Backness and roundness harmony in Hungarian

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1. INTRODUCTION

Ferdinand de Saussure said at one of his lectures: "The first thing that strikes us when we study the facts of language is that their succession in time does not exist insofar as the speaker is concerned. He is confronted with a state. That is why the linguist who wishes to understand a state must discard all knowledge of everything that produced it and ignore diachrony."; translation in1960, p. 81.

Alf Nyman - a Swedish philosopher - follows the same line of thought: "But the step of thought from the origin to the value [....] throws itself precipitately between two differing *dimensions* within the world of human judgement: the two standpoints of genetic explanation and estimating reflection."; 1960, p. 81 (my translation).

These passages have been of some importance to me when writing this article, because it deals with Hungarian vowel harmony - both the front /back type (hereafter simply called harmony) and the roundness harmony - in *synchronic* terms. Etymological assumptions about certain words and certain phonemes have in previous attempts obscured the real facts concerning vowel harmony. Although historical linguistics is an interesting part of linguistics in its own right and may shed light upon the synchronic study, the two views should not be confused.

Section 2 is a description of the vowel system and the general vowel harmony types in Hungarian. In section 3 we will look at the three main problems concerning harmony. Section 4 consists of formalizations of relevant rules.

2. VOWEL SYSTEM AND VOWEL HARMONY

One way of dividing the Hungarian vowels in subsets is according to backness. Harmonic front and back vowels are normally kept apart word-

internally. Vowels that belong to the neutral group - a subclass of the front vowel class - may appear freely with vowels from any of the two harmonic sets. Harmonic vowels have a much greater influence on the backness of other vowels in the word. Neutral vowels are unchangeable in suffixes while harmonic suffix vowels typically conform to harmony.

(1)

	Short			Long			
	Front		Back	Front		Back	
	-round	+round	+round	-round	+round	-round	+round
High	i	ü	u	í	ű		ú
Mid	ë	ö	o	é	ő		ó
Low	e		a			á	

On the above chart[1] are all the orthographic vowels as well as the phoneme ë, which is spelled <e>. In the seven-vowel dialects (with Budapest as center), ë has merged with e. The previous rule-writers have only been concerned with this dialect, but more than two thirds of the Hungarians in Hungary and neighbouring countries retain ë. Henceforth I will sometimes use forms with ë for explanatory purpose and rules will be given for both standard dialect groups. The relation between pronunciation and spelling is otherwise much closer than e.g. in English, French or Swedish (the main exceptions being certain proper names).

Scholars have different opinions about which vowels are neutral. Vago counts e, é, i and í as neutral, while Ringen´s opinion is that only é, i and í should be termed neutral.

Suffix vowels usually agree in backness with the last root vowel[2]. If that vowel is harmonic or there are only neutral and front harmonic vowels in the stem, this statement is always valid, e.g.:

(2)

		(adess.)	(delat.)	(instr./com.)	(allat.)
well	kút	kútnál	kútról	kúttal	kúthoz
hair	haj	hajnál	hajról	hajjal	hajhoz
ear	fül	fülnél	fülről	füllel	fülhöz
rain	eső	esőnél	esőről	esővel	esőhöz
thorn	tövis	tövisnél	tövisről	tövissel	tövishez
fairy	tündér	tündérnél	tündérről	tündérrel	tündérhez

If the last vowel is neutral and the first harmonic vowel to the left in the morpheme is back, there are three possibilities. Normally the suffix vowels become back, e.g.:

(3)			(delat.)	(instr./comitat.)
party, spree; rebellion		muri	muriról	murival
eraser		radír	radírról	radírral
coffee		kávé	kávéról	kávéval

But after some roots the suffix vowels are always front[3]:

(4)		(delative)	(instr./comitat.)
concert	koncert	koncertről	koncerttel
bronchitis	bronchitisz	bronchitiszről	bronchitisszel

The last case is free variation between front and back vocalism:

(5)		(delative)	(instr./comitat.)
positive	pozitív	pozitívról/ pozitívről	pozitívvel/ pozitívval
fool, greenhorn	balek	balekről/ balekról	balekkal/ balekkel

When there are no harmonic vowels in the root, front vowels are normally chosen for the suffixes:

(6)		(adess.)	(delat.)	(instr./com.)	(allat.)
address	cím	címnél	címről	címmel	címhez
hand	kéz	kéznél	kézről	kézzel	kézhez
film	film	filmnél	filmről	filmmel	filmhez

But about fifty roots take the back variants of alternating suffixes:

(7)		(as)	(pl.)	(ablat.)	(owner: 3 psg.)
bridge	híd	hídul	hidak	hídtól	hídja
arrow	nyíl	nyílul	nyilak	nyíltól	nyila
aim; target	cél	célul	célok	céltól	célja

The question as to how these neutral roots (henceforth called the <u>híd</u> words) should be described is another big problem within this field of investigation[4]. A third burning question is whether root harmony and suffix harmony ought to be described as a unitary process. In this article I will analyse and try to answer these problems. Furthermore the roundness harmony will be touched upon - the very limited assimilation process that lies behind e.g. one of the forms of the allative suffix: <u>hez</u> (cf. (2)).

3. THE MAIN PROBLEMS

3.1. The neutral exceptional roots

Roots without any harmonic vowels usually take front variants in the suffixes, as the harmony rule predicts. But as we saw, some neutral roots have instead back vowels in their suffixes.

Kiparsky (1968) divides neutralization into absolute neutralization - which is assumed to take place independently of context - and contextual neutralization, which shows up in a certain environment. He notes that only the existence of contextual neutralization has been proven.

A possible way of describing the place of the híd words in the harmony system is to accept absolute neutralization so that underlying back non-low unround vowels block suffix fronting (Kiparsky assumes that alternating suffixes have basic back vowels). Afterwards they merge everywhere with their front counter-parts.

Another solution is to assume that a non-phonological (diacritic) feature which is attached to the root conditions the harmony in suffixes.

A third alternative, which Kiparsky defends, is to introduce rule features to take care of the troublesome items and let phonological rules handle the majority of the words. Thus both cím and híd contain an /i:/ in the lexicon but híd is marked [- Vowel Harmony] so the suffix vowels do not change.

The preference for the first solution in analyses of numerous similar problems is said to depend on diachronic considerations only (for instance, there should have been - in Hungarian - unround back vowels that have merged with front vowels[5]).

If synchrony and diachrony could be described by the same rules, research in linguistics would no doubt have been easier. But children that acquire their native language "do not have the interests of linguistics at heart". Kiparsky further notes that "contextual neutralizations are reversible, stable and productive whereas the alleged absolute neutralizations are irreversible, unstable and unproductive".

Vago's (1973) main purpose is to show that the neutral vowels which govern back harmony are best described as underlying back vowels (i→i, í→í, Á→é). This view is referred to as the abstract solution. The exceptions are said to be systematic - all híd roots have just neutral vowels. Diacritics should not apply to systematic exceptions and accordingly not to the neutral exceptional roots.

Then Vago claims that he, Esztergar (1971) and Stong&Jensen (1971)- independently of each other - proved the rule feature analysis to be incorrect.

The evidence comes from the personal pronouns in other cases than the nominative and the accusative. Possessive suffixes are in these cases attached to the case markers, which thus act like stems. (The personal pronoun in its basic form is generally not used here, since it conveys emphasis and otherwise gives the same information as the suffix.) The following examples are taken from Vago:

(8)		(from)	(with)	(off)	(at)
I	én	tőlem	velem	rólam	nálam
you	te	tőled	veled	rólad	nálad
he, she, it	ő	tőle	vele	róla	nála
we	mi	tőlünk	velünk	rólunk	nálunk
you	ti	tőletek	veletek	rólatok	nálatok
they	ők	tőlük	velük	róluk	náluk

Vago concludes that the word-initial case forms display the underlying value for the feature back[6]. Some of the case morphemes moreover occur as verb prefixes, which agree in backness with the corresponding case stems. Another piece of evidence is the underlying frontness of the conditional -na/-ne - in the first person singular all verbs pick up the front variant.

So Kiparsky's assumption that all alternating suffix vowels are basically back must be rejected and with it his rule feature solution. (In the rule feature analysis híd+től would not change to hídtól - even if vowel harmony did not apply.)

Farkas (1979) presents some evidence against Vago's abstract solution. His informants are native speakers of Hungarian, living in Rumania. When they try to speak Rumanian, roots with harmony determining vowels that are similar to i, í, á do not behave like the híd words (but follow the general harmony pattern) and the vowels do not change as the absolute neutralization rule predicts.

Even more interesting is material from three speakers, showing that cél (aim; target) and derék (honest; brave; waist) may take front vowel variants of less common suffixes and back vowel variants of more common suffixes. Derivational suffixes almost always have the back vowel variants. E.g.: céltalan (aimless), derekas[7] (well), célnak, céltől, célba/célbe, dereka, deréktől. This is of course strong support for a non-

abstract theory. Farkas notes that no roots with i or í show such a variation. I suppose the special behaviour of cél and derék depends on the alternation between á and é in suffixes. This relationship should strengthen the attraction towards true harmony as in the above examples.

We may now conclude this passage in the following way:

Absolute neutralization would constitute, as Kiparsky points out, a very small part of all neutralization processes. There is only disconfirming evidence - with the single exception of the deceptive simplicity of the solution. Farkas showed that there is a tendency - in words with a putative Á - towards true harmony in at least one Hungarian dialect.

The abstract solution is inferior for another reason: sounds that have not been heard in Hungarian for centuries are now treated as existing but latent, while the merger is repeated on and on.

Evidently a synchronic solution is preferable. The exact nature of the rules will be investigated in 4.2.

3.2. Neutral vowels

As we have seen, Vago assumes that e, é, i and í are the neutral vowels in Hungarian (the seven-vowel dialect). The criterion that Vago makes use of is that neutral vowels may appear in any morpheme together with front harmonic vowels - e.g.: sügér (perch) - as well as back vowels -e.g.: virág (flower) - without it sounding odd to a Hungarian.

Ringen (1978) vindicates for various reasons the claim that e is a harmonic vowel.

For instance, none of the híd words contain an e and the same goes for all invariable suffixes. Some of the mixed vocalic words with the neutral vowels i, í or é take only back suffixes - this is not true for those with e. She notes also that in certain native roots - like betyár (outlaw; scamp) - e co-occurs with back vowels. But all such co-occurrences are said to depend on the merger ë→e, so that the original form was bëtyár[8]. Ringen saves a solution with harmony as a unitary process moving from the first harmonic vowel in the root by saying that e is obligatorily exempted from harmony in roots.

Vago (1978) explains the reason e does not enter into any of the híd words (note, however, derék) is because those with Á are secondary developments and only found in two roots. As e alternates with a and

there is no independent motivation for an abstract A, e can never be invariable. The last objection is turned down because the list of focal exceptions would be too long.

Vago (1980) has even more criticism against Ringen's view. Against Ringen's assumption that no neutral, but in general all harmonic suffix vowels are sensitive to harmony, Vago counters with the fact that the suffix kor never alternates - though o is harmonic. But Vago himself (1978b) satisfactorily analyzes the suffix as an exception (low vowel lengthening does not appear before kor either), so the objection is not valid.

That é alternates with á in some suffixes is not a good argument either. The suffix vowels i and í are always invariant (e.g.: ni (infinitive ending) and ít (causative verbal ending)), while é sometimes is invariant (e.g.: é (a possessive derivational suffix, marking that the root is a possessor of something in the linguistic context)) but may also vary with á (e.g.: nál/nél (adessive)). Examples (where the verb - unless otherwise stated - is given in its basic form, i.e.: 3 psg. in the indefinite conjugation of the present indicative): mosolyog (smile, i.e.: someone smiles) - mosolyogni (to smile); boldog (happy, delighted) - boldogít (make happy, favour); Kovács (family name) - Kovácsé (something that belongs to Kovács); a ház (the house) - a háznál (at the house). A reasonable interpretation of the facts is to regard á as the source in case there is an alternation, otherwise é.

But Vago has a reliable argument, namely that a number of roots govern back harmony but have an e in the last syllable (back vowels for the rest) - e.g.: maszek (self-employed), maszeknak (+dative/genitive), *maszeknek.

Let us summarize the results in the following manner:

Ringen's view that e is harmonic in Standard Hungarian has both advantages and disadvantages. If only neutral vowels may be skipped over in roots - as in (3) - then the fact that words like maszek condition back harmony is unexplainable. Vago, on the other hand, proposed that co-occurrence within native roots is characteristic of neutral vowels - here e acts as if it was neutral. But if e is regarded as neutral, it ought to be invariant in suffixes and then forms like *maszeknek would come up.Thus:

(9)

a) e is harmonic	b) e is neutral
maszek+nek →	maszek+nek →
*maszeknek	*maszeknek
Root-e gives front vocalism to suffixes = no change.	Root-e is skipped over but neutral suffix vowels never change.

Facts actually seem to be a bit more complicated, even if Kiefer (1984) only mentions back suffix vowels (acc.and pl.) after this root. One native informant would spontaneously say maszeknak, but adds that the root is likely to vacillate in the speech of many Hungarians. maszek is furthermore considered a vacillating root in Papp (p. 167). Even so, one possible variant is underivable in both solutions - as shown in (9).

A neat way to solve the problem is to accept that e is ambivalent as regards neutrality. In roots it acts like a neutral vowel but in suffixes as a harmonic vowel. e is then typologically neither a neutral vowel nor a harmonic vowel.

In the dialects with ë the situation is much simpler. Sima (1980) says that [æ] does not co-occur with back vowels in native Finnish roots and the same goes for the eight-vowel dialects. Here the low front vowel is truly harmonic .

3.3. The domain of progressive harmony

Now we may investigate our next problem - which deals with the range of progressive harmony: whether the process affects all vowels or whether only suffix vowels harmonize as a result of it.

Kiparsky (1968) suggests that stem harmony should be described by morpheme structure conditions, because its exception classes differ from those of affix harmony. His premiss is right: there are disharmonic loanwords like parfüm (perfume) or zsonglőr (juggler) but suffixes on a line are never disharmonic in themselves, e.g.: (j)eitëkhëz/(j)aitokhoz (the harmony rule with the concomitant exceptions determines what alternant the root should take; the endings mark that the root is a possessed noun in plural in the allative case and whose owner is 2 ppl.). Vago (1973) accepts this use of MSC's, primarily due to the fact that stems normally do not alternate.

Kiparsky (1973a) refers to an input which arises from morpheme combination or by the application of a phonological rule as a derived input. It is shown that there are phonological rules in Finnish, Estonian, Swedish and Sanskrit which only apply to derived inputs. A new alternation condition is now formulated as:

(10) Neutralization processes apply only to derived forms.

Then ten cases for absolute neutralization - among them Vago (1973) are taken into account and the condition is accordingly altered to accept (preliminarily) such processes, iff they are automatic (applying to all occurrences):

(11) Non-automatic neutralization processes apply only to derived forms.

This is of interest here because Vago (1976) remarks an interesting difference between the forms of certain words: bokor (bush)/bokrok (k: pl.), tükör (mirror)/tükrök (pl.). In these words epenthesis and later harmony probably affect the singular and other forms. A similar difference is displayed in words like falu (village)/falvak (pl.) and tetű (louse)/ tetvek.

Vago concludes that harmony affects these singular forms because they are derived (in Kiparsky's sense). This is a good explanation, at least for the second group.

In an issue of Linguistic Inquiry, Jensen (1978), Phelps (1978) and Ringen (1978) criticize Vago's approach, while Vago (1978a) defends it.

Ringen's approach follows both from her assumption that e in roots is neutral - true, though not enough elaborated upon - and from rule (18), which I do not find explanatorily adequate.

Both Jensen and Phelps believe in abstract segments and place them even in roots like bika (bull) so that the harmony will be identical for roots and suffixes. To roots like Tibor - whose diminutive (with the derivative suffix -i) takes front suffixes (e.g.: Tibinél) - they add an exception feature.

But Vago points at iskola (school) - whose diminutive form isi acts like Tibi (it takes front suffixes). But isi is not used by all school children. It would be odd if both analyses were used in this case, so Vago rejects their solution. He also adds a stronger objection - some recent loan-words like sofőr (chauffeur) are disharmonic according to native judgement while words like bika are felt to be quite regular.

Jensen (1984) is an attempt within lexical phonology to show that harmony is also at work in roots. But his arguments are far from convincing.

The treatment of zero feature marking has a definite affinity to what I regard as a weakness in (18) - two groups of morphemes that should have been kept apart are combined.

Rules that ignore intervening neutral vowels are said to be unnatural, but such a rule makes - as we saw in the preceding section - a correct and important generalization (the want of which Jensen's solution does not compensate).

A vacillation was reported by Vago (1980) in the case of suffixes preceded by both a back-vocalic root and the suffix né (wife of). Jensen solves this by marking né (-), which is intended to mean optional variation between negative and neutral value for backness.

One native informant reports however that né is a truly neutral *ending* and that the morpheme-combination tanárné (wife of teacher) in careful speech takes back suffixes . Tanárné is actually rare, but the more usual papné (wife of priest) has only the possessive form papnéja (not papnéje) attested in ÉrtSz. The existence of occasional or possibly dialectal front suffixes might partly depend on the simultaneously semantic and phonetic similarity between né and nő (woman) - cf. tanárnő (female teacher). They are surely related, but né is not a free morpheme - which strongly suggests that it forms part of the suffixes. That the vowel is neutral allows on the other hand for both possibilities, since that property should prevent it from alternating (even if it were derived). The fact that its status as a suffix is comparatively vague presents itself as an explanation for e.g.: tanárnének. In the Standard dialects we should not expect to encounter such front forms to any extent. Hence it is possible to treat né as the other suffixes with neutral roots.

In short, the separation of root harmony and progressive harmony seems well motivated.

4. FORMALIZATIONS

4.1 Harmony conditions

Except for some newer and unassimilated borrowings, vowels from the two harmonic classes do not co-occur in any morpheme. Let us therefore assume that backness in vowels is normally a suprasegmental feature that covers every morpheme, so that the same value for backness is inserted in the matrices for all non-neutral vowels that are included.

Vowels in disharmonic words must on the other hand be specified for backness on the underlying level and this is of course more costly.

Before the harmony condition we need a condition that assigns the value [-back] to neutral vowels, namely:

(12) $\begin{bmatrix} V \\ -round \\ -low \end{bmatrix} \rightarrow [-back]$

For the dialects which lack ë the neutral vowel condition has to be expressed like this:

(13) $\begin{bmatrix} V \\ -round \\ \begin{Bmatrix} -low \\ -long \end{Bmatrix} \end{bmatrix} \rightarrow [-back]$

Harmonic vowels may then be described by a condition[9] that the two dialects have in common:

(14)

If: $\begin{bmatrix} V \\ \_0back \_ \end{bmatrix} / \begin{bmatrix} +morpheme \\ \alpha back \\ (\ldots \_ \ldots)_1 \end{bmatrix}$

Then: [αback]

Notice that the opposite order (condition (14) before the condition that assigns frontness to neutral vowels) is possible but not desirable. The alternatives to the inputs in (12) and (13), respectively, demand more space and seem intricate in comparison. Evidently the former order is better off.

A mirror-image MSC which prohibits front round and back vowels from co-occurring would serve no purpose - we would have to insert separate values for every vowel in every morpheme and then the disharmonic ones must carry exception markings. One could naturally think of the first or the last vowel as trigger - but there is no evidence in either direction.

The vowels in kaland (adventure), lát (see), orca (cheek), őz (deer, roe), görög (Greek) and rügy (bud, burgeon) are thus underlyingly unspecified for backness, while the neutral vowels in idő (time; weather; tense (n.)) and palacsinta (pancake) are fronted by the earlier condition.

4.2 Harmony rules

These harmony rules are presented in Vago (1976):

(15) (m) VH: [+syll] → [+back] / $\begin{bmatrix} +\text{syll} \\ +\text{back} \end{bmatrix}$ C_0 ($\begin{bmatrix} +\text{syll} \\ -\text{back} \\ -\text{round} \end{bmatrix}$ $C_0)_1$—

(16) (u) VH: [+syll] → [αback] / $\begin{bmatrix} +\text{syll} \\ \alpha\text{back} \end{bmatrix}$ C_0—

If (m) VH applies, (u) VH is blocked. This disjunctive order is just what might be expected if we accept Kiparsky's (1973b) Elsewhere Condition.

Ringen (1980) also presents two rules:

(17) $\begin{bmatrix} V \\ \begin{Bmatrix} +\text{low} \\ +\text{round} \end{Bmatrix} \end{bmatrix}$ → [αback] / $\begin{bmatrix} V \\ \alpha\text{back} \end{bmatrix}$ (C_0 $\begin{bmatrix} V \\ -\text{low} \\ -\text{round} \end{bmatrix}$ $)_0 C_0$—

(18) $\begin{bmatrix} V \\ \begin{Bmatrix} +\text{low} \\ +\text{round} \end{Bmatrix} \end{bmatrix}$ → [-αback] / $\begin{bmatrix} V \\ \alpha\text{back} \\ D \end{bmatrix}$ (C_0 $\begin{bmatrix} V \\ -\text{low} \\ -\text{round} \end{bmatrix}$ $)_0 C_0$—

Condition: obligatory when root contains only neutral vowels,
optional otherwise.

As starting-point we will use Ringen's first rule (slightly revised), which is quite general and corresponds well to the normal circumstances in the dialects with eight short vowels.

In section 3.1 the abstract solution was rejected. Ringen's diacritic feature theory is not satisfactory either. Collapsing e.g. o in pozitív and í in híd under the designation D seems counter-intuitive. It is like denying the real reason for vacillating roots.

If both methods have to be refused - what expedient may then be chosen?

Because of examples like those in (8), Kiparsky's rule feature theory had to be given up in subsequent theories. But that its failure is only illusory will be shown on this chart:

(19)	Harmony	aludnál	nőnél		alszik: sleep
	OHarmony	aludnék	nőnék	innék	nő: grow
	-Harmony			innál	iszik: drink
	-na/-ne: conditional		-l: 2 psg.		-k: 1 psg.

So the fifty exceptional stems are treated as inducing [-Harmony] (disharmony) - [+Harmony] is the unmarked case and not needed as specification in lexicon.

Chomsky and Halle (1968, p. 374) assumed that [- rule n] only meant non-application of rule n to a given so marked item. It is however clear that the motivation for their proposal is weak. Naturalness is not a conclusive argument, especially when it implies simplicity united with lack of counter-evidence.

We may assume that the extraordinary result - opposite to the expected - could be stored for the híd words in the lexicon as a negation on the rule. My hypothesis is that in a rule where a segment in the context has an α which determines in part the output, [- rule n] means a minus marking on the contextual α.

It is obvious that harmony fulfils the demands of the new Alternation Condition (11). Only the derived areas are affected.

Anderson (1980) notes that there are languages (Nez Perce, Luorawetlan, Diola Fogny and others) with two sets of vowels: dominant and recessive. Only if all underlying segments are recessive will the word contain recessive vowels. Otherwise all vowels will be dominant.

The typical harmony rule differs from (17) - but both imply that all vowels in the word will agree with regard to the relevant feature. Type (17) implies neither that harmony is non-automatic nor that it may only change derived forms. The limitation on harmony can be expressed by means of a marking on the changing segment:

(20)
$$V^{d} \rightarrow [\alpha back] \,/\, \begin{bmatrix} V \\ \alpha back \end{bmatrix} \quad (C_0 \begin{bmatrix} V \\ -low \\ -round \end{bmatrix}_N)_0 C_0 \begin{bmatrix} \_\_\_\_ \\ \{ +round \\ +low \} \end{bmatrix}$$

There is now no need for a marked harmony rule. A mechanism that counts the last neutral vowel in words like koncert (4) as determinant accounts for forms like koncertről. The mechanism is optional for roots like pozitív. We may use 'N≤d' - where ≤ is inclusion. It is to be read: ë, é, i and í in underived areas to the right of the last back vowel are not parts of N - instead they determine harmony.

Without this restriction a harmonic vowel is the determinant - cf. (3).

An example consisting of the same string with two derivations might be clarifying: pozitív+j△i+k+ról → pozitívjeikról (about their positives), pozitív+j△i+k+ról → pozitívjeikről (the symbol △ designates a low short vowel which is unspecified for backness; functionally neutral vowels (i.e. parts of N) are printed in boldface). The root is unmarked in the first derivation - which works allright under the assumption that the scope of the rule (determinant with intervening and determined vowels) is maximal.

Earlier in this article we have seen that e in the seven-vowel dialects acts like a neutral vowel in roots but in suffixes as a harmonic vowel. The state of affairs can be incorporated into the rule[10]:

(21)
$$V^d \rightarrow [\alpha back] / \begin{bmatrix} V \\ \alpha back \end{bmatrix} (C_0 \begin{bmatrix} V \\ -round \\ \begin{Bmatrix} d.-low \\ -back \end{Bmatrix} \end{bmatrix}_N),C_0 \begin{bmatrix} \_\_\_\_\_ \\ \begin{Bmatrix} +round \\ +low \end{Bmatrix} \end{bmatrix}$$

There is yet another problem. After the segment structure conditions have applied (vid. Stanley, 1967) á may change equally well into é and e, a may become o or e, while e has two nearest back equivalents - a and á.

Here Vago (1974) makes use of adjustment rules, which Farkas (1979) gives in an informal manner.

Vago has a rule [a]→[ɒ] which accounts for the fact that when suffixes with underlying [æ] alternate, the vowel not only becomes back but round as well.

a-adjustment may be stated as:

(22)
$$\begin{bmatrix} V \\ +low \\ +back \\ -long \end{bmatrix} \rightarrow [+round]$$

An é-adjustment rule is needed for the á/é alternation: harmony applies - [a:]→[æ:] - and then [æ:] is raised to [e:].

Vago collapses e-adjustment (a lowering needed for e.g. roundness harmony in the seven-vowel dialects) and é-adjustment into one rule, which will look like this:

(23) $$\begin{bmatrix} V \\ -high \\ -back \\ -round \\ -\alpha long \end{bmatrix} \rightarrow [\alpha low]$$

(22) and (23) must however be replaced in this description because they are not synchronically motivated. In the next section alternative ways out will be described.

With the markings a on input and b on change vacuous rule application can be effectively hindered. This is achieved by a new condition: $a \neq b$. Now the arrow always means change.

But this convention should rather be universal - a general property of every phonological rule, not necessary to mention on this low level. The alternative would be to accept vacuousity; the rules need anyhow no adjustment in themselves.

4.3 Roundness harmony and replacing the adjustment rules

To account for derivations like gyümölcs+ei+tök+höz → gyümölcseitékhéz (to your (pl.) fruits) and kert+öm+höz → kertémhéz (to my garden) - as opposed to gyümölcs-ö-tök+höz → gyümölcsötökhöz (to your (pl.) fruit) and kert+ünk+höz → kertünkhöz (to our garden) - the following rule will do[11]:

(24) $$V^d \rightarrow [-round] \,/\, [-round]\, C_0 \begin{bmatrix} \_\_\_\_ \\ -high \\ -long \\ -back \end{bmatrix}$$

This rule is simpler than Vago's (1974) - adopted in Ringen (1980) and which mentions the feature lowness - and the fact that it applies vacuously (ë → ë and/or e → e) does not matter, as we saw in the preceding section.

In the case of unrounding in the dialects without ë, there are actually three possible outputs: i, e and é. Of the nonlabial vowels, the three just mentioned are most close to ö - that is, they have the greatest number of distinctive features in common with ö.

The eventual output - e - is low. This may be expressed in the rule by adding the feature [+low] immediately to the right of the arrow. But as the determinant may be non-low as well as low this expedient does not seem appealing.

If we consider two other rules with similar problems, the description will overall be better. The rules are harmony and low vowel lengthening (LVL).

The existence of the latter is defended in Vago (1978b). LVL is responsible for alternations like kefe (brush), kefét (accusative), keféje (poss. 3 psg.), kefejét; alma (apple), almát, almája, almáját.

The rule looks like this[12]:

$$(25)\quad \begin{bmatrix} +\text{syll} \\ +\text{low} \end{bmatrix} \rightarrow [+\text{long}] \,/\, \_ + [+\text{segment}]$$

Here a may change to á or ó and e may change to é or á. A closer look at the precedence for a certain feature over another in the rules might be revealing[13]:

(26)

Harmony:	á→é	e→a	a→e	Roundness:	ö→e	ö→e
	long	long	low	(dialects	(not i)	(not é)
	low	round	round	without ë)	high	long
LVL: a→á	e→é				low	low
low	back					
round	low					

For example: a and ö have another value for round than e, while a and e in contrast to ö share the same value for low. Because a becomes e in the harmonic feature exchange we put it this way: low matters more than round.

It is easy to see that there is a general pattern: round is below low while the other features are on the top.

We may further assume that the precedence for a feature over another is indicated in the feature order on the Hungarian vowel matrix. As an example the harmonic change a→e is given below[1]:

(27) a → [-back]

	a	á	e	é	ë	ö	ő	o	ó	u	ú	ü	ű	i	í
long	-	+	-	+	-	-	+	-	+	-	+	-	+	-	+
back	+		-		-	-		+		+		-		-	
high	-		-		-	-						+		+	
low	+		+		-	-									
round	+														

Now each segment which on a certain step agrees with the changing segment **s** may proceed, except when the output and **s** have different values. Then the reverse value is preferred so that any segment which exhibits it passes over to the next feature, the next link in the chain.

Instead of two diachronic rules we have an order between the features in the vowel matrix.

Another solution consists of introducing a principle, that predicts what will happen:

If the value for feature **f** changes through a rule, then let us assume that the participants in that rule (or a possible extension of it) move towards symmetric pair relations (where two elements pair solely with each other).

Consider the following description:

(28)

Harmony	RH (seven-vowel dialects)	LVL (eight-vowel dialects)	LVL (seven-vowel dialects)
o↔ő	ü↔i	ë↔é	ő↔ö↔é↔i↔í
↙↗	↙↗	↙↗	↙↗
a	ö↔e	e	e
↖↘	↖↘	↖↘	↖↘
e	ő↔é	á	á
↙↗		↙↗	↙↗
á		a	a
↖↘		↖↘	↖↘
é		o↔ó	o↔ó
↙↗			
ó↔ő			

A dotted line marks total similarity except for f; a continuous line marks that the two segments are separated by two features.

e→é in LVL (eight-vowel dialects) does not seem predictable at first. Harmony surely plays a role here - it might by the way be ordered after LVL (two endings are sensitive only to the former rule, vid. Vago (1978b)). We may also consider that á is back and so not neutral - a word like szőke (blond) would be disharmonic whenever a derived input followed it.

Everything else follows neatly from the principle - a→e (harmony), ö→e (RH) and a→á (LVL) because primary pair relations block the alternatives. e→a makes the sufficient addition for the creation of a secondary pair relation. e therefore repels á, which consequently becomes é.

e→é in the seven-vowel dialects does not improve our conviction about the principle's reliability since the change is already accounted for.

When it comes to deciding between the two devices, things are more uncertain. They are both rather simple but one may ask whether any one of them has an anchorage in reality. Yet they differ beneficiently from (22) and (23) by being based on the structure of present-day Hungarian speech only.

5. SUMMARY

Evidence has been given for a division of harmony - on the morpheme level it is determined by condition (14), while a rule makes the suffixes harmonize uniformly.

Neutral vowels are as stated above invariable in suffixes. Together with some other pieces in the puzzle this leads us to the conclusion that in the seven vowel dialects e belongs to neither the harmonic nor the neutral group, but acts in roots as a neutral vowel and in suffixes as a harmonic vowel. é, i and í are thus the proper neutral vowels, while front round and back vowels are harmonic. In the eight-vowel dialects, ë is neutral and e is harmonic everywhere.

All affected (changing) vowels are automatically defined as derived inputs. This makes the nature of harmony more transparent and the marker d obviates the need for a second rule.

It has been shown that a rule feature analysis is possible for the híd words, if Chomsky and Halle's convention to account for lexically

determined rule non-application is given up and replaced by a new convention.

Instead of diachronic rules, two kinds of ways to derive correct surface forms have been suggested.

Though my aim with this article has been to give an alternative to the predominant historicistic view through functioning and unexpensive methods, it may well be that the main finding is how e in dialects without ë reacts to harmony.

Footnotes

1. It may be noted that the vowels here designated as a, ë and e are transcribed in IPA as [ɒ], [e] and [æ], respectively. In the seven-vowel dialects, e is more close - something like [ɛ] but with a special timbre.

2. Harmony causes the following alternations: a/e, á/é, o/ö, ó/ő, u/ü, ú/ű.

3. The tendency to choose the front variants is positively related to the number of final neutral vowels but in individual cases the harmony is not predictable. Kombiné (slip, undergown) thus takes back suffixes (or, more likely, vacillates), while oxigén (oxygen) takes the front variants. The two words differ from each other with respect to harmony in spite of the fact that their vowel sequences are identical.

4. Harmony occurs between all sorts of roots and endings, thus: zöld (green), zöldebb (greener), korrekt (correct), korrektebb/korrektabb (more correct), zsír (grease), zsíros (greasy), föld (earth), földes (earthy), fúj (blow), fújtam (I blow+preterite), nyit (open), nyitottam (I open+pret.).

5. But Kiparsky (1968) observes that Finnish vowel-initial suffixes are back after neutral monosyllabic roots. This rule may originate from the same source as the harmonic behaviour of the híd words.

6. Underlying forms of the case suffixes are: -nek (dative/genitive), -be (illative), -ben (inessive), -ből (elative), -ra (sublative), -ról (delative), -hoz (allative), -nál (adessive), -től (ablative), -vel (instrumental/comitative) and -ért (causal/final). All except the last one alternate. Some of the case stems are slightly different from the corresponding suffix forms, e.g.: belől- → -ből.

7. The form is dërëkas in the eight-vowel dialects - the basic form is dërék. Derék is the only bisyllabic stem in the exceptional híd group.

8. This already mentioned merger is by all means quite natural; its existence is confirmed in Sima (1980).

9. Adopting the Elsewhere Condition - vid. Kiparsky (1973b) - we may state the changing segment simply as [V].

10. In a lexical phonology framework, d might be replaced by the number of that level (or stratum) where alternating suffixes are adjoined.

11. The marker d is needed for the root eszköz (means; tool; instrument).

12. Low final vowels are never lengthened before a root morpheme, e.g.: körtefa (pear tree), faláb (wooden leg).

13. From now on until the beginning of (27) long, high etc. are to be taken as abbreviations for longness, highness etc.

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