated below:

(16)

- a. /garasu tana/ 'glass shelf' → garasu dana (R)
 b. /kami kaze/ 'divine wind' → kami gaze (R) → kami kaze (LL)

As the contrast between /garasu dana/ and /kami kaze/ indicates, a voiced sonorant like /n/ does not trigger Lyman's Law: Ito and Mester attribute this to the fact that its [voice] value is still missing at the relevant stage. Confirming this suggestion is the observation that when /n/ separates two voiced obstruents, Lyman's Law applies, as if their [+voice] autosegments are directly adjacent:

(17)

- a. /taikutsu ŷinogi/ 'time killing' → /taikutsu jinogi/ (R) →
 → taikutsu ŷinogi (LL).
 b. [+voice] [+voice] [+voice]
 | | |
 j i n o g i → ŷ i n o g i

3. Missing D-values

It is a common assumption in the recent literature on underspecification that only one value of any given feature may be present underlyingly. In many cases this entails that some segments with D-values for the relevant feature must be underlyingly unspecified for it. For instance, if we take [+voice] as the underlying value, the voiceless obstruents of Japanese must be represented as unspecified. Similarly, this entails that if [+lateral] is underlying, then the [-lateral] value of /r/ must be absent in the early stages.

I have suggested earlier, following in this Christdas (1986), that both D-values must sometimes be present underlyingly. I will examine now what appear to be the strongest cases for missing D-values. As it turns out, only two clear arguments of this sort

have so far been found.

3.1. Voiceless obstruents

Ito and Mester (1986) determine whether a J is for [voice]. If it is, if it is not, it will be are, by this test, u [g...t...b], /g/ underg /t/.

(18)

- a. /onna kotoba/ 'feminine language'
 b. [+voice] [+voice]
 | |
 g o t o b a

I see no alternative voicing value of Japanese. Lyman's Law operates.

3.2. Front vowels in Finnish

In what follows I will discuss Finnish [back] harmony distinctive and redundant surface vowel qualities respect to [back]: (a, ä) no direct [+back] counting harmony rule propagating not triggered or blocked similar to Hungarian:

(19)

- a. talo-ssa 'house-iness'
 b. lume-ssa 'snow-iness'
 Pariisi-ssa 'Paris-iness'

Native stems are generally either all back or mixing freely the vowels

(20)

- a. marttyri 'martyr', jo
 b. syntaksi 'syntax', ty

According to Campbell whose last non-neutral vocalic suffixes: both / acceptable, in different learned, more prestigious colloquial. In contrast last non-neutral vowel

Campbell (1980) and Kiparsky (1981) report that /följätongi-ä/, /tyranni-kö/ are definitely impossible pronunciations. It appears that, until recently, the low front vowel /ä/ had an effect similar to that of back vowels: a disharmonic stem whose last non-neutral vowel was /ä/, would take exclusively front suffixes. This is the pattern described by Campbell: /hydrosfääri-ä/ but */hydrosfääri-a/. Paul Kiparsky, however, informs me that in contemporary Finnish front /ä/ behaves like /ö/ and /y/: all three are disregarded by harmony, if a back vowel precedes them. The generalization is then, at least for this recent variety of Finnish, that all front vowels optionally behave as neutral segments in disharmonic stems. The only obligatorily neutral vowels are the unpaired (e,i), the R-class for [back].

There are then two patterns to account for: the prestigious /analyysi-a/, /följätongi-a/ and the colloquial /analyysi-ä/, /följätongi-ä/. Kiparsky (1981) points out that the only difference between the two is whether front, non-neutral vowels are transparent or opaque. The shared characteristic of the two styles, the impossibility of */följätongi-ä/, reveals that back vowels are invariably opaque. This suggests that only [+back] is underlyingly present, as shown below:

- (21)
- | | |
|------------------------|----------------------------|
| a. a n a l y y s i - a | b. f ö l j e t o n g i - a |
| | |
| [+back][+back] | [+back] |

To account for the prestigious pattern, in which both (a) and (b) will surface with suffixal back vowels, one need only assume that the representations in (21) are the input to harmony:

- (22)
- | | |
|------------------------|----------------------------|
| a. a n a l y y s i - a | b. f ö l j e t o n g i - a |
| | |
| [+back][+back] | [+back] |

Kiparsky explains the fact that [+back] spreads only across the morpheme boundary rather than stem-internally (*/analuusi/, */foljätongi/) by assuming that harmony is cyclic, subject to the Strict Cycle. The derivation is completed by specifying as [-back] the vowels untouched by harmony.

To derive the alternative paradigm /foljätongi-a/, /analyysi-a/, Kiparsky postulates that the front non-neutral vowels are opaque in the colloquial style: although still unspecified for [back], they cannot be crossed by harmony:

- (23)
- * [+back]
- / \
- V V_i V, where V_i is a non-neutral vowel (ä, ö, y)

The spirit of Kiparsky without filters like (2) describe the opacity of. Rather, the colloquial s all D-values are present the input representation as shown in (24):

- (24)
- | |
|-----------------------|
| a. a n a l y y s i - |
| |
| [+back][+back][-back] |

Harmony in both sets possibility we have explored observe that only the suffixal specification: cyclicity, which prevent crossed association lines:

Kiparsky's analysis of argument for missing D-values no straightforward extension of Finnish described by all back vowels are opaque

3.3. Round harmony in Mongolian has seven transcribed as (a, e, o, front (ö, ü) are in fact front. This indicates, that the Mongolian "front" values. In this harmony /e/. With this in mind, the features ATR, [round]

- (25)
- | | | |
|--------|-------|------|
| | | -ATR |
| round | high | u |
| | -high | o |
| -round | high | |
| | -high | a |

From this classification /u/ for [round]. Looking the structural isomorphism and the Mongolian system unique segment, /i/. It only transparent vowel in

- (26)
- | |
|---------------------------|
| a. uls-aas 'from the coun |
| b. ger-ees 'from the hous |

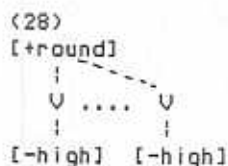
- c. saz-l-xii-l-aad 'having shaken violently';
 nugi-xii-l-aad 'having folded'
 d. düliig-ees 'from the mute'

The suffixal alternations caused by ATR harmony are illustrated in (26), with data from Djamouri and Rialland (1985). The forms in (c-d) indicate that /i/ is transparent.

We may consider now the more problematic case of Mongolian Round harmony. The fact is that in this case we have an unexpected transparent segment: /i/.

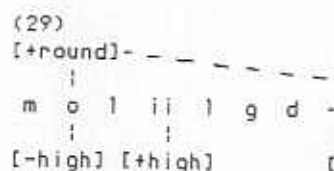
- (27)
 a. tögl-ööd 'having played'; odoog-g-ooos 'from now on';
 tör-öös 'from the state'
 b. ob-r-xii-l-ood 'having seemed furious';
 mol-ii-lg-ood 'having flattened'
 c. oduul-aad 'having sent'; ögүүл-үүл-eed 'having made speak'

The forms in (a) illustrate the basic [round] alternations. Those in (b) show that /i/ is transparent and that it fails to undergo [round] harmony. Those in (c) show that /ü/ and /u/ are opaque and that they fail to trigger [round] harmony. Leaving aside for the moment the characterization of transparent and blocking segments, let us simply note that [round] harmony operates in Mongolian only between non-high vowels.

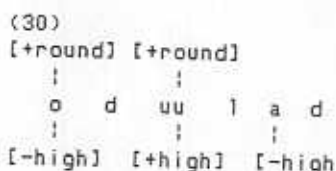


It is clear that the distinction between D-values and R-values cannot help explain why /i/ is transparent while /u/ and /ü/ are opaque. If anything, the line of argument pursued in the preceding sections would make one expect that only /u/ should be transparent, as it is the only vowel whose [round] specifications are predictable: [+high, -ATR] → [+round]. Every other vowel has its [-round] counterpart. Let us admit then that harmony operates in this case after the redundant roundness of /u/ has been introduced.

We must still explain the behavior of /i/. One option would be to assume that distinctive [-round] values are absent when harmony takes place. This will mean that all unrounded vowels are unspecified for [round] at that stage. A non-high unrounded vowel will be a target of harmony, as (28) states. A high unrounded vowel will not be a target but neither will it block the rule, as a derivation of /moliilgd-ood/ indicates:



Finally, the vowels / are non-triggers specific blocker sequence in /odu

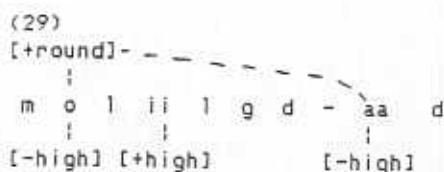


It appears then that Mongolian must rely on. However, unlike featur [lateral], [round] does. There are no instances and no other kind of specification for this trivial underspecificati absence of D-values.

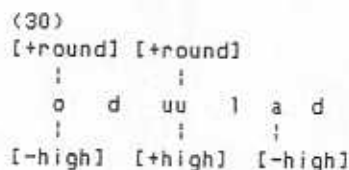
By deciding that [rou assumption of language-s introducing R-values an Finnish front harmony re (i,e) be introduced afte the former is absent w present, at least in Mongolian R-value for [[round] harmony applies. introduced at some poi indicated above. Thi double-valued forces us R-rules and D-rules is a [round] fails to posse arise.

I conclude from this the need for non-trivial: 4. Conclusion

The picture emergin significant respects fro work on underspecificat Archangeli and Pulley differences.



Finally, the vowels /u/ and /ü/ will block harmony because they are non-triggers specified as [+round]. (30) below represents the blocker sequence in /oduulaad/:



It appears then that an optimal analysis of [round] harmony in Mongolian must rely on the absence of the D-value [-round]. However, unlike features like [back], [high], [anterior] and [lateral], [round] does not appear to be a double-valued feature. There are no instances of [-round] assimilation or dissimilation and no other kind of evidence that unrounded segments have any specification for this feature. Mongolian may then illustrate trivial underspecification for [round], rather than the non-trivial absence of D-values.

By deciding that [round] is single-valued we can also avoid the assumption of language-specific orderings between redundancy rules introducing R-values and D-values. Recall that the analysis of Finnish front harmony requires that the redundant [-back] value of (i,e) be introduced after the distinctive [-back] value of (ä,ö,γ); the former is absent when harmony applies whereas the latter is present, at least in the colloquial style. In contrast, the Mongolian R-value for [round], that of /u/, must be present when [round] harmony applies. If we assume that the D-value [-round] is introduced at some point, this must happen after harmony, as indicated above. Thus, the assumption that [round] is double-valued forces us to stipulate that the relative order of R-rules and D-rules is a language specific matter. In contrast, if [round] fails to possess a second value, this issue does not arise.

I conclude from this that Mongolian harmony fails to establish the need for non-trivially absent D-values.

4. Conclusion

The picture emerging from this survey differs in some significant respects from that presented in some of the more recent work on underspecification, especially in Archangeli (1984) and Archangeli and Pulleyblank (1986). Let us review these differences.

harmony are illustrated and (1985). The forms in

case of Mongolian Round we have an unexpected

om now on';

'having made speak'

c [round] alternations. nt and that it fails to ow that /ü/ and /u/ are round] harmony. Leaving ion of transparent and [round] harmony operates

en D-values and R-values nt while /u/ and /ü/ are : pursued in the preceding /u/ should be transparent, und] specifications are Every other vowel has its that harmony operates in ness of /u/ has been

/i/. One option would be s are absent when harmony 1 unrounded vowels are non-high unrounded vowel tates. A high unrounded l it block the rule, as a

We have seen here that the linguistically significant boundary is that separating distinctive and non-distinctive assignments of feature values. Thus, Latin liquid dissimilation distinguishes two types of [-lateral] values: the distinctive one (that of /r/) and the redundant one (that of the non-liquids). Finnish [back] harmony distinguishes two types of [-back] values: the distinctive one (that of (ä, ö, y)) and the redundant one (that of (i, e)). Similarly, Kinande ATR harmony requires special status for /a/, the only vowel whose ATR specification is non-distinctive. Finally, Chumash sibilant harmony distinguishes two types of [+anterior] segments: the sibilant /s/, whose anteriority is distinctive, and the stops, whose anteriority is redundant.

The alternative distinction proposed by Archangeli and Pulleyblank, that between Default assignments predictable from universal facts and Complement assignments predictable from language specific facts appears to play no role in the functioning of phonological systems that I am aware of. This distinction would, for instance, separate the [lateral] specifications of vocoids and nasals from that of other segment classes: vocoids and nasals are, perhaps, universally non-lateral whereas other segments, such as the obstruents and the liquids, have language specific assignments of [lateral]. As we have seen, however, the language specific non-laterality of obstruents is as irrelevant in Latin as the universal non-laterality of nasals and vowels. Similarly, the distinction between universally mandated feature values and language-specific ones is not the appropriate one for Chumash [anterior]: markedness facts require us to set up [-anterior] as the marked value and thus dictate, in Archangeli and Pulleyblank's terms, a Default rule of the form [] → [+anterior]/ [+coronal]. But this approach will incorrectly lump together Chumash /s/ and /t/ by specifying them simultaneously. What is needed is a stage where both /s/ and /t/ are specified, but not yet /t/.

At the outset of this search for evidence of underspecification I had decided to rely primarily on the typology of transparent segments. In a number of cases, my conclusions about missing values were also drawn from the typology of non-triggers: segments which are expected to trigger a rule by virtue of their surface specifications for some feature yet fail to do so. Both types of evidence support the idea that R-values are missing underlyingly.

In contrast, there is little evidence for missing D-values. First, we have seen that in some cases both D-values for a feature must be present in underlying lexical entries (cf. sections 2.1.3 (Ngbaka) and 2.2.2 (Tamil)). Second, the clear-cut arguments for the elimination of D-values from underlying representations reduce to two: the voicing of Japanese obstruents and the backness of Finnish non-neutral vowels (4). The disparity between the strength of the case for underspecification of R-values and D-values is striking and invites reanalysis of the Finnish and Japanese data. I have no clear suggestions on this score at present but it seems possible to experiment with the idea that the appearance of missing

D-values may be the effect of Finnish [back] acting on a basis.

As a final remark, the relations expressed by Kawasaki (1987) point to a distinction between the backness of [-round] and [+round] which reflect different sorts of relative segment class definitions ([consonantal], [sonorant], [content] feature has an instance [voice] has sonorants; [lateral] of obstruents and vowels within the class of coronal obstruents, continuant vowels, within the class of redundant relative no unambiguous cases for feature be restricted to a content feature such as [voice]. For instance, I know [+sonorant] or where that, aside from R-rules one other type of R-rules is a stricture feature able to extend this process systems, we must extend height as well: this is [low] define relative [sonorant], [consonantal] among consonants. The restrictions such as []

This proposal has the possibility of dealing with the case I have in mind that of Nyangumata. Pulleyblank (1986:305) lists the following values:

(31)

	a	i	u
high		+	
round			+

In choosing to leave the [+high] value of [] it is the only [+round] [+high]. Yet both []

ally significant boundary distinctive assignments of bilabial distinguishes two values: one (that of /r/) and one (that of /r/) and liquids). Finnish [back] values: the distinctive one (that of /i,e/), the special status for /a/, the non-distinctive. Finally, two types of [+anterior] priority is distinctive, and

ed by Archangeli and segments predictable from segments predictable from a role in the functioning of. This distinction [lateral] specifications of segment classes: vocoids and [-lateral] whereas other liquids, have language have seen, however, the segments is as irrelevant in of nasals and vowels. universally mandated feature the appropriate one for require us to set up dictate, in Archangeli and the form [] -> [+anterior]/ incorrectly lump together simultaneously. What is are specified, but not yet

nance of underspecification typology of transparent conclusions about missing of non-triggers: segments virtue of their surface to do so. Both types of missing underlyingly. for missing D-values. with D-values for a feature (cf. sections 2.1.3) clear-cut arguments for representing reduce segments and the backness of priority between the strength R-values and D-values is Finnish and Japanese data. at present but it seems the appearance of missing

D-values may be the effect of features such as Japanese [voice] and Finnish [back] acting as single-valued on a language specific basis.

As a final remark, I would like to speculate on the nature of the relations expressed by R-rules. As Stevens, Keyser and Kawasaki (1987) point out, some of these relations, such as the one between the backness of non-low vowels and their roundness ([+back] -> [+round]) reflect enhancement of perceptual salience. A different sort of relation expressed by R-rules takes as input a segment class defined in terms of stricture features ([consonantal], [sonorant], [continuant]) and states that a "content" feature has defective distribution within it. For instance [voice] has restricted distribution within the class of sonorants; [lateral] has restricted distribution within the class of obstruents and vocoids; [coronal] has restricted distribution within the class of continuant obstruents (in languages where all fricatives are coronals); [nasal] is restricted within the class of obstruents, continuant sonorants and, in languages lacking nasal vowels, within the class of vocoids. Interestingly, the opposite type of redundant relation is seldom if ever encountered: I know of no unambiguous cases requiring that the distribution of a stricture feature be restricted within a segmental class defined in terms of a content feature such as [coronal], [back], [labial] or [voice]. For instance, I know of no language in which all coronals are [+sonorant] or where all labials are [+continuant]. Suppose then that, aside from R-rules stemming from enhancement, there is only one other type of R-rule: it takes the form [α F] -> [PG], where F is a stricture feature and G is a content feature. In order to be able to extend this proposal to the R-rules observable within vowel systems, we must extend the term stricture feature to cover vocalic height as well: this seems natural, in that the features [high] and [low] define relative sonority among vowels, in the same way that [sonorant], [consonantal] and [continuant] define relative sonority among consonants. We can now express frequently encountered restrictions such as [+low] -> [+back], or [+high] -> [+ATR].

This proposal has a welcome empirical consequence: it excludes the possibility of defining an R-rule such as [+round] -> [+high]. The case I have in mind is a three-member vowel system (a,i,u) like that of Nyangumata. In analyzing such a system, Archangeli and Pulleyblank (1986:305) use two features, [high] and [round], and the following values:

(31)

	a	i	u
high		+	
round			+

In choosing to leave /u/ unspecified for height they remark that the [+high] value of this segment is predictable from the fact that it is the only [+round] vowel in the system: thus [+round] -> [+high]. Yet both /i/ and /u/ function as high throughout the

phonology of Nyangumata. More significantly, I know of no comparable system in which one surface high vowel functions as phonologically lacking in height values while the other one behaves as [+high]. This problem is not specific to Archangeli and Pulleyblank's theory of underspecification: the logic of the distinction between D-values and R-values made in (5) would also force one to leave out the height value of /u/ from a system based on the features [high] and [round]. Superficially, the relation between [round] and [high] in Nyangumata seems identical to that between [low] and [back] in Tamil and Ainu: yet, while we have good evidence that a unique low vowel is [0back] in Tamil, Ainu and elsewhere, we have no evidence that a unique rounded vowel is [0high] in systems like Nyangumata. The solution to this problem is to recognize that the statement [+round] → [+high] reverses what appears to be a constant relation between stricture and content features. This observation may provide the grounds for its exclusion.

Footnotes

(1) The fact that low vowels do not undergo height harmony should be interpreted along the lines suggested by Kiparsky (1985) and Ito and Mester (1986): a segment which cannot bear an underlying specification for F (in this case [high]) cannot be subject to a lexical rule that assigns it a value for F. This condition is referred to as structure preservation.

(2) The lax vowel /E(:)/ also fails to undergo height harmony (/KetE:skuahtemowaw/ 'your door') and blocks it (/ke:wE:tuaq/ 'when they go home'). See Cole and Trigo (1986) for a possible explanation of this phenomenon.

(3) The rule [+back] → [+round] need not to be restricted to non-low vowels if we assume that the redundant backness of /a/ is not considered.

(4) The picture may change somewhat when tonal underspecification is evaluated in light of the distinctions proposed here. In contrast, the underspecification for [nasal], a feature not discussed here, is unlikely to alter my conclusions: as Lauren Trigo (p.c.) points out, [nasal] specifications in most consonant systems may fall into the class of R-values, by being predictable from features such as [sonorant] and [consonantal]. If this hypothesis is upheld, then the frequent existence of transparent consonants in nasal harmony systems will simply strengthen the case for the underspecification of R-values, without providing further cases of missing D-values.

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icantly, I know of no high vowel functions as the other one behaves specific to Archangeli and the logic of the made in (5) would also f /u/ from a system based superficially, the relation seems identical to that is: yet, while we have good back] in Tamil, Ainu and unique rounded vowel is solution to this problem und] → [+high] reverses between stricture and divide the grounds for its

undergo height harmony tested by Kiparsky (1985) which cannot bear an case [high] cannot be it a value for F. This ervation. undergo height harmony ks it (/ke:wE:tuag/ 'when (1986) for a possible

not to be restricted to ndant backness of /a/ is somewhat when tonal it of the distinctions ification for [nasal], a alter my conclusions: as specifications in most of R-values, by being [l] and [consonantal]. If frequent existence of y systems will simply ion of R-values, without

in Yawelmani Phonology
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The categories of (vs. passive) constitute morphology. Opposition means of contrasting v with the so-called "Phonological classes are morphological gemination.

A glance at some of the problem of Arabic morphology, for example, the past passive, for example, the various vowel patterns where necessary in Arabic. Similarly, the pattern can be reduced to a simple

McCarthy's account reduces the vocalisms

These patterns are absent or more rules serving morphological or phonological example, is deleted in other than II, III, or stem-prefix t (V, VI).

Active *u-a-

Passive *u-a

The patterns of the past these deletes u in the is a negative-alpha rule for the final vowel in

Active *u-a-

Passive *u-a

This system is designed