CONSTRAINT RERANKING IN THE SZEGED DIALECT OF HUNGARIAN

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Alberti, G., and I. Kenesei, eds. (2000), *Papers from the Pécs Conference, Approaches to Hungarian.7*,
Szeged: JATEPress.

1. *Introduction*

In this paper we consider certain differences between suffix vowels in the Budapest and Szeged dialects of Hungarian.[1] These differences are illustrated in (1) with the crucial examples in bold type.[2]

(1)

Budapest dialect	Szeged dialect
Ternary suffix -hoz/höz/hɛz 'allative'	-hoz/höz
a. ha:s-hoz 'house-ALL'	i. ha:s-hoz 'house-ALL'
b. tök-höz 'pumpkin-ALL'	j. tök-höz 'pumpkin-ALL'
c. **kɛrt-hɛz 'garden all.'**	k. **kɛrt-höz 'garden ALL'**
Quaternary suffix -ɔk/-ok/-ɛk/-ök 'plural'	Quaternary suffix -ɔk/-ok/-ɛk/-ök
d. ha:z-ɔk 'house-PL'	l. ha:z-ɔk 'house-PL'
e. bɔb-ok 'bean-PL'	m. bɔb-ok 'bean-PL'
f. **hi:r-ɛk 'news-PL'**	n. **hi:r-ök 'news-PL'**
g. tüz-ɛk 'fire-PL'	o. tüz-ɛk 'fire-PL'
h. tök-ök 'pumpkin-PL'	p. tök-ök 'pumpkin-PL'

Specifically, in the Budapest dialect, the so-called "ternary suffixes" have three alternants, for example, the allative suffix [hoz]/[höz]/[hɛz], whereas in Szeged there are only two: [hoz]/[höz] (compare (1c) and (1k)). And the so-called "quaternary" suffixes have four alternants in both dialects, but with some roots the Szeged dialect has [ö] where the Budapest dialect has [ɛ] (compare (1f) and (1n)).

We will show that in Optimality Theory (McCarthy and Prince 1993, 1995, and Prince and Smolensky 1993), these differences receive a straightforward account. Our account adopts the account of the binary and ternary suffixes in the Budapest dialect proposed by Ringen and Vago (1998) and the account of the quaternary suffixes in the Budapest dialect proposed in Szentgyörgyi (1999). We will show that the differences between the Budapest and Szeged dialects in (1) can be described by reranking one constraint in the Ringen-Vago-Szentgyörgyi analysis. This provides support for the Ringen-Vago analysis of the binary and ternary suffixes and the Szentgyörgyi analysis of the quaternary suffixes, as well as the claims of McCarthy and Prince (1993) and Prince and Smolensky (1993) that different rankings of constraints yield different and attested dialects of languages.

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[1] We are grateful to an anonymous reviewer for a careful reading of this paper and for many helpful suggestions.

[2] In these examples there are other alternations: root vowel length and voice assimilation. However these are beyond the scope of the present paper. Examples are given in phonetic transcription unless otherwise indicated: orthographic forms are given in italics and underlying forms between slashes (//).

2. *The Budapest dialect*

2.1 *The Ringen-Vago Analysis (binary and ternary suffixes)*

The surface vowels of Hungarian are given in (2):

(2)

	-back				+back		
	-round		+round		-round	+round	
	short	long	short	long	long	short	long
HIGH	i [i]	í [i:]	ü [y][3]	ű [y:]		u [u]	ú [u:]
MID		é [e:]	ö[ø]	ő [o:]		o [o]	ó [o:]
LOW	e [ɛ]				á [a:]	a [ɔ]	

The vowels [i], [i:], and [e:] are neutral or transparent, the remaining vowels are harmonic.[4] Front and back harmonic vowels do not generally co-occur in the same word. Hence, suffixes with harmonic vowels have two alternants, one with a front vowel and one with a back vowel as illustrated in (2):

(3)

ha:z-nɔk	'house-DAT'	ha:z-na:l	'house-ADE'
tü:z-nɛk	'fire- DAT'	tü:z-ne:l	'fire- ADE'
kɛrt-nɛk	'garden- DAT'	kɛrt-ne:l	'garden-ADE'
vi:z-nɛk	'water- DAT'	vi:z-ne:l	'water-ADE'
rɔdi:r-nɔk	'eraser- DAT'	rɔdi:r-na:l	'eraser-ADE'

Two constraints which are central to the analysis of Ringen and Vago are an alignment constraint and a positional faithfulness constraint. The alignment constraint is formulated as suggested by Ellison (1995) and Zoll (1996):

(4) **Align R**

No vowel intervenes between the rightmost anchor of every backness feature and the right edge of the prosodic word. One violation is assessed for intervening vowel.

The positional faithfulness constraint in (5) is ranked above the general faithfulness constraint which requires that corresponding input and output segments have the same specification for backness:

[3] Note that for the sake of simplicity we do not use the IPA symbols [y] and [ø] but we use [ü] and [ö] instead.

[4] We treat *e* [ɛ] as front harmonic.

(5) **IDENT-IO$_{ba}$**

Correspondent specifications round).[5]

The tableaux in [tü:z-ne:l], and [kɛrt-ne:

(6)

/ha:z-nɛk/[7]	
a.	ha:z-nɛ
b. ☞	ha:z-nɔ
c.	hɛ:z-nɛ
d.	hA:z-n

We assume that [back] feature. If there and be eliminated. Th violates Align R and is e not. In particular, there [+back] feature and the because the backness sp underlying root vowel.

(7)

/tü:z-na:l/	
a. ☞	tü:z-ne
b.	tü:z-na
c.	tu:z-na:

In (7), (c) is elim that of the corresponden intervenes between the r the word.

[5] This is actually two constr

[6] Capital A stands for a low

[7] The reason that the suffix front harmony when it function to be underlyingly back becaus

(5) **IDENT-IO$_{harm/root}$**
Correspondent input and output harmonic root vowels have identical specifications for [αback] (harmonic vowels are those specified as low or round).[5]

The tableaux in (6), (7), and (8) show how these constraints choose [ha:z-nɔk], [tü:z-ne:l], and [kɛrt-ne:l] as the optimal outputs[6]:

(6)

/ha:z-nɛk/[7]	ID-IO$_{harm/root}$	Align-R
a. ha:z-nɛk		*!
b. ☞ ha:z-nɔk		
c. hɛ:z-nɛk	*!	
d. hA:z-nAk	*!	

We assume that vowels with the same backness specification are linked to a single [back] feature. If there were two separate [back] features, the first would violate Align-R and be eliminated. The candidate in (6a), with a [+back] feature followed by [-back] violates Align R and is eliminated. While the [-back] feature is right aligned, the [+back] is not. In particular, there is a vowel that intervenes between the rightmost anchor of the [+back] feature and the right edge of the word. Candidates (6c) and (6d) are eliminated because the backness specification of the harmonic root vowel is different from that of the underlying root vowel.

(7)

/tü:z-na:l/	ID-IO$_{harm/root}$	Align-R
a. ☞ tü:z-ne:l		
b. tü:z-na:l		*!
c. tu:z-na:l	*!	

In (7), (c) is eliminated because the harmonic root vowel differs in backness from that of the correspondent input vowel, and (b) is eliminated because there is a vowel that intervenes between the rightmost anchor of the [-back] specification and the right edge of the word.

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5 This is actually two constraints: ID-IO$_{low/root}$ and ID-IO$_{round/root}$.

6 Capital A stands for a low vowel unspecified for backness and roundness.

7 The reason that the suffix vowel is assumed to be underlyingly front in the suffix *-nak/nek* is that it governs front harmony when it functions as a root as in *nek-em* 'to me'. Similarly, the suffix vowel in *-nál/nél* is assumed to be underlyingly back because it governs back harmony when it funcions as a root as in *nál-am* 'at me'.

(8)

/kɛrt+na:l/	ID-IO$_{harm/root}$	Align-R
a. ☞ kɛrt-ne:l		
b. kɛrt-na:l		*!
c. kɔrt-na:l	*!	

Forms with only neutral vowels show the need for two additional constraints. Following Kaun (1995), Ringen and Vago assume that there is a constraint, Specify, that requires that segments be specified for (binary) features. They also assume a markedness constraint *ɨʌ which prohibits the relatively marked back unrounded vowels [ɨ] and [ʌ] and their long counterparts that never occur in Hungarian:

(9) **Specify**
Segments should be specified for features.

(10) *ɨʌ
Vowels which are [+back] and [-low] must be specified as ROUND.

Tableau (11) illustrates their account of roots containing only neutral vowels. (Capital I represents a high vowel unspecified for backness and not specified for privative ROUND.)

(11)

/vi:z+na:l/	*ɨʌ	ID-IO$_{harm/root}$	Align-R	Spec
a. ☞ vi:z+ne:l				
b. vi:z+na:l			*!	
c. vI:z+na:l				*!
d. vɨ:z+na:l	*!			

These constraints will also account for mixed vowel roots with a back harmonic vowel followed by a transparent vowel such as in *radír* 'eraser'. In (12) we see a form with no suffixes. Note that here the optimal output violates AlignR, but this is the best we can do, since the other candidates violate higher ranked constraints.

(12) * ɨʌ , ID-IC

/rɔdi:r/[8]	
a.☞ rɔdi:	
b. rɔdɨ:ɪ	
c. rɔdI:ɪ	
d. rɛdi:r	

This same root
(c) the single [+back
intervening vowel is
backness in the output

(13) Align-R >>

/rɔdi:r+nɛl	
a. rɔdi:r-	
b. rɔdɨ:r-	
c. ☞rɔdI:r	
d. rɛdi:r-	

Most suffixes
However, some suffix
'house-ALL.', [tü:s-höz

(14) Roundness

allative -hoz
a. ha:s-hoz
b. tü:s-höz
c. rɔdi:r-hoz '

2PL -tok/tö
f. hos-tok
g. fö:s-tök
h. ne:s-tɛk

[8] We give the underlying
assumption. If the initial r
optimal since we assume an
be [ROUND]. We assume
Optimisation (Prince & Smo

(12) * ɨʌ , ID-IO$_{harm/root}$ >> Align-R,

/rɔdi:r/[4]	* ɨʌ	ID-IO$_{harm/root}$	Align-R	Spec
a. ☞ rɔdi:r			*	
b. rɔdɨ:r	*!			
c. rɔdI:r			*	*!
d. rɛdi:r		*!		

This same root with the suffix [nɔk]/[nɛk] 'dative' is illustrated in (13). In candidate (c) the single [+back] specification is linked to both the first and last vowels. The intervening vowel is unspecified for backness. Assuming that vowels unspecified for backness in the output are interpreted as front, the optimal output, (c) is correct.

(13) Align-R >> SPEC

/rɔdi:r+nɛk/	* ɨʌ	ID-IO$_{harm/root}$	Align-R	Spec
a. rɔdi:r-nɛk			*!*	
b. rɔdɨ:r-nɔk	*!			
c. ☞rɔdI:r-nɔk				*
d. rɛdi:r-nɛk		*!		

Most suffixes with harmonic vowels are like the binary suffix [nɔk]/[nɛk] 'dative'. However, some suffixes have three alternants. These are the ternary suffixes: [ha:s-hoz] 'house-ALL', [tü:s-höz] 'fire- ALL', [kɛrt-hɛz] 'garden- ALL'.

(14) Roundness Harmony

allative -hoz/höz/hez

a.	ha:s-hoz	'house'	d.	vi:s-hɛz	'water'
b.	tü:s-höz	'fire'	e.	körɛt-hɛz	'side dish'
c.	rɔdi:r-hoz	'eraser'			

2PL. -tok/tök/tɛk

f.	hos-tok	'bring-2PL'
g.	fö:s-tök	'cook-2PL'
h.	ne:s-tɛk	'watch-2PL'

[4] We give the underlying form of this root with an initial *rounded* short vowel. Nothing crucial depends on this assumption. If the initial root vowel were not specified as [ROUND], output (c) would still be designated as optimal since we assume an inventory constraint (discussed below) which requires that all short, low, back vowels be [ROUND]. We assume that the input has a vowel which is specified as [ROUND], as mandated by Lexicon Optimisation (Prince & Smolensky 1993).

Following a suggestion by Polgárdi and Rebrus (1998), Ringen and Vago propose an analysis that involves a licensing constraint, specifically one that restricts the licensing of ROUND by front mid vowels to certain prominent or strong positions. In Budapest Hungarian, mid front rounded vowels are found only in roots (e.g. [tök] 'pumpkin'), when they are long (e.g. [vi:s-tö:l] 'water-ABL'), or following front rounded vowels (e.g. [öröm-höz] 'joy-ALL'; [fül-höz] *'ear*-ALL'; [viz-ünk-höz] 'water-POSS.1 PL -ALL').

Mid front rounded vowels are highly marked segments. They are more marked than mid front unrounded vowels, and languages have mid front rounded vowels only if they also have high front rounded vowels (but not the reverse). There are many examples in which such highly marked segments are permitted only in prominent or strong positions, where prominent includes stressed, word-initial, roots, and long segments; see Beckman (1995, 1997, 1998), Steriade (1995), and Zoll (1996, 1997).

Ringen and Vago's licensing constraint is formulated as in (15):

(15) **Link [ROUND]**
[ROUND] may be linked to a short (monomoraic), mid, front, suffix vowel only if it is also linked to a preceding vowel

This constraint requires that a short, mid, front vowel that is [ROUND] be in a root ([tök] 'pumpkin'), or that the [ROUND] feature is also associated with a root vowel ([örŏm-höz] 'joy-ALL') or that the [ROUND] feature also be associated with a *preceding* round vowel that is not short and mid ([viz-ünk-höz] 'water-POSS.1PL -ALL').

Ringen and Vago also assume an Identity constraint on [ROUND], ranked below Link-R, which requires that input and output segments have identical specifications for [ROUND]:

(16) **IDENT-IO$_{round}$**
Correspondent input and output segments have identical specifications for [ROUND].

They assume that suffixes which have three alternants with [o], [ö], [ɛ] have underlying round vowels.[9] Of this set, only allative [hoz]/[höz]/[hɛz] occurs independently as a root. When it does, it shows up with a back vowel: e.g. [hoz:a:m] 'to me'. This suffix is assumed to have /o/ in the input. For the other ternary suffixes either an underlying front or back vowel may be assumed, assuming /o/ vs /ö/ in the input makes no difference.

In the tableaux below, we include only output candidates which satisfy Align-R, ID-IO$_{harm/root}$, and SPEC, since these constraints are not relevant to the points being developed.

In (17) the correct output is designated as optimal when the root contains a back harmonic vowel:

[9] If a suffix had underlying /e/ it would behave like *-nek/nak* 'dative'.

(17)

/ha:z+hoz/
a.☞ ha:s-hoz
b. ha:s-hʌz

In (18) the same
adjacent round vowels w
separate R specifications l
feature are underlined. In
since it is not associated v
[ROUND] feature of the
with a root vowel. Cand
whereas (b) does not (the
in the output is not).

(18)

/tü:z+hoz/ R R
a. tüs+höz R R
b.☞ tu̲s+hö̲z
c. tüs+hɛz

Consider next the t
has a front unrounded roc
'water-ALL'). Two other cc
inventory constraint whicl
low. The second is a mark

(19) **Short ɛ**
Short non-high

The constraint Shor
an input /e/ from being pre

(20) *** üö**
Front rounded v

[10] Here we use * üö as an abbre

(17)

/ha:z+hoz/	* ɨʌ	Link-R	ID-IO$_{round}$
a.☞ ha:s-hoz			
b. ha:s-hʌz	*!		*

In (18) the same suffix follows a root with a front rounded vowel. We indicate adjacent round vowels which are not linked to the same [ROUND] specification with separate R specifications beneath the vowels. Round vowels linked to the same [ROUND] feature are underlined. In (18a) the [ROUND] feature of the suffix vowel violates Link-R since it is not associated with a vowel that is in a root or bimoraic. On the other hand, the [ROUND] feature of the suffix vowel in (b) does not violate Link-R since it is associated with a root vowel. Candidate (b) is better than (c), because (c) violates IDENT-IO$_{round}$, whereas (b) does not (the suffix vowel in the input is [ROUND] whereas the correspondent in the output is not).

(18)

/tü:z+hoz/ R R	* ɨʌ	Link-R	ID-IO$_{round}$
a. tüs+höz R R		*!	
b.☞ tűs+hőz			
c. tüs+hɛz			*!

Consider next the ternary suffix [hoz]/[höz]/[hɛz] with a root such as [vi:z], which has a front unrounded root vowel. Here we see that the suffix vowel is low ([vi:s-hɛz] 'water-ALL'). Two other constraints play a role in selecting [vi:s-hɛz] as optimal. One is an inventory constraint which requires that all short, front, non-high, unrounded vowels be low. The second is a markedness constraint stating that front rounded vowels are marked.

(19) **Short ɛ**
Short non-high unrounded front vowels are low.

The constraint Short ɛ must be ranked above the faithfulness constraints to prevent an input /e/ from being preserved in the output.

(20) *** üö**
Front rounded vowels are prohibited.[10]

[10] Here we use * üö as an abbreviation for two constraints, *ü, *ö.

The tableau in (21) illustrates that these constraints and rankings correctly designate [vi:s-hɛz] as optimal.

(21) Link-R >> ID-IO$_{round}$

/vi:z+hoz/	Short ɛ	Link-R	ID-IO$_{round}$	* üö
a. vi:s+höz		*!		*
b. vi:s+hez	*!		*	
c.☞ vi:s+hɛz			*	

When a ternary suffix is preceded by a root with a front rounded vowel and an unrounded vowel as in [körɛt] 'side dish', the suffix vowel is unrounded ([körɛt-hɛz] 'side dish-ALL'). Such forms show the necessity of the constraint, NO GAP which has been widely assumed in earlier works, to prevent the skipping of potential anchors. (Levergood, 1984; Archangeli and Pulleyblank, 1994):

(21) **NO-GAP**

Gapped configurations are prohibited. A gapped configuration is illustrated below: * A B C

F (where B is a possible anchor for F)

(23) NO-GAP, Short ɛ >>ID-IO$_{round}$ >> *üö

/körɛt+hoz/	Short ɛ	NO-GAP	Link-R	ID-IO$_{round}$	* üö
a. körɛt-höz R R			*!		**
b. kö̲rɛt-hö̲z[11]		*!			**
c.☞ körɛt-hɛz				*	*
d. kö̲rœt- hö̲z				*	**!
e. kɛrɛt-hɛz				**!	

Without NO-GAP, candidate (b) would be optimal instead of the correct candidate, (c)[12].

2.2. *The Szentgyörgyi analysis (quaternary suffixes)*

In addition to the above types of harmony, Hungarian is said to have a third type, quaternary harmony, in which certain suffixes have four different vowels depending on the

[11] We assume that there is nothing which prevents the association of the feature [ROUND] with any vowel.

[12] Note that NO-GAP has to be dominated by Align-R. Otherwise words like [rɔdi:rnɔk] 'eraser-DAT' would incorrectly surface as *[rɔdi:mɛk] with a front suffix vowel. Note also that there must be a markedness constraint *œ because there are no low, front, round vowels in Hungarian. This constraint, which must be ranked high, would exclude candidate (23d).

stem. As we will see be
they involve the phenor
members of a morpholog

(24) -ɔk/-ok/-ɛk/-ö

Back
I kɔr+o
kor+o

Front
III hi:r+ɛ
sirt+ɛ

In group I we fin
peculiar about them. In
great number of roots l
unmarked since all nonc
for front stems, groups I
according to the backne
other hand, displays bel
class contain being front
groups II and IV can t
quaternary suffix such
[öt], they take the low v

Next consider ste

(25) a. Lowering
kö̲ɲv+ɛk+ɛt
tüz+ɛk+ɛt

b. Non-lowerin
kɔr+ok+ɔt
kor+ok+ɔt

[13] Note that the affiliation
suffix, as part of the stem, c
However, the quality of the
approach is taken. In the pres

Also, quaternary suffixes
also drops its vowel after no
not considered here since no

rankings correctly designate

-IO$_{round}$	* üö
	*
*	
*	

ınt rounded vowel and an
ırounded ([körɛt-hɛz] 'side
NO GAP which has been
ntial anchors. (Levergood,

ınfiguration is illustrated

'or F)

)-IO$_{round}$	* üö
	**
	**
	*
	**!
!	

e correct candidate, (c)[12].

id to have a third type,
owels depending on the

ıUND] with any vowel.
ıdi:rnɔk] 'eraser-DAT' would
st be a markedness constraint
which must be ranked high,

stem. As we will see below, quaternary alternations differ from ternary harmony in that they involve the phenomenon of lowering, a result of attaching quaternary suffixes to members of a morphologically marked class, the so-called lowering stems.

(24) -ɔk/-ok/-ɛk/-ök Plural[13]

	Back				
I	kɔr+ok 'arm'	II	fɔl+ɔk 'wall'		
	kor+ok 'age'		hold+ɔk 'moon'		
	Front				
III	hi:r+ɛk 'news'	IV	köɲv+ɛk 'book'	V	kör+ök 'circle'
	sirt+ɛk 'cliff'		tüz+ɛk 'fire'		kürt+ök 'horn'

In group I we find roots that take back binary and ternary suffixes; there is nothing peculiar about them. In group II, however, roots take a back low suffix vowel. Although a great number of roots belong to this class, it is still group I that can be considered as unmarked since all nonce words and loanwords entering the language belong group I. As for front stems, groups III and V are normal in their behaviour, selecting the suffix vowel according to the backness and roundness quality of the last stem vowel. Group IV, on the other hand, displays behaviour similar to that of stems in group II. Roots of this marked class contain being front rounded vowels, but take front unrounded low suffix vowels. Thus groups II and IV can be called lowering stems since whenever they are followed by a quaternary suffix such as the plural [ɔk],[ok],[ɛk], [ök] or the accusative -[ɔt], [ot], [ɛt], [öt], they take the low variant with the appropriate backness specification.

Next consider stems with multiple suffixes, plural and accusative:

(25) a. Lowering

köɲv+ɛk+ɛt 'book'	fɔl+ɔk+ɔt 'wall'	
tüz+ɛk+ɛt 'fire'	hold+ɔk+ɔt 'moon'	

b. Non-lowering

kɔr+ok+ɔt 'arm'	fɛj+ɛk+ɛt 'head'	kör+ök+ɛt 'circle'
kor+ok+ɔt 'age'	sirt+ɛk+ɛt 'cliff'	kürt+ök+ɛt 'horn'

[13] Note that the affiliation of the vowels of quaternary suffixes is unclear. They may be treated as part of the suffix, as part of the stem, or as a separate constituent, i.e. a linking vowel, between the stem and the suffix. However, the quality of the vowel must be determined by principles of vowel harmony regardless of which approach is taken. In the present analysis nothing hinges upon the status of the suffix vowel.

Also, quaternary suffixes have a surface variant without a vowel after stems ending in vowels. The accusative also drops its vowel after non-lowering stems ending in coronal sonorants and sibilant fricatives. Such cases are not considered here since no vowel harmony is involved.

Here we see that if a non-lowering stem is followed by the plural as in (25b), then the accusative suffix will be low. This means then that not only roots but also suffixes can be lowering.[14]

The examples in (26) show that lowering is blocked if a non-lowering suffix intervenes between a lowering root and a quaternary suffix.

(26) (a) mɔgɔʃ mɔgɔʃ+ɔt 'tall-ACC'
(b) mɔgɔʃ+ʃa:g mɔgɔʃ+ʃa:g+ot 'height-ACC'

The lowering root [mɔgɔʃ] 'tall' has to be followed by a quaternary suffix with a low vowel as shown in (26a). If, however, it is followed by a non-lowering suffix, then the quaternary suffix vowel will be mid as in (26b). Thus we can conclude that it is always the lowering or non-lowering quality of the morpheme preceding the quaternary suffix that determines the height of the quaternary suffix vowel.

The analysis proposed by Szentgyörgyi (1999) assumes the Ringen and Vago (1998) analysis just sketched. In this analysis quaternary suffix vowels are specified as [-high] and [ROUND] underlyingly but unspecified for the feature [low]. They gain their backness specifications from the stem they attach to just like all the alternating suffixes[15]. Szentgyörgyi (1999) proposes an alignment constraint that forces lowering morphemes to be followed by [+low] quaternary suffix vowels. This analysis also makes use of an ID-IO$_{low}$ constraint. The constraints are formulated as in (27) and (28):

(27) **Lowering**[16] (ALIGN right lowering morpheme, left [+low])
The right edge of a lowering morpheme is aligned with the left edge of [+low] in an affix.

(28) **IDENT-IO$_{low}$**
Corresponding segments in the input and output have identical specifications for the feature [low].

The following tableaux show how Lowering, IDENT-IO$_{low}$ and other constraints interact to yield the correct surface forms. Capital O stands for a round vowel, unspecified for the feature [low].

[14] Polgárdi and Rebrus (1997) make the interesting observation that all lowering suffixes are inflectional . This does not mean that all inflectional suffixes are lowering. Also, all derivational suffixes are non-lowering, but not all non-lowering suffixes are derivational. Finally, while all quaternary suffixes can be argued to be lowering, it is not true that all lowering suffixes are quaternary.

[15] Although quaternary suffixes never act as roots and it is thus impossible to decide on their underlying backness value, the constraint hierarchy will always select the actual surface form as optimal as shown by Ringen and Vago (1998).

[16] This constraint cannot possibly be universal. In general, Alignment constraints indicate whether morphemes are prefixes or suffixes are language specific although their general format is universal.

(29) SPEC >>

/hold$_{lower}$	
a. ☞ hol	
b.	hol
c.	hol
d.	hol

As we can s
lowering stem, like
suffix vowel. Candid
violates ID-IO$_{low}$ and

(30) Lowering

/tüz$_{(lowerin}$	
a. ☞ tüzɛ	
b.	tüzö
c.	tüze
d.	tüzE

Tableau (30)
ranked the opposite w
surface form, candida
Tableau (31)
quaternary suffix[20]:

(31)

/mɔgɔʃ$_{(low}$	
a. ☞ mɔg	
b. ☞ mɔg	
c.	mɔg

Notice that can
suffix is low although
hierarchy cannot unan
the need for markedne

[17] This candidate also viol
[18] This candidate also viol
[19] Capital 'E' stands for a
[20] Note that the optimal
suffixes.

(29) SPEC >> ID-IO$_{low}$

/hold$_{(lowering)}$ + Ok/	* ɨʌ	SPEC	ID-IO$_{low}$	Lowering	ID-IO$_{round}$
a. ☞ holdɔk			*		
b. holdok			*	*!	
c. holdʌk[17]	*!		*	*	*
d. holdOk		*!		*	

As we can see in tableau (29), the quaternary suffix must be low following a lowering stem, like [hold] 'moon'. Candidates (a) and (b) only differ in the height of the suffix vowel. Candidate (b) is eliminated because it violates Lowering. Candidate (a) only violates ID-IO$_{low}$ and thus wins.

(30) Lowering >> ID-IO$_{round}$

/tüz$_{(lowering)}$ + Ok/	SPEC	ID-IO$_{low}$	Lowering	ID-IO$_{round}$
a. ☞ tüzɛk		*		*
b. tüzök		*	*!	
c. tüzek[18]		*	*!	*
d. tüzEk[19]	*!		*	*

Tableau (30) shows that Lowering has to dominate ID-IO$_{round}$. Should they be ranked the opposite way, candidate (b) would be the winning candidate instead of the actual surface form, candidate (a).

Tableau (31) shows a lowering root followed by a non-lowering suffix and a quaternary suffix[20]:

(31)

/mɔgɔʃ$_{(lowering)}$ + ʃa:g + Ot/	* ɨʌ	ID-IO$_{low}$	Lowering	ID-IO$_{round}$
a. ☞ mɔgɔʃ+ʃa:g+ot		*		
b. ☞ mɔgɔʃ+ʃa:g+ɔt		*		
c. mɔgɔʃ+ʃa:g+ʌt	*!	*		*

Notice that candidate (b) does not violate Lowering because the vowel in the second suffix is low although the suffix is attached to a non-lowering morpheme. Our constraint hierarchy cannot unambiguously select the optimal candidate. This example thus indicates the need for markedness constraints:

---

[17] This candidate also violates the constraint LO/R proposed by Ringen and Vago (1998).

[18] This candidate also violates the constraint Short ɛ proposed by Ringen and Vago (1998).

[19] Capital 'E' stands for a front, unrounded non-high vowel unspecified for the feature [low].

[20] Note that the optimal candidate is selected the same way for non-lowering roots followed by quaternary suffixes.

(32) *o

Short back mid round vowels are prohibited.

(33) *ɔ

Short back low round vowels are prohibited.

If we rank (33) above (32), then short back mid vowels will be preferred to short back low vowels by the grammar. This is exactly what we need for our analysis[21] and this constraint is also supported by the fact that low back rounded vowels are typologically much rarer than their mid counterparts. (34) shows the results of adding the two markedness constraints to the constraint hierarchy[22]:

(34) *ɔ >> *o

/mɔgɔʃ$_{(lowering)}$+ʃa:g+Ot/	* ɨʌ	ID-IO$_{low}$	Low ering	ID-IO$_{round}$	*ɔ	*o
a. ☞ mɔgɔʃ+ʃa:g+ot		*			**	*
b. mɔgɔʃ+ʃa:g+ɔt		*			***!	
c. mɔgɔʃ+ʃa:g+ʌt	*!	*		*	**	

Since the markedness constraints are ranked below Lowering and the other the constraints, adding them does not influence the selection of the optimal candidates in the previous tableaux.

The tableau in (35) shows how the constraint hierarchy selects the actual surface form if a lowering stem is followed by a non-quaternary suffix such as the allative. Specifically, since ID-IO$_{low}$ is ranked above Lowering, no suffix vowel except for those in quaternary suffixes may be lowered:[23]:

(35) ID-IO$_{low}$ >> Lowering

/fɔl$_{(lowering)}$ + hoz/	ID-IO$_{low}$	Lowering	ID-IO$_{round}$	*ɔ	*o
a. ☞ fɔlhoz		*			*
b. fɔlhɔz	*!			*	
c. fɔlhaz	*!		*		

[21] Note that Polgárdi and Rebrus (1997) argue that [ɔ] is the default back linking vowel in Hungarian.

[22] It can also be shown that ID-IO$_{round}$ must outrank *ɔ:

/hɔl/ 'fish'	ID-IO$_{round}$	*ɔ
a. ☞ hɔl		*
b. hal	*!	

[23] It is because all suffixes except quaternary ones are assumed to be specified for the feature [low]; hence lowering of the vowel in a non-quaternary suffix would violate the IDENTITY$_{low}$ constraint.

As can be seen, car
the constraint ranking allo
also saw that if a quaterna
suffix vowel is mid and
constraints.

3. *The Szeged dialect*

In the Szeged diale
Budapest dialect have only
suffix vowel. This can b
ID-IO$_{round}$ have different r
ranked above ID-IO$_{round}$, w
ranking gives the correct r
we consider only candidat

(36)

/vi:z+hoz/
a.☞ vi:s+höz
b. vi:s+hɛz
c. vü:s+höz

(37)

/ha:z+hoz/
a.☞ ha:s+hoz
b. ha:s+hʌz
c. he:s+hɛz

(38)

/tök+hoz/
a.☞ tök+höz
b. tök+hɛz
c. tɛk+hɛz

But if ID-IO$_{round}$
have implications for the c
analysis makes use of thes
quaternary suffixes is co
quaternary suffixes will b
is rounded or unrounded,
what we see in the Szeged

As can be seen, candidate (b) violates both ID-IO$_{low}$ and *ɔ. Thus we conclude that the constraint ranking allows the lowering of quaternary suffix vowels but not others. We also saw that if a quaternary suffix is attached to a non-lowering morpheme, the quaternary suffix vowel is mid and is not lowered, an effect of the ranking of the markedness constraints.

3. *The Szeged dialect*

In the Szeged dialect, suffixes that have three alternants ([hoz], [höz], [hɛz]) in the Budapest dialect have only two alternants ([hoz], [höz]) — there is never unrounding of the suffix vowel. This can be accounted for if we assume that the constraints Link-R and ID-IO$_{round}$ have different rankings in the two dialects. In particular, in Budapest Link-R is ranked above ID-IO$_{round}$, whereas in the Szeged dialect the ranking is the reverse. That this ranking gives the correct results for Szeged is shown in tableaux (36), (37) and (38). Here we consider only candidates which satisfy ALIGN-R and Short ɛ.

(36)

/vi:z+hoz/	IDENT$_{round}$	* üö	LINK-R
a. ☞ vi:s+höz		*	*
b. vi:s+hɛz	*!		
c. vü:s+höz	*!	**	

(37)

/ha:z+hoz/	IDENT$_{round}$	* üö	LINK-R
a. ☞ ha:s+hoz			*
b. ha:s+hʌz	*!		
c. he:s+hɛz	*!		

(38)

/tök+hoz/	IDENT$_{round}$	* üö	LINK-R
a. ☞ tök+höz		**	
b. tök+hɛz	*!	*	
c. tɛk+hɛz	*!*		

But if ID-IO$_{round}$ is ranked above Link-R in the Szeged dialect, then this should have implications for the quaternary suffixes as well. This is because Szentgyörgyi's (1999) analysis makes use of these constraints. More particularly, if Szentgyörgyi's analysis of the quaternary suffixes is correct, then this ranking predicts that the front alternant of the quaternary suffixes will be rounded after regular morphemes, whether the last stem vowel is rounded or unrounded, but low unrounded after lowering morphemes. This is exactly what we see in the Szeged dialect illustrated in (39):

(39) Szeged dialect

Lowering
könv+ɛk 'book' fɔl+ɔk 'wall'
tüz+ɛk 'fire' hold+ɔk 'moon'

Non-lowering
kɔr+ok 'arm' hi:r+ök 'news' kör+ök 'circle'
kor+ok 'age' sirt+ök 'cliff' kürt+ök 'horn'

As shown above, the quaternary plural suffix has two mid alternants, [ok]/[ök], after regular morphemes and two low alternants, [ɔk]/[ɛk], after lowering morphemes. The difference between the Budapest and Szeged dialects then is that quaternary suffixes are never unrounded after non-lowering stems. If Link-R is ranked low in the constraint hierarchy, then it yields the actual surface forms in the Szeged dialect as illustrated below:

(40) $ID\text{-}IO_{round}$ >> Link-R

/hi:r+ Ok/	$ID\text{-}IO_{low}$	Lowering	$ID\text{-}IO_{round}$	Link-R
a. ☞ hi:rök	*			*
b. hi:rɛk	*		*!	
c. hi:rek[24]	*		*!	

The constraint hierarchy selects the actual surface forms as optimal for the other forms as shown below:

(41)

/tüz$_{(lowering)}$ + Ok/	$ID\text{-}IO_{low}$	Lowering	$ID\text{-}IO_{round}$	Link-R
a. ☞ tüzɛk	*		*	
b. tüzök	*	*!		
c. tüzek	*	*!	*	

It is obvious from tableau (41) that ranking Link-R at the bottom of the hierarchy does not have any effect whatsoever on the selection of the optimal candidate in this case. In the case of lowering morphemes, the suffix vowel will be low and thus Link-R, being concerned with front *mid* vowels only, cannot interfere. The same is true of back vowel roots. Link-R has no effect on back roots for it can only be violated by roots followed by suffixes with front vowels[25].

[24] Note that candidate (c) also violates Short ɛ.

[25] Even if a back root is followed by a suffix with a front vowel, it will be penalized by the constraint Align-R, which is ranked much higher than Link-R in the hierarchy.

(42)

/kɔr + Ok/
a. ☞ kɔrok
b. kɔrɔk

In tableau (42) a ba
and candidate (a) is selecte
*ɔ which is violated by car

(43)

/hold$_{(lowering)}$+C
a. ☞ holdɔk
b. holdok

In (43), candidate (b

4. *Conclusion*

In this paper we ha
Budapest and Szeged dialc
three alternants, whereas
alternants in both dialects
unrounded require take qu
roots require that quaternar

We have shown
Optimality Theory. The
described by reversing th
$IDENT_{round}$ faithfulness co
while it is just the opposit
Vago analysis of the bin
quaternary suffixes in Hun
Prince and Smolensky (1
attested dialects of languag

[26] Note that candidates contai
formulation of the constraint. Lo
being followed by a suffix with a

(42)

/kɔr + Ok/	ID-IO$_{low}$	Lowering	ID-IO$_{round}$	Link-R	*ɔ	*o
a. ☞ kɔrok	*				*	*
b. kɔrɔk	*				**!	

In tableau (42) a back non-lowering root is followed by the quaternary plural suffix and candidate (a) is selected. The constraint that decides between candidates (a) and (b) is *ɔ which is violated by candidate (b) twice and by (a) only once[26].

(43)

/hold$_{(lowering)}$+Ok/	ID-IO$_{low}$	Lowering	Link-R	*ɔ	*o
a. ☞ holdɔk	*			*	*
b. holdok	*	*!			**

In (43), candidate (b) violates Lowering and hence (a) wins.

4. *Conclusion*

In this paper we have considered differences between harmonic suffix vowels in the Budapest and Szeged dialects of Hungarian. In the Budapest dialect, ternary suffixes have three alternants, whereas in Szeged there are only two. Quaternary suffixes have four alternants in both dialects, but in the Szeged dialect roots in which last vowel is front unrounded require take quaternary suffixes with [ö], whereas in the Budapest dialect such roots require that quaternary suffixes have [ɛ].

We have shown that these differences receive a straightforward account in Optimality Theory. The differences between the Budapest and Szeged dialects can be described by reversing the relative ranking of the Link-R licensing constraint and the IDENT$_{round}$ faithfulness constraint: in the Budapest dialect the latter dominates the former while it is just the opposite in the Szeged dialect. This provides support for the Ringen–Vago analysis of the binary and ternary suffixes and the Szentgyörgyi analysis of the quaternary suffixes in Hungarian, as well as the claims of McCarthy and Prince (1993) and Prince and Smolensky (1993) that different rankings of constraints yield different and attested dialects of languages.

[26] Note that candidates containing non-lowering morphemes will never violate Lowering because of the formulation of the constraint. Lowering can only penalize forms containing a sequence of a lowering morpheme being followed by a suffix with a non-low vowel.

References

Archangeli, D., and D. Pulleyblank (1994), *Grounded Phonology*, Cambridge MA: MIT Press.

Beckman, J. (1994), Fill 'er up: An Optimality Theory analysis of Shona height harmony, paper presented at the *Annual meeting of the Linguistic Society of America*, Boston.

Beckman, J. (1995), Shona height harmony: Markedness and positional identity, in Beckman et al. (1995).

Beckman, J. (1997), Positional faithfulness, positional neutralisation, and Shona vowel harmony, *Phonology* 14.1, 1-46.

Beckman, J. (1998), *Positional Faithfulness*, University of Massachusetts, PhD Dissertation.

Beckman, J., L. Dickey and S. Urbanczyk, eds. (1995), *UMOP 18: Papers in Optimality Theory, GLSA*, Amherst, MA.

Ewen, C., and H. van der Hulst (1985), Single-valued features and the non-linear analysis of vowel harmony, *Linguistics in the Netherlands*, ed. by H. Bennis and F. Beukema, 317-36, Dordrecht: Foris.

Ellison, T. M. (1995), Phonological derivation in Optimality Theory, unpublished ms., University of Edinburgh.

Hulst, H. van der (1985), Vowel harmony in Hungarian: a comparison of segmental and autosegmental analyses, *Advances in Nonlinear Phonology*, ed. by H. van der Hulst and N. Smith, 267-303, Dordrecht: Foris.

Kaun, A. (1995), *The Typology of Rounding Harmony: An Optimality Theoretic Approach*, UCLA, PhD Dissertation.

Kiparsky, P. (1981), Vowel harmony, unpublished ms.

Kirchner, R. (1993), Turkish vowel disharmony in Optimality Theory, paper presented at *ROW* #1.

Kornai, A. (1987), Hungarian vowel harmony, *WCCFL* 6:147-161.

Levergood, B. (1984), Rule governed vowel harmony and the Strict Cycle, *Proceedings of NELS* 14:275-93, GLSA, Amherst.

Maddieson, I. (1984), *Patterns of Sound*, Cambridge: Cambridge University Press.

McCarthy, J., and A. Prince (1993), Generalized alignment, *Yearbook of Morphology*, 79-154.

McCarthy, J., and A. Prince (1995), Faithfulness and reduplicative identity, in Beckman et al. 1995.

Polgárdi, K., and P. Rebrus (1997), Two default vowels in Hungarian? *Proceedings of HILP3*, Amsterdam

Polgárdi, K., and P. Rebrus (1998), Vowel harmony and government in Hungarian, in *Approaches to Hungarian* 6, ed. by C. de Groot and I. Kenesei.

Prince, A., and P. Smolensky (1993), *Optimality Theory: Constraint Interaction in Generative Grammar*, Rutgers University: Technical Report #2 of the Rutgers Center for Cognitive Science.

Ringen, C., and R. Vago (1998), Hungarian vowel harmony in Optimality Theory. *Phonology* 15.3, 393-416.

Steriade, D. (1995), Underspecification and markedness, in *Handbook of Phonological Theory*, ed. by J. Goldsmith, 114-174, Oxford: Basil Blackwell.

Szentgyörgyi, Sz. (1999), Hunga *Proceedings of DOXIMP3*.

Vago, R. (1980), *The Sound Pat* Press.

Zoll, C. (1996), Parsing Below Dissertation, U.C. Berkele

Szentgyörgyi, Sz. (1999), Hungarian quaternary vowel harmony in Optimality Theory, *Proceedings of DOXIMP3*, ed. by V. Trón, 193-220, Budapest: ELTE University.

Vago, R. (1980), *The Sound Pattern of Hungarian*, Washington: Georgetown University Press.

Zoll, C. (1996), Parsing Below the Segment in a Constraint Based Framework, PhD Dissertation, U.C. Berkeley.