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Privative and Equipollent Backness in Hungarian*

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Introduction

This paper shows the need for equipollent backness in Hungarian (section 1) and the consequences of equipollent backness for Hungarian palatal harmony (section 2).

We begin with a brief presentation of the facts. The vowel system of Hungarian is given in (1).

	SHORT			LONG			
	-Back -R	+Back +R	+Back +R	-Back -R	+Back +R	-Back -R	+Back +R
High	⓪	ü	u	⓪	ú		ú
Mid		ö	o	⓪	ó		ó
Low	⓪ [æ]		a [ɔ]			á	

The circled vowels are said to be neutral with respect to palatal harmony; the remaining vowels are harmonic. In terms of harmony, we distinguish the six root types given in (2) - (7). Most native roots fall into the harmonic category in (2).

- (2) Harmonic roots
- város (+ nak) 'city (+ dative)'
 - öröm (+ nek) 'joy (+ dative)'

Borrowed roots may be disharmonic, as in (3).

- (3) Disharmonic roots
- büro (+ nak) 'bureau (+ dative)'
 - parfüm (+ nek) 'perfume (+ dative)'

Roots whose only vowel is neutral fall into two categories, (4a) or (4b), depending on the suffix harmony that they trigger.

- (4) Neutral-Vowel-Only Roots
- híd (+ nak) 'bridge (+ dative)'
 - víz (+ nek) 'water (+ dative)'

The three remaining root types are 'mixed' in that a final neutral vowel (NV) is preceded by a harmonic vowel. We distinguish between Back - Neutral roots in (5) and Back - Neutral Sequence roots in (6) because they trigger different patterns of suffix harmony. In these roots, suffix vowel backness is determined by the number and height of the NVs.

- (5) Back - Neutral Roots
- papír (+ nak) 'paper (+ dative)'

- b. kávé (+ nak) 'coffee (+ dative)'
 c. hotel (+ nak/nek) 'hotel (+ dative)'

(6) Back - Neutral Sequence Roots

- a. analízis (+ nek/nak) 'analysis (+ dative)'
 b. ábécé (+ nek/nak) 'alphabet (+ dative)'
 c. november (+ nek) 'November (+ dative)'

The roots in (7) end in a NV preceded by a front harmonic vowel; as expected, they trigger front harmony.

(7) Front - Neutral Roots

- a. rövid (+ nek) 'short (+ dative)'
 b. közép (+ nek) 'middle (+ dative)'
 c. körte (+ nek) 'pear (+ dative)'

1. The need for equipollent backness

In recent work on vowel harmony in Hungarian, it has been assumed that phonetic backness is realized by a privative (or single-valued) autosegment [i] (see Goldsmith (1985) and van der Hulst and Smith (1986)). The major empirical advantage of this assumption is that it allows an account of back suffix harmony in the presence of root-final NVs without having to associate these phonetically front vowels with a [+B] feature. In both of the analyses mentioned above, that roots of the type in (4), (5), and (6) trigger back suffix vowels follows from the absence of a spreading [i] autosegment in the root; the back value of the suffix is assigned by default.

Note that any such analysis predicts that back vowels (BVs) do not affect harmony since they, just like consonants, do not contribute a backness feature to the harmonic tier. This means that BVs should neither trigger nor block harmony. We now turn to evidence against this prediction, looking first at cases where BVs appear to trigger back harmony and then at cases where they appear to block the spreading of front harmony.

1.1. Apparent spreading of [+B]

The apparent spreading of [+B] involves roots with NVs preceded by BVs. We will show that these roots behave differently from roots with only NVs and that a full account of the data cannot be had without reference to a [+B] autosegment.

The relevant data, sketched above in (4) and (5), are given in more detail in (8), which contrasts the harmonic behavior of root-final NVs not preceded by a BV (the cases under (a)) with the harmonic behavior of root-final NVs immediately preceded by a BV (under (b)). What emerges from these data is that BVs affect harmony. While the facts differ depending on the particular NV in question (i.e., the non-low vowels behave differently from /e/), the generalization valid for all the cases in (8) is that roots ending in a NV preceded by a BV are more compatible with BV

suffixes than roots ending in pattern is purely accidental [i] autosegment, since, u contribute anything to the b we consider the two analyses

(8) /i/, /í/

- a. NV-Only (follow suffixe
 víz + nek² 'w
 szív + nek 'h
 liszt + nek 'f
- b. Back-Neutral (fo
 papír + nak 'p
 fasírt + nak 'm
 kavics + nak 'p

/é/

- a. NV-Only (followe
 of 2 roc
 év + nek 'j
 ész + nek 't
 szél + nek 'v
- b. Back-Neutral (fo
 fazék + nak 't
 kávé + nak 'c
 pucér + nek 'r

/e/

- a. NV-Only (followe
 elv + nek 'l
 kert + nek 'l
 vers + nek 't
- b. Back-Neutral (fo
 few
 hotel + nak/nek
 Ábel + nak/nek
 hárem + nak/nek

In Goldsmith's approach autosegment [i] when they the other hand, in roots w and (9c), NVs are not assoc

- (9) a. [víznek] [

'coffee (+ dative)'
'hotel (+ dative)'

's
'analysis (+ dative)'
'alphabet (+ dative)'
'November (+ dative)'

fed by a front harmonic vowel;
ny.

'short (+ dative)'
'middle (+ dative)'
'pear (+ dative)'

ny in Hungarian, it has been realized by a privative (or e Goldsmith (1985) and van der r empirical advantage of this unit of back suffix harmony in hout having to associate these +B] feature. In both of the of the type in (4), (5), and allows from the absence of a root; the back value of the

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suffixes than roots ending in NVs not preceded by BVs. But this pattern is purely accidental in an analysis using only a privative [i] autosegment, since, under such an approach, BVs do not contribute anything to the backness tier. This becomes clear as we consider the two analyses mentioned above in more detail.

(8) /i/, /í/

- a. NV-Only (followed by FV or, for some 60 roots, BV suffixes)
- | | | | |
|-------------|----------|------------|----------|
| víz + nek | 'water' | híd + nak | 'bridge' |
| szív + nek | 'heart' | nyíl + nak | 'arrow' |
| liszt + nek | 'flower' | | |
- b. Back-Neutral (followed by BV suffixes only)
- | | |
|--------------|------------|
| papír + nak | 'paper' |
| fasírt + nak | 'meatball' |
| kavics + nak | 'pebble' |

/é/

- a. NV-Only (followed by FV suffixes, with the exception of 2 roots)
- | | |
|------------|---------|
| év + nek | 'year' |
| ész + nek | 'brain' |
| szél + nek | 'wind' |
- b. Back-Neutral (followed by BV suffixes only)
- | | |
|-------------|----------|
| fazék + nak | 'pot' |
| kávé + nak | 'coffee' |
| pucér + nek | 'naked' |

/e/

- a. NV-Only (followed by FV suffixes only)
- | | |
|------------|-------------|
| elv + nek | 'principle' |
| kert + nek | 'garden' |
| vers + nek | 'poem' |
- b. Back-Neutral (followed by vacillating suffixes, with a few exceptions accepting only FV suffixes)
- | | |
|-----------------|---------|
| hotel + nak/nek | 'hotel' |
| Ábel + nak/nek | 'Abel' |
| hárem + nak/nek | 'harem' |

In Goldsmith's approach, the NVs are associated with the autosegment [i] when they trigger front harmony, as in (9a). On the other hand, in roots which trigger back harmony, as in (9b) and (9c), NVs are not associated with any backness autosegment.

(9) a. [víznek]

[i]
|
víz + nAk

- b. [hídnak] híd + nAk -->
 híd + nAk (by Front Specification) -->
 híd + nak (by default)
- c. [papírnak] pApír + nAk -->
 pApír + nAk (by Front Specification) -->
 papír + nak (by default)

In these forms, the frontness of NVs is specified by a late, post-harmony, redundancy rule. Notice, however, that this approach does not rule out a root whose vowel configuration and harmonic behavior is as in (10), and yet no such root exists.

- (10) * [papírnek] [i]
 |
 pApír + nAk

Thus Goldsmith does not predict the distribution of [i]-bearing and non-[i]-bearing NVs, thereby failing to account for the difference between the (a) and (b) roots in (8). In the absence of a [+B] feature, the correct generalization cannot be captured.

In van der Hulst and Smith's analysis, neutral vowels which trigger front harmony contribute a floating, spreading [i], as in (11a). When NVs are 'transparent' (i.e., do not spread front harmony), they are lexically associated with [i], and lexically associated autosegments do not spread, as in (11b) and (11c).

- (11) a. [víznek] [i]
 |
 víz + nAk
- b. [hídnak] [i]
 |
 híd + nAk --> híd + nak (by default)
- c. [papírnak] [i]
 |
 pApír + nAk --> papír + nak (by default)

The problem again is that this approach cannot predict when a NV will have a lexically associated [i] and when it will not. It instead predicts non-occurring roots of the type in (12).

- (12) * [papírnek] [i]
 |
 pApír + nAk

We see, then, that in both analyses the fact that roots like *papír* or *kávé* are always followed by BV suffixes is accidental. Neither analysis can predict the pattern in (8), the major obstacle being the impossibility of referring to a [+B] autosegment.

1.2. Apparent blocking
 We turn now to case of front harmony and t which recognize only a relevant data are of non-alternating back suf

1.2.1. Disharmonic root:
 Disharmonic roots, problems for single-valt root itself, the [i] aut must be blocked from s Second, to account for forms like (13a) must b while the [i] in (13b) but not to the other roo

- (13) a. *büró* + nak
 b. *parfüm* + nek

Goldsmith's solution spreads only when associ His analysis of the data

- (14) a. [*bürónak*]

- b. [*parfümnek*]

Unfortunately, the pr abandon root harmony and roots form a distinct roo problem is posed by ro followed by a neutral (15), these roots invari

- (15) a. *rövid* + nek
 b. *közép* + nek
 c. *körte* + nek

To account for these dat vowel of each root in (1 accident, then, that n triggering back harmony.

- (16) * [*rövidnak*]

Front Specification) -->
(default)

Front Specification) -->
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that roots like papír
is accidental. Neither
the major obstacle being
autosegment.

1.2. Apparent blocking of front harmony by back vowels

We turn now to cases where BVs appear to block the spreading of front harmony and the problems such data raise for analyses which recognize only a single privative backness feature. The relevant data are of two types: disharmonic roots and non-alternating back suffixes.

1.2.1. Disharmonic roots

Disharmonic roots, like those repeated in (13), present two problems for single-valued feature analyses. First, within the root itself, the [i] autosegment of the front vowel of the root must be blocked from spreading to the back vowel of the root. Second, to account for suffix harmony, the [i] autosegment in forms like (13a) must be blocked from spreading to the suffix while the [i] in (13b) must be allowed to spread to the suffix, but not to the other root vowel.

- (13) a. büró + nak
b. parfüm + nek

Goldsmith's solution to these problems is to assume that [i] spreads only when associated with the final vowel of the root. His analysis of the data in (13) is therefore as in (14).

- (14) a. [bürónak] [i]
 |
 bUró + nAk
- b. [parfümnek] [i]
 | \
 pArfUm + nAk

Unfortunately, the price to be paid by this approach is to abandon root harmony and with it the intuition that disharmonic roots form a distinct root class in Hungarian. A more serious problem is posed by roots in which a harmonic front vowel is followed by a neutral vowel. As seen in (7), repeated here as (15), these roots invariably trigger front harmony.

- (15) a. rövid + nek 'short'
b. közép + nek 'middle'
c. körte + nek 'pear'

To account for these data, Goldsmith has to assume that the final vowel of each root in (15) is associated with [i]. It becomes an accident, then, that no roots have the configuration in (16), triggering back harmony.

- (16) * [rövidnak] [i]
 |
 rOvId + nAk

Finally, we note that, if only the [i] of the last root vowel spreads, we cannot account for the front variant of the suffix in (17c). The form *mamicinek* can only be explained by assuming spreading of a non-root [i]. Note furthermore that this non-root [i] cannot be assigned to either of the diminutive suffixes, since in the presence of only one such suffix (as in (17a) and (17b)), only the back variant of the dative, *-nak*, occurs. The front variant, *-nek*, in (17c) is a consequence of the cumulative effect of NVs, to which we will return below.

- (17) a. mam+i+nak 'mother + diminutive₁ + dat'
 b. mam+csi+nak 'mother + diminutive₂ + dat'
 c. mam+ici+nek/nak 'mother + dim₁ + dim₂ + dat'

We see, then, that Goldsmith's solution to disharmonic roots forces abandonment of root harmony and causes problems with forms in which front suffixes are not preceded by root-final front harmonic vowels.

Van der Hulst and Smith offer a different approach to disharmonic roots. They propose that the segmental boundaries of vowels in such roots project onto the harmonic tier, creating domains whose left boundaries are opaque to harmony but whose right boundaries are not, as in (18).

- (18) a. [bürónak]
$$b \begin{pmatrix} [i] \\ U \end{pmatrix} r \begin{pmatrix} \text{ } \\ \acute{O} \end{pmatrix} + nAk$$

 b. [parfümnek]
$$p \begin{pmatrix} \text{ } \\ A \end{pmatrix} r f \begin{pmatrix} [i] \\ U \end{pmatrix} m + nAk$$

An advantage of this approach is that root harmony need not be abandoned. A serious disadvantage, however, is that the projection mechanism lacks independent motivation and is unnecessarily powerful, at least for Hungarian. For example, once again we see that the harmonic behavior of the roots in (15) is accidental. Nothing prevents a non-occurring root configuration like that in (19), which would trigger a back suffix vowel. (Recall that a lexically associated [i] does not spread.)⁴

- (19) * [rövidnak]
$$r \begin{pmatrix} [i] \\ \text{ } \\ O \end{pmatrix} v \begin{pmatrix} [i] \\ \text{ } \\ I \end{pmatrix} d + nAk$$

1.2.2. Non-alternating suffixes

As a final argument against a single-valued backness feature for Hungarian, we consider suffixes that are invariably back, like the diminutive *-kó* in (20).

- (20) a. Gyur + kó
 b. Fer + kó

To handle *-kó* in an a) need to block the [i] spreading to the suffix root must be analyzed i triggers front vowels i would presumably block segmental backness of i tier, as in (21).

- (21) [ferkónak]

We do not, however, see for (20b). One possibility that *-kó* is preceded b harmony. But in the c independent motivation f the basis of the data gi privative backness featu it solves.

2. Alternative solution

From the data prese an equipollent back aut problems for the analysi is non-distinctive, cann (as in van der Hulst and as shown in (22), lexi crossing association lin

- (22) +B [i]
$$\begin{array}{c} | \\ p \ A \ p \ \acute{I} \ r \ + \end{array}$$

Second, if association distinguish the transpar in *papírnak* from the (rounded) vowels (as in. The obvious alterna is to assume that NV ba rule, as in (23).

- (23) +B
$$\begin{array}{c} | \\ p \ A \ p \ \acute{I} \ r \ + \end{array}$$

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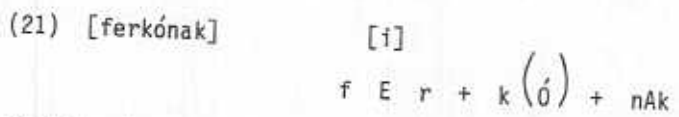
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- (20) a. Gyur + kó 'Proper name + diminutive'
 b. Fer + kó 'Proper name + diminutive'

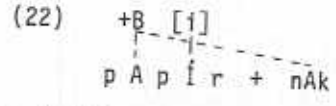
To handle -kó in an approach recognizing only privative [i], we need to block the [i] of the front root vowel in (20b) from spreading to the suffix without referring to a [+B] feature. This root must be analyzed as having an [i] autosegment because it triggers front vowels in other suffixes. Van der Hulst and Smith would presumably block spreading in (20b) by projecting the segmental backness of the vowel in -kó onto the autosegmental tier, as in (21).



We do not, however, see any obvious way for Goldsmith to account for (20b). One possibility would be to say (as Vago (1980) does) that -kó is preceded by a word boundary which blocks vowel harmony. But in the case of this particular suffix, there is no independent motivation for such a boundary. We conclude, then, on the basis of the data given in (8) - (21), that assuming a unique privative backness feature in Hungarian creates more problems than it solves.

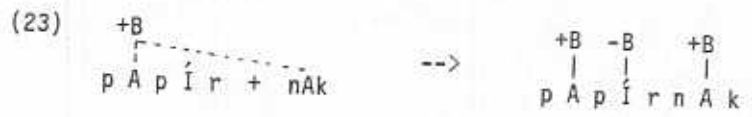
2. Alternative solutions

From the data presented above we conclude that Hungarian has an equipollent back autosegment. Binary backness, however, poses problems for the analysis of NVs. The front value of NVs, which is non-distinctive, cannot be supplied by an early redundancy rule (as in van der Hulst and Smith) for at least two reasons. First, as shown in (22), lexical association of NVs with [i] leads to crossing association lines.



Second, if association is early, it is not clear how one would distinguish the transparent behavior of redundantly front NVs (as in papírnak) from the opaque behavior of non-redundantly front (rounded) vowels (as in parfúmnak).

The obvious alternative (basically that adopted by Goldsmith) is to assume that NV backness is supplied by a late redundancy rule, as in (23).



But this approach fails to express what we call the 'cumulative effect' of NVs, exemplified in the contrast between 'Back - Neutral' roots and 'Back - Neutral Sequence' roots. We repeat the relevant data in (24).

- (24) a. Back - Neutral Roots
- | | |
|----------------------|----------|
| 1. papír (+ nak) | 'paper' |
| 2. kávé (+ nak) | 'coffee' |
| 3. hotel (+ nak/nek) | 'hotel' |
- b. Back - Neutral Sequence Roots
- | | |
|-------------------------|------------|
| 1. analízis (+ nek/nak) | 'analysis' |
| 2. ábécé (+ nek/nak) | 'alphabet' |
| 3. november (+ nek) | 'November' |

The generalization is the following: when immediately preceded by a BV, two neutral vowels are more likely to trigger front harmony than a single NV. As mentioned before, the facts vary depending on the height of the NVs (non-low NVs patterning differently from /e/), but the generalization is valid across the board. Late specification of NV backness cannot account for this opaque behavior of NV sequences.

Thus, exclusively late or exclusively early specification of NVs for [-B] cannot handle the facts of palatal harmony, the problem being that NVs are both transparent and opaque to harmony. That is, the redundant [-B] of NVs sometimes -- but not always -- behaves like the non-redundant [-B] of other front vowels. In the remainder of this section, we present two possible approaches to this problem. The first permits a uniform, unambiguous analysis of NVs at the cost of assuming two phonological backness features: privative (redundant) [i] and equipollent (distinctive) [B]. The second approach assumes a single backness feature, equipollent [B], but treats NVs as ambiguous between harmony-bearing (opaque) and non-harmony-bearing (transparent) segments.

2.1. Two-feature analysis

Following Vago (1985), our first analysis claims that phonetic backness is represented phonologically by two features on different tiers. A privative feature [i] is associated with NVs and is supplied by redundancy rule. An equipollent [+/-B] feature is associated with harmonic vowels. Under this approach, the representation of a root like papír is as in (25).

- (25) +B
 |
 p A p í r
 |
 [i]

We note that the neutrality of NVs in Hungarian with respect to palatal harmony can be predicted from the fact that their backness is non-distinctive. One cannot claim, however, that a vowel will

be neutral with respect to its value for F is no include Khalka Mongc harmony, even though however, that the r alternative general with respect to harmo

The assumptions following. First, as /í/, and /é/) are 1 rule) with the privat may either be associa [-B];⁶ and any lexi [+/-B].

- (26) a. /i í é/

- b. /e/

- c. /ü ú ö ő

- d. /u ú o ó

Second, we assume that where an autosegment new autosegment if autosegment on that t

- (27) F

- V V V

A third assumption, f spreads only by def spread. But we dif [i] are not incompat vowel.

Given these assu needed to account f (28). Both conventio vowel already associa with [i]. Under the host vowel is [-low].

be neutral with respect to harmony for feature F if and only if its value for F is non-distinctive. Counterexamples to this claim include Khaika Mongolian, in which /i/ is neutral to rounding harmony, even though the language has /y/ (Anderson, 1980). Note, however, that the roundness value of /i/ is unmarked. The alternative generalization is thus that a vowel may be neutral with respect to harmony for F iff its value for F is unmarked.

The assumptions incorporated in our first analysis are the following. First, as shown in (26), all [-low] NVs (i.e., /i/, /í/, and /é/) are lexically associated (by an early redundancy rule) with the privative feature [i]; the [+low] NV (i.e., /e/) may either be associated with privative [i] or with equipollent [-B]; and any lexical associations for harmonic vowels are with [+/-B].

(26) a.	/i í é/	$\begin{array}{c} V \\ \\ [i] \end{array}$	
b.	/e/	$\begin{array}{c} V \\ \\ [i] \end{array}$	or
			$\begin{array}{c} [-B] \\ \\ V \end{array}$
c.	/ü ú ö ó/	$\begin{array}{c} -B \\ \\ V \end{array}$	
d.	/u ú o ó a á/	$\begin{array}{c} +B \\ \\ V \end{array}$	

Second, we assume that autosegments spread locally, as in (27), where an autosegment F spreads to an adjacent vowel, creating a new autosegment if that vowel is not already associated with an autosegment on that tier.

(27)	F	-->	$\begin{array}{ccc} F & F & F \\ \vdots & \vdots & \vdots \\ V & V & V \end{array}$
------	---	-----	---

A third assumption, following Vago (1985), is that privative [i] spreads only by default, that is, if equipollent [-B] cannot spread. But we differ from Vago in that we assume that [+B] and [i] are not incompatible, and may be associated with the same vowel.

Given these assumptions, only two specific conventions are needed to account for the behavior of NVs and these are given in (28). Both conventions involve the spread of [+B] from a source vowel already associated with [i] to a host vowel also associated with [i]. Under these conditions, [+B] optionally spreads if the host vowel is [-low]. This is indicated by the single slash in

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'

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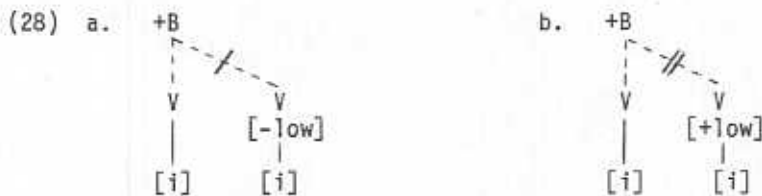
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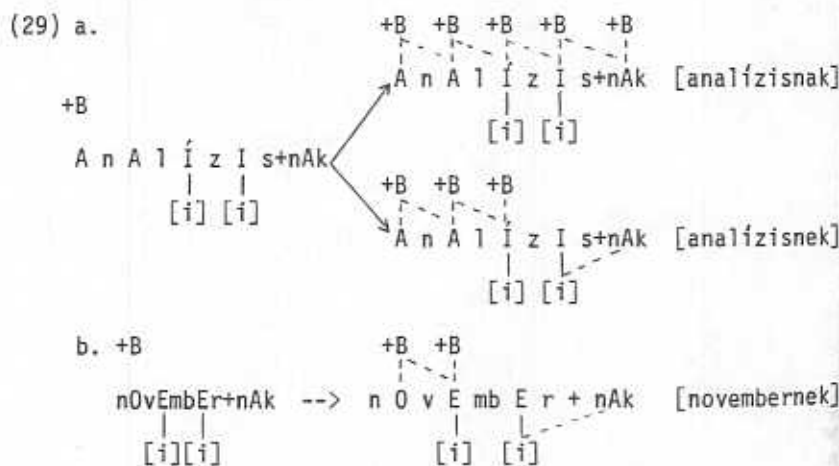
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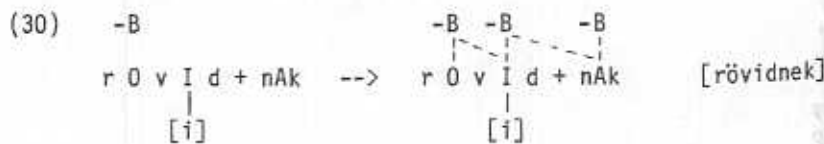
(28a). The double slash in (28b) shows that [+B] cannot spread if the host vowel is [+low].



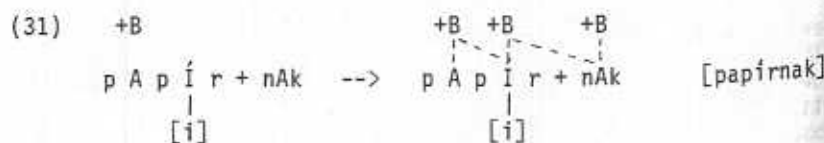
Taken together, (28a) and (28b) account for the cumulative and height effects of NVs. Sample derivations are given in (29). (28a) applies to roots like analízis and ábécé, which trigger vacillating suffixes; (28b) applies to roots like november, which take only front suffixes.



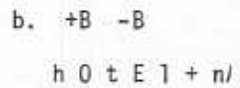
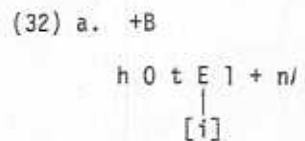
The behavior of other root types is unproblematic. Front-Neutral roots like rövid in (30)



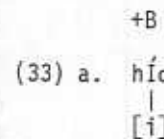
and Back-Neutral roots like papír in (31)



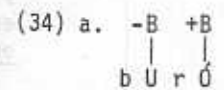
show identical spreading low, two underlying re neutral /e/ and the ot when the low NV is pre underlying representation



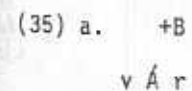
NV-Only roots, which on the particular morpher



Disharmonic roots have autosegments, as in (34)



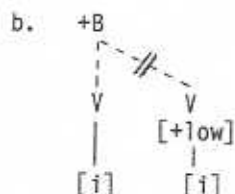
and harmonic roots have i



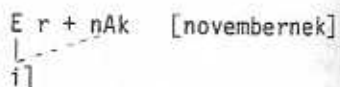
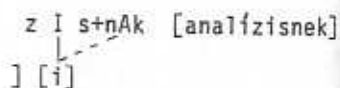
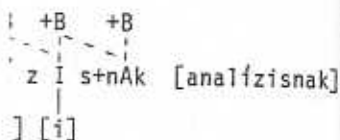
2.2. Analysis based on i
We turn now to an single backness auto: Goldsmith's insight in Crucially, we assume here with equipollent [B] or i the behavior of NVs are which predict whether a Similar to the associat these statements are sent of the NV.

The distributional NVs (/i f é/) are freel:

that [+B] cannot spread if



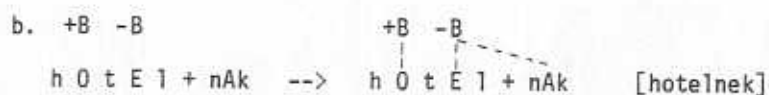
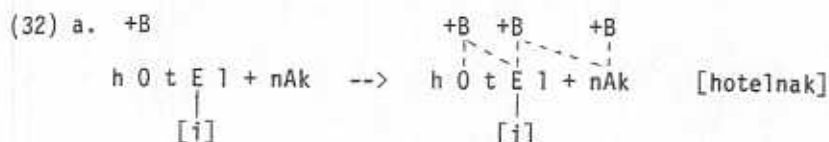
for the cumulative and
tions are given in (29).
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s unproblematic. Front -



show identical spreading patterns. However, when the final NV is low, two underlying representations are possible: one with neutral /e/ and the other with harmonic /e/. As shown in (32), when the low NV is preceded by a BV, as in hotel, these dual underlying representations give rise to vacillating suffixes.



NV-Only roots, which trigger front or back harmony depending on the particular morpheme, are analyzed as in (33).



Disharmonic roots have lexically associated equipollent back autosegments, as in (34),



and harmonic roots have unassociated autosegments, as in (35).

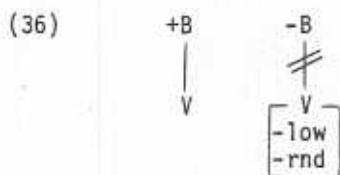


2.2. Analysis based on ambiguous NVs

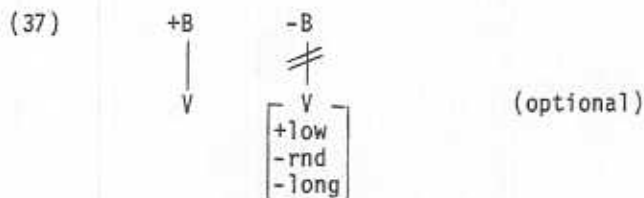
We turn now to an alternative analysis which involves a single backness autosegment, equipollent [B]. We invoke Goldsmith's insight in recognizing the dual character of NVs. Crucially, we assume here that all NVs can either be associated with equipollent [B] or unspecified for backness. Regularities in the behavior of NVs are expressed by distributional statements which predict whether a particular NV may be associated with [-B]. Similar to the association conventions in the first analysis, these statements are sensitive to the height and immediate context of the NV.

The distributional regularities are the following. Non-low NVs (/i í é/) are freely associated with [-B] or left unspecified

for backness, except when immediately preceded by a [+B] vowel, in which case the NV cannot be associated with [-B]. This regularity is expressed by the rule in (36).

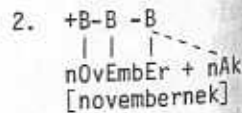
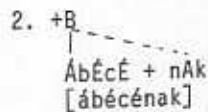
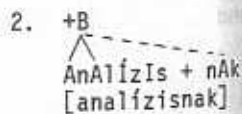
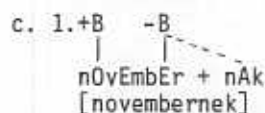
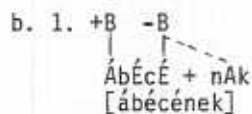
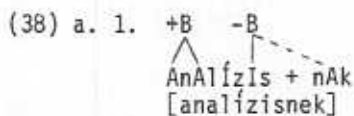


For /e/, the simplest analysis is to assume that it is always associated with [-B], except when immediately preceded by a [+B] vowel, in which case [-B] is optionally delinked, as formalized in (37).



The motivation for (36) and (37) is the same, namely the avoidance of adjacent [+B] and [-B] specification. We note that (36) and (37) apply to roots, filling in the backness specification of NVs before association conventions apply. Below we give the analysis of various root types, starting again with the most complex cases.

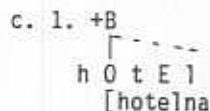
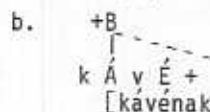
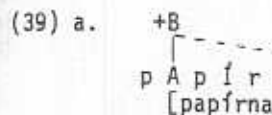
Roots with NV sequences, like analízis, ábécé, and november, are analyzed as in (38).



Note that the choice between [-B] and underspecification gives vacillating suffixes when the NV is [-low] (as in (38) a and b), but yields only the front suffix when the NV is [+low] (as in (38c)), which is the desired result.

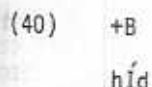
Roots with single NVs preceded by a BV, like papír, kávé, and

hotel, are handled as in

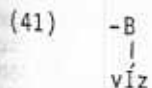


Here a single low NV (a but a single non-low harmony. In contrast, and körte, will always the final NV is associa

To account for NV roots have an equipol contribute floating au which there is an hist exceptional roots with in (40).



The absence of /e/ root the fact that /e/ is no which take front suff analyzed as in (41).



Finally, we note that d exactly as before.

We have presented Hungarian palatal harmo evidence that decides between them is, at pr approaches do make difi principle) testable. second, approach, the [i] autosegments. Thu:

hotel, are handled as in (39).

(39) a. +B
 p A p í r + nAk
 [papírnak]

b. +B
 k Á v É + nAk
 [kávének]

c. 1. +B
 h O t E l + nAk
 [hotelnek]

2. +B -B
 h O t E l + nAk
 [hotelnek]

Here a single low NV (as in (39c)) leads to vacillating suffixes, but a single non-low NV (as in (39) a and b) does not affect harmony. In contrast, Front - Neutral roots, like rövid, közép, and körte, will always yield front suffixes regardless of whether the final NV is associated with [-B] or not.

To account for NV-Only roots, we have to assume that all roots have an equipollent [B] autosegment and that roots may contribute floating autosegments in certain marked cases (for which there is an historical explanation).¹¹ These cases are the exceptional roots with non-low NVs that trigger back harmony, as in (40).

(40) +B
 híd

The absence of /e/ roots triggering back harmony is predicted by the fact that /e/ is normally associated with [-B]. NV only roots which take front suffixes, like víz (i.e., the usual case), are analyzed as in (41).

(41) -B
 víz

Finally, we note that disharmonic and harmonic roots are analyzed exactly as before.

We have presented two analyses which account for the facts of Hungarian palatal harmony. As yet we have not found any empirical evidence that decides between them and therefore the choice between them is, at present, a theoretical one. However, the two approaches do make different phonetic predictions which are (in principle) testable. Recall that in the first, but not the second, approach, the same vowel may be associated with [+B] and [i] autosegments. Thus the first solution, but not the second,

ed by a [+B] vowel, in [-B]. This regularity

me that it is always preceded by a [+B] vowel, as formalized in

ional)

namely the avoidance of the specification of NVs we give the analysis of most complex cases, ábécé, and november,

2. +B
 AnAlízIs + nAk
 [analízisnak]

2. +B
 ÁbÉcÉ + nAk
 [ábécénak]

2. +B -B -B
 nOvÉmbEr + nAk
 [novembernek]

specification gives in (38) a and b), NV is [+low] (as in like papír, kávé, and

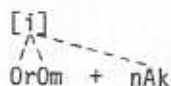
predicts that NVs in [+B] harmony contexts should be articulated further back than NVs not in such contexts. Hungarian compounds provide the necessary structures for testing this prediction independently of normal vowel-to-vowel coarticulation, and this research is now in progress.

Footnotes

* We would like to thank Bill Darden and audiences at Haskins Laboratories and Yale University for useful comments and discussion.

1. The details of each analysis will become clear below. Note that the first proposal that vowel harmony is not involved in 'abstract' roots like (4a) was Kiparsky (1968).
2. When only one suffix is given, the alternative is ungrammatical.
3. Root harmony could be preserved by assuming that front harmonic roots involve a (spreading) unassociated [i]:

[örömnek]



In this case, however, the association conventions become complicated.

4. If the projected segmental boundaries in (19) are omitted, [i] would spread to the suffix because of the OCP, which converts a lexically associated [i] preceded by a floating [i] into a single, floating [i].
5. Note that the previous analyses discussed above also involved two types of frontness. Goldsmith's approach required early-associated [i] and late-associated [i]; van der Hulst and Smith had floating [i] and lexically associated [i].
6. Treating /e/ as ambiguous between a NV and a harmonic vowel can be motivated by the fact that synchronic /e/ is the result of a recent merger between a neutral mid vowel and a harmonic low vowel. The distinction is still preserved in several contemporary dialects.
7. The root április triggers only back harmony (április + nak/*nek) and would be marked as an exception to (28a).
8. The exceptional root József, which triggers only front harmony, has a single representation with harmonic /e/.
9. For an alternative analysis of the cumulative and height effects of NVs, see van der Hulst (1985).
10. In this approach, április + nak/*nek would differ from

analízis + nek/nak
cannot be associated

11. Most /i/ and /ɨ/ NVs derive from roots with fronted by 900-1000 harmony: cél 'aim' 'crust' probably in dialects (see Vago

Anderson, S.R. (198) description of vowel harmony. *Ams*

Goldsmith, J. (1985). Finnish and Hungarian

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Hulst, H.G. van der and K. Bogers, H. va phonological representation. Foris. 233-79.

Kiparsky, P. (1968) University Linguist (1973) Three dimensions 5-56.

Vago, R.M. (1980). *T* D.C.: Georgetown U

Vago, R.M. (1985). segments in harmony

analízis + nek/nak in that the root-final NV of the former cannot be associated with [-B].

11. Most /i/ and /ɨ/ NV-Only roots which trigger back suffixes derive from roots with back high unrounded vowels, which were fronted by 900-1000 A.D. Only two /é/ roots trigger back harmony: cél 'aim' is a borrowing from German Ziel and hég 'crust' probably comes from haj, which survives in some dialects (see Vago (1980), p. 10).

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