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CONTENTS

Nádasdy, Á.–Siptár, P.: Issues in Hungarian phonology: Preliminary queries to a new project 3

Dressler, W.U.–Siptár, P.: Towards a natural phonology of Hungarian 29

Fónagy, I.: On status and functions of intonation 53

Gósy, M.: Vowel harmony: interrelations of speech production, speech perception, and the phonological rules 93

Jensen, J.T.–Stong-Jensen, M.: Vowel length alternations in Hungarian 119

Kálmán, L.: Monotonicity in phonology 133

Kenesei, I.–Vogel, I.: Prosodic phonology in Hungarian 149

Nádasdy, Á.: Consonant length in recent borrowings into Hungarian 195

Siptár, P.: On fast speech 215

Szende, T.: On how we speak when we speak as we speak (Multi-layer *PR* and (post-)postlexical processes in Hungarian) 225

Törkenczy, M.: Does the onset branch in Hungarian? 273

Vago, R.M.: Empty consonants in the moraic phonology of Hungarian 293

Varga, L.: The stylized fall in Hungarian 317

Vogel, I.: Prosodic constituents in Hungarian 331

Weijer, J. van de: The formation of diminutive names in Hungarian 351

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ISSUES IN HUNGARIAN PHONOLOGY: PRELIMINARY QUERIES TO A NEW PROJECT

ÁDÁM NÁDASDY–PÉTER SIPTÁR

0. Preliminaries

This paper was originally written as as a 'reminder' for participants of a Hungarian Phonology Project launched in 1987 at the Linguistics Institute of the Hungarian Academy of Sciences. It raises a few issues that the present authors think are to be discussed and tentatively agreed on before the project gets under way. Some of these issues are genuinely open, others are apparently settled but not in what we think is the proper way. In what follows, we are going to give a sketchy account along the lines we think we should proceed in some cases; in others, we merely raise the problems. As this paper was originally conceived of as internal discussion material, references are omitted throughout.

1. Transcription

To begin with the most basic technicalities, we are going to suggest a transcription system for Hungarian. Only 'broad' sound types are going to be dealt with here; how to represent finer distinctions—if and when these are needed in a **phonological** discussion—will be left for the individual authors to decide. We have tried to make the suggested transcription system conform to the following desiderata:

a) It should be easy to type. Reduce to minimum the symbols that a conventional typewriter cannot produce. Hence e.g. the vowels in *hat* 'six', *vet* 'cast' are to be written simply as /a/ and /e/, respectively; the roundness of *a* and the openness of *e* will be understood by convention. (In phonetic transcription, where needed, they may be represented as [ɔ], [ɛ].)

b) It should be kept similar to Hungarian orthography. Thus, we suggest /j/ for the consonant in *jó* 'good', similarly /ö/ and /ü/ for the rounded front vowels.

c) American tradition, rather than British/IPA conventions, should be followed. The literature of modern phonology uses the former, including major treatments of Hungarian (like Hall or Vago). Thus e.g. the consonants in *só* 'salt', *cső* 'tube' will be written as /š/, /č/.

d) The symbol /c/ is ambiguous and should be avoided. In the literature, it is used either for the initial consonant of *cél* 'aim' or that of *tyúk* 'hen'. The first squares with Hungarian orthography (e.g. *cél* = /ce:l/) but is on the whole less widespread, and brings in an asymmetry with respect to *dz* (cf. *léc* – *lécből* 'lath/of lath') since the latter can only be represented as /d^{z}/ at best. (/ʒ/ is another possibility for *dz*; but it is ambiguous—IPA /ʒ/ = our /ž/, does not resemble the orthographic symbol, and cannot be produced on a typewriter.) The second interpretation (i.e. *tyúk* = /cu:k/) is so much at odds with Hungarian orthography that it is a constant source of misunderstanding. Our suggestion is /t^{s}e:l/, /t^{y}u:k/.

e) There are five consonants that we think are best represented by compound symbols: /t^{y}, d^{y}, n^{y}; t^{s}, d^{z}/. The second letter is raised in order to

(i) make sure that the 'one segment – one letter' principle is observed, at least in terms of non-raised characters. Thus, *koca* 'sow' is represented by four symbols: /kot^{s}a/ since the raised character does not 'count';

(ii) make it possible to represent differences as in *rácáfol* 'refute' vs. *átszálló* 'junction': /ra:t^{s}a:fol/ vs. /a:tsa:lo:/ (or -/llo:/).

Once /t^{y}/ is introduced, *gy* = /d^{y}/ and *ny* = /n^{y}/ follow (as in Vago); this looks satisfactory to us. The reason why the letter *y* is preferred to *j* is that /t^{j}/ etc. suggest palatalized dentals; /t^{y}/ etc. would also if the palatal semivowel were represented as /y/ but we have already discarded that possibility. Symbols like /ȶ/, /ȡ/ might also be proposed, but then /ȵ/ would result for the palatal nasal which looks too much like the conventional symbol for the velar nasal. (/ɲ/ would be better but this is not easy to reproduce on most typewriters.)

It is somewhat unfortunate that the affricates are not represented in a uniform manner (/č/, /ǰ/ vs. /t^{s}/, /d^{y}/); this might be avoided by using /t^{š}/, /d^{ž}/ for the palato-alveolars, but the loss in simplicity is not sufficiently made up for by the gain in transparency, especially that the symbols /t^{š}/, /d^{ž}/—strictly speaking—misrepresent the place of articulation for the initial portions of these affricates.

In the tables below the proposed transcription system is summarized; along with the phoneme symbols, some major speech sounds (of doubtful status) are also included. Phonetic symbols are only given where they differ from the corresponding phonemic characters. It should be noted, however, that in most cases simple orthographic forms can also be quoted; transcription should be restricted to cases where the conventional orthography would be misleading or inadequate.

Vowels

Letters	Phonological transcription	Phonetic symbols	Alternative symbols used in other works
a	/a/	[ɔ]	[ɒ]
á	/a:/	=	–
h*a*rdver	?	[ȧ]	[a]
*a*rra	?	[ɔ:]	[ã], [ɒ:]
aj*á*nl	?	[ã:]	–
e	/e/	[ɛ]	[æ]
é	/e:/	=	–
gyer*e*k	?	[ë]	[e]
*e*rre	?	[ɛ:]	[ē]
i	/i/	=	–
í	/i:/	=	–
o	/o/	=	–
ó	/o:/	=	–
ö	/ö/	=	[ø], [œ]
ő	/ö:/	=	[ø:]
u	/u/	=	–
ú	/u:/	=	–
ü	/ü/	=	[y]
ű	/ü:/	=	[y:]

Consonants

Uncontroversial: p b t d k g
f v
m n l r

The rest:

Letters	Phonological transcription	Phonetic symbols	Alternatives in other works	Examples
sz	/s/	=	–	
z	/z/	=	–	
s	/š/	=	/ʃ/	
zs	/ž/	=	/ʒ/	
cs	/č/	=	/tʃ/	
dzs	/ǰ/	=	/dʒ/, /ǯ/	
c	/t^{s}/	=	/ts/, /c/	
dz	?	[d^{z}]	/dz/, /ʒ/	
ty	/t^{y}/	=	/c/	
gy	/d^{y}/	=	/ɟ/	
ny	/n^{y}/	=	/ɲ/	
h, ch	/h/	[x́]	– [ç]	i*h*let, pe*ch*, te*ch*nika
h, ch	/h/	[h], [ɦ]	– [x]	*h*ír, gólya*h*ír, Ba*ch*, ma*ch*inál
j, ly	/j/	[j]	/y/	*j*ó, pá*ly*a
j	/j/	[ç]	–	kap*j*

Length: double consonant symbols (see below); e.g.

reccs /rečč/ 'crack' *adta* /atta/ 'he gave it'
hattyú /hat^{y}t^{y}u:/ 'swan' *látja* /la:t^{y}t^{y}a/ 'he sees it'
vicces /vit^{s}t^{s}eš/ 'funny' *lesz* /less/ 'will be'

Devoicing (for sonorants): subscript circle, e.g. [r̥].
Stress: vertical stroke before the syllable (if necessary): /ˈmajd el ˈpustult/ 'he almost died'.

Further examples:	*kétsoros* /ke:tšoroš/ 'double-breasted'
pác /pa:t^s/ 'pickle'	*barackból* /barad^{z}gbo:l/ 'from peach'
csurran /čurran/ 'spill'	*csekélység* /čeke:jše:g/ 'trifle'
gyöngy /d^yö$n^y$$d^y$/ 'pearl'	*átjött* /a:tjött/ 'he came over'

2. Long consonants or geminates?

Vowel length, then, will be indicated by a colon, including /a/–/a:/, /e/–/e:/.

2.1. However, we suggest that consonant length should be indicated by doubling. One of our reasons is a practical one: Hungarian orthography—as well as that of many other languages—does exactly that. As a phonological issue, consonant length is trickier: do we have, in *olló* [ol:o:] 'scissors', a geminate (/ollo:/) or a long /l:/ (/ol:o:/)?

2.2. Does the place of the syllable boundary have anything to do with this issue? One type of reasoning says that whenever a geminate is 'ambisyllabic' in the loose sense that its first 'half' closes one syllable and the second opens another, we have a cluster of two identical consonants (/ol–lo:/); whereas if all of it is in the same syllable—a state of affairs that may only arise word finally in Hungarian—it is a single long consonant (e.g. *ott* /ot:/ 'there'). This might as well be true, but it would bring chaos to our phonological transcription—notice that *ott* /ot:/ would then differ from *ottan* /ottan/ 'id.' or *ott is* /ottiš/ 'there, too' in transcription (and, by implication, in analysis).

2.3. Does consonant shortening/lengthening help?

	Long		Short	
1.	o*tt* 'there'	[t:]	o*tt* van 'it is there'	[t]
2.	csö*pp* 'drop'	[p:]	csö*pp*nyi 'a little'	[p]
3.	íro*tt* 'written'	[t:]	ír*t* 'wrote'/'written'	[t]
4.	lo*bb*an 'flare'	[b:]	lo*b*og 'blaze'	[b]

As the examples suggest, the same morpheme may appear with a long consonant in some cases, and with a short consonant in others. This is mostly a mechanical consequence of phonetic context (i.e. the result of a rule of neutralization): in examples 1 to 3 above the long version must be underlying, and shortening automatically applies next to another consonant. In example 4, however, it appears that we also have a lengthening rule: this is triggered by the suffix *-An*, hence the change is morphologically conditioned here. (Autosegmentally speaking, we might suggest that the instantaneous suffix is of the shape -*CAn*, where C denotes an empty (unassociated) consonant slot, and A is a low vowel unspecified for backness that regularly undergoes vowel harmony; as the suffix is attached to stems like *lob-*, *poty-*, *csöp-*, the segmental matrix ('melody') of the stem final consonant will spread onto the empty consonant slot of the suffix.) However, *potty* 'plop', *csöpp* 'drop' end in long consonants in isolation as well. Is it perhaps the case that we do not have lengthening before -*An* but, rather, shortening before -*Og*? But then how can that shortening be accounted for? (Notice that *kattog* 'clatter', *csattog* 'flutter', *brummog* 'growl' etc. do not shorten.)

Now if we interpret the alternations above as 'double /tt/ vs. single /t/' rather than 'long /t:/ vs. short /t/', we cannot speak about shortening/lengthening but we have to recognise consonant deletion/insertion instead. I.e., *csöpp* will 'drop' one of its /p/'s before -*nyi*, and *lob* will 'acquire' another /b/ before -*An*, etc. This looks rather distressing from a taxonomic phonemic point of view. In traditional generative terms, on the other hand, there is nothing wrong with a rule like

$$\mathrm{C_iC_i} \longrightarrow \mathrm{C_i} \ / \ \mathrm{Y} \ \_\_ \ \mathrm{Z}$$

for the shortening (i.e. degemination) cases and the opposite for lengthening (gemination). Coindexing is a rather powerful notational device, however; in more recent versions of generative phonology it is avoided, if possible. Hence, the only remaining formal possibility (short of C $\longrightarrow$ [–long]/ Y __ Z) is the autosegmental solution

$$\begin{array}{ccc} \mathrm{C}\quad\mathrm{C} & \longrightarrow & \mathrm{C} \ / \ \mathrm{Y} \ \_\_ \ \mathrm{Z} \\ \diagdown\!\diagup & & | \\ \mathrm{X} & & \mathrm{X} \end{array}$$

Notice that in the autosegmental framework the whole dilemma discussed in this section reduces to a mere notational issue. Whether we transcribe a geminate as /t:/ or /tt/, what it really is, on this view, is $\begin{array}{c}\mathrm{C}\quad\mathrm{C}\\ \diagdown\!\diagup\\ \mathrm{t}\end{array}$, i.e. a single segment on the melodic tier associated with two timing slots, hence it is **both** a 'long segment' and a 'geminate' at the same time. It is still distinct—in principle, if not in Hungarian surface forms—from a 'cluster of identical consonants', $\begin{array}{cc}\mathrm{C} & \mathrm{C}\\ | & |\\ \mathrm{t} & \mathrm{t}\end{array}$, see below.

2.4. What happens on concatenation of morphemes? How does the [t:] in *matt* 'unpolished' differ from [t:] in *maradt* 'remained'? Phonetically, they are identical. Grammatically, however, they are quite distinct: the last two consonants of *maradt* are separated by a morpheme boundary. The fact that, on the surface, *matt* and *maradt* form a perfect rhyme (end identically), is due to (voice assimilation and) a very late (postlexical) rule saying that two adjacent identical consonant segments will appear on the surface as a single long consonant. Schematically, this rule could be written as

$$/C_iC_i/ \longrightarrow [C_i{:}]$$

or else, in autosegmental terms (of course, *maradt* is not the proper example here since Voice Assimilation already creates a linked structure; the rule, however, is still needed for cases like *hattól* 'from six'):

$$\begin{array}{ccccc} C & C & \longrightarrow & C & C \\ | & | & & \multicolumn{2}{c}{\vee} \\ X & X & & \multicolumn{2}{c}{X} \end{array}$$

The derivations then run roughly as follows:

Underlying:	/marad+t/	/matt/
1. Voice Assimilation:	maratt	–
2. Long Cons. Formation:	marat:	mat:
Surface:	[mɔrɔt:]	[mɔt:]

The rule of LCF is obligatory and context-free (it neutralizes the distinction between /tt/ and /t:/). Since it is postlexical, it also applies across word boundary, cf. ma*tt* = mara*dt* = ha*t* *t*ojás 'six eggs' = va*d* *t*áj 'wild scenery'. [In fact, it may not even be a language specific rule of Hungarian: it is one of the possible outcomes of the universal OCP (obligatory contour principle)]. Hence, we may safely opt for the type of transcription (and phonological analysis) that represents the pre-LCF stage (i.e. /tt/ etc.) in morpheme-internal cases as well.

2.5. Are vowel length and consonant length analogous?—The rule of LCF (actually, its possible counterpart 'LVF') does not apply to vowels:

leesik 'fall of'	$\not\rightarrow$	*[lɛ:šik], *[le:šik]
bantuul 'in Bantu'	$\not\rightarrow$	*[bɔntu:l]
ki indít 'who starts'	$\not\rightarrow$	*[ki:ndi:t]

(However, a vowel degemination rule may apply in fast speech, merging two adjacent identical short vowels into one **short** vowel, with the output being one syllable rather than two.)

That is, in vowels the distinction /ii/ vs. /i:/ is well founded (they do not get neutralized), in consonants the distinction /tt/ vs. /t:/ is spurious (they get neutralized). For consonants, practical (cf. **2.1**) and theoretical (cf. **2.4**) considerations both favour the notation (and analysis) /tt/. (By contrast, in phonetic transcription we will retain [t:] to suggest the effect of LCF. Hence we are also able to indicate occasional cases where the LCF fails to apply. This normally happens with affricates (across word boundary): *Tóth Tamás* [-t:-] but *Gács Csaba* [-čč-] <proper names>, except in fast speech where [-č:-] is also possible.)

2.6. In sum: long vowels are better treated as independent entities ('phonemes'), since /ii/ $\neq$ /i:/. Doubling the whole inventory of consonants, however, is superfluous and pointless. Anybody who wants to claim that Hungarian has fifty, rather than twenty-five, distinctive consonant phonemes will soon bump into Occam, coming with razor in hand.

3. Vowel length: SLH or ECH?

In present-day Hungarian, vowel length shows a certain degree of variability. The point of this section is not simply to draw attention to this fact—it is generally known anyway—but to propose that, in phonological discussion, the variants that actually occur in educated speakers' normal pronunciation should be taken as a point of departure. In other words, it is not literary/stage/radio pronunciation (Standard Literary Hungarian) and—even less—the naturally obsolete orthographic forms that we should consider the type of data to be accounted for, but rather what can be labelled Educated Colloquial Hungarian, i.e. our own speech. Of course, this does not only apply to vowel length; but this is a rather appropriate example given that the differences are easier to pin down in this area. Consider the following:

Spelling	SLH (obsolete)	ECH (= normal, unmarked)	Gloss
fiú	†/fiu:/	/fiu/	boy
tetű	†/tetü:/	/tetü/	louse
házból	†/ha:zbo:l/	/ha:zbol/	from the house
hegyről	†/hed^{y}rö:l/	/hed^{y}röl/	down the hill
óvoda	†/o:voda/	/ovoda/	nursery school
vízi	†/vi:zi/	/vizi/	water (adj.)
árboc	†/a:rbot^s/	/a:rbo:t^s/	mast

We are aware that this decision will introduce a lot of uncertainty, even controversial data, into our discussions. It would be much easier to simply confine ourselves to literary pronunciations as they appear in a conventional dictionary. But isn't it equally clear, especially to phonologists, that the real data are not to be found in dictionaries? Therefore, we propose that actually occurring ('colloquial') forms should be considered to be the norm—at least in cases where the differences are obvious—and literary pronunciation should only be mentioned for completeness' sake, if at all.

4. Marginal vowels

In this section, we will give a brief overview of issues concerning the phonological status of unrounded short [å], mid [ë], as well as long [ɔ:] and [ɛ:].

4.1. Unrounded short [å] (IPA [a])

Unrounded [å] appears on the surface (apart from regional dialects) in the following cases:

(i) In nonfinal closed syllables it is the normal (colloquial) realization of /a:/, as in *általános* [åltɔla:noš] 'general', *vásárváros* [va:šårva:roš] 'market town'; in certain phonetic contexts with vacillation (where the postlexical shortening rule concerned is optional/rate-dependent): *áttekinthető* [åt:ɛkinthɛtö:] ~ [a:t:ɛkinthɛtö:] 'perspicuous'.

(ii) Also with [å] ~ [a:] free variation in words like *Svájc* 'Switzerland', *spájz* 'larder', *Mozart* (here, however, 'free variation' means inter-speaker variability rather than intra-speaker vacillation).

(iii) On the other hand, [å] ~ [ɔ] (inter-speaker) variation is found in words like *gavott* 'gavotte', *hardver* '(computer) hardware', *Csajkovszkij*

'Tchaikovsky', and in *hallό* [hȧlo:] 'hullo' as used in phone calls (where classical minimal pairs can also be found for both [ɔ] and [a:]: *haló* 'dying' vs. *halló* [ȧ] 'hullo' vs. *háló* [a:] 'net').

The question that arises at this point is what the phonological status of all these [ȧ]'s can be. There are a number of convincing arguments to the effect that /a/ behaves morphophonologically as a nonround vowel (cf. the length alternation /a:/ ~ /a/ and the vowel harmony alternation /e/ ~ /a/; in both cases an intermediate nonround low back vowel is derived that surfaces via an /a/ ⟶ [ɔ] realization rule). Since the rounding of /a/ is phonologically irrelevant (non-distinctive), and phonetically rather moderate as opposed to mid and especially high back vowels (though this does not weigh much in phonology), it is at least possible to claim that /a/ is in general (i.e. not only in the alternating cases) underlyingly nonround. (Consider a parallel case: the centrality of [a:] and the fact that in terms of tongue height it is lower than [ɔ] or [ɛ] are just as redundant phonologically as the roundness of [ɔ] is; consequently, although phonetically it is central and 'lower low', in the phonological pattern of Hungarian it behaves as a low back vowel. Hence, if the roundness of [ɔ] also proves irrelevant, the *a* ~ *á* alternation will fit the rest of the pattern where alternants only differ in length (cf. **4.2** on *e* ~ *é*).)

Now if we accept this reasoning, the following can be said about the three groups of surface [ȧ]'s exemplified above:

(i) In addition to the morphophonological rule /a:/ ⟶ /a/ (*nyár* ~ *nyarat* 'summer' nom./acc.), followed by rounding adjustment /a/ ⟶ [ɔ], there is also a surface (postlexical) shortening rule that will of course be applied (much) later than rounding adjustment and whose output will therefore remain unrounded.

(ii) For speakers who say [špȧjz] etc., underlying nonround /a/ will be a (lexical) exception to rounding adjustment in these words; for other speakers, the lexical representation is /špa:jz/ to which shortening or rounding adjustment will of course be inapplicable.

(iii) The word *halló*—and, for some speakers, the set of words belonging to this category—is exceptional in that it will be (optionally or categorically) exempt from the rounding adjustment /a/ ⟶ [ɔ]. (Alternatively, in terms of underspecification theory, garden-variety /a/ will be underlyingly unspecified for rounding whereas the vowel in *halló* etc.—and *spájz* etc. for [ȧ] speakers—will be specified as [– round]; rounding adjustment would then be a 'fill-in rule' in that it cannot **change** feature specifications, only fill in blanks; the desired result then follows without any rule exception feature.)

In sum: if these conjectures are on the right track, nonround /a/ is not 'marginal'—in fact, it is one of the most loaded elements of the Hungarian vowel system; what is marginal is the range of cases where it surfaces unaltered.

4.2. Short mid [ë] (IPA [e])

The case of mid [ë] is in some respects similar to that of [å], in others it is quite different. On the surface it appears with regional/cultural restrictions (i.e. in certain regional varieties): its use is much wider than that of—dialectal!—[å], but does not include standard Hungarian in the strict sense. (The postlexical shortening of /e:/ as in the second syllable of *keménység* 'hardness' results in a vowel tenser than [ë], just like that of /o:/ and /ö:/; that is, [ë] and [e:], [o] and [o:], [ö] and [ö:] differ not only in length but also in tenseness.)

If, in standard Budapest Hungarian, [ë] does not appear even to the limited extent that [å] does, why do we mention it here? The reason is that Hungarian morphophonology works **as if** there was an /ë/ in the system. The nonround member of the alternation *o* ~ *ö* ~ *e* (at the level of the immediate output of the rule) is mid, whereas the front member of the alternation *á* ~ *é* and the long member of *e* ~ *é* (*kefe* ~ *kefét* 'brush' nom./acc.) are low (at the same level), hence an *e/é*-adjustment (redundancy) rule is needed to convert such derived *e*'s into a low, and derived *é*'s into a mid (and tense) vowel. These facts, however, are still not sufficient to justify an underlying /ë/, unless the ambiguous behaviour of *e* in vowel harmony could be explained by positing mid /ë/ along with low /e/ (but this is a long story, and we are not going to discuss it further here).

4.3. Long [ɔ:], [ɛ:]

Along with the surface shortening rule mentioned in the previous two sections, there are surface lengthening rules as well. 'Pause-substituting' (hesitational or phrase-final) and emphatic lengthenings do not convert short vowels into their long counterparts; rather, they either leave vowel quality unaffected or modify it in another direction (e.g. emphatic *ooolyan* 'so much' with an *o* opener than usual, whereas long /o:/ is closer/tenser than /o/). Other types of surface lengthening will produce [i:] out of /i/, [o:] out of /o/, etc. For instance, names of letters and sounds are usually quoted in a lengthened version, e.g. *Ezt rövid* [i:]-*vel kell írni* 'This is spelt with short I', *A magyarban nincs rövid* [o:]-*ra végződő szó* 'There are no word-final short O's in Hungarian', etc.

However, such (surface) lengthening of [ɔ] and [ɛ] will produce [ɔ:] and [ɛ:] rather than [a:] and [e:]. (This can be explained simply by assuming that such lengthening takes place at a point where the adjustment rules mentioned above have already applied.) For instance, the length of the initial vowels in *erre* [ɛ:rɛ] 'this way' and *arra* [ɔ:rɔ] 'that way' can be derived by compensatory lengthening although, on a strictly taxonomical view, these are independent (micro)phonemes, cf. the minimal pairs *erre* 'this way'/*ere* 'his vein', *arra* 'that way'/*ara* 'bride': [ɛ:rɛ/ɛrɛ], [ɔ:rɔ/ɔrɔ].

The names of the letters/sounds *a* and *e* exhibit a curiously intricate pattern. The basic case can be observed in contexts like *nagy* [ɔ:]-*val írjuk* 'it is spelt with capital A', *kétféle* [ɛ:]-*vel beszél* 'he distinguishes two types of E in his speech', etc. (Minimal pairs can be found again: *a-hoz* [ɔ:hoz] 'to A' vs. *ahhoz* [ɔhoz] 'to that', *e-szer* [ɛ:sɛr] 'E times' vs. *eszer* [ɛsɛr] 'Social-Revolutionary', *a-féle* [ɔ:fe:lɛ] 'of the type A' vs. *afféle* [ɔfe:lɛ] 'sort of', *e-be* [ɛ:bɛ] 'into E' vs. *ebe* [ɛbɛ] 'his dog', etc.) On the other hand, the musical notes A and E are called [a:] and [e:], and the word *ábécé* 'alphabet' itself makes it likely that the name of the letter A used to be pronounced [a:] (latinate influence?). Letters used for identification show an even more chaotic picture: the bus *7/a* is [he:t ɔ:], but a school class *7/a* is [he:t a:] (although *7/e* is [ɛ:] rather than [e:]); *A épület* 'building A' can be either [ɔ:] or [a:] but *E épület* can only be [ɛ:]; in geometry, *a pont* 'point A' is either [a:] or [ɔ:] but *e pont* is always [ɛ:], etc. Abbreviations, if they are pronounced as a sequence of letters, contain [a:] and [e:] if A or E is initial (*AB* 'abortion committee', *EKG* 'electrocardiogram') but [ɔ] and [ɛ:] if final (*MTA* 'Hungarian Academy of Sciences', *BSE* 'Budapest Sports Club'). Those abbreviations that are read out as words (*USA* 'United States', *ELTE* 'Eötvös Loránd University') behave as normal words do: they end in short [ɔ]/[ɛ] which regularly undergoes Low Vowel Lengthening ([uša:bɔn] 'in the US', [ɛlte:röl] 'from ELTE'), hence they are uninteresting for our present purposes. What is much more interesting though is that [ɔ:] and [ɛ:] **never** undergo LVL: [ɛmte:ɔ:vɔl], not [ɛmte:a:vɔl] if the nominative is [ɛmte:ɔ:]. (See also the examples listed earlier in this paragraph.)

Now, are [ɔ:] and [ɛ:] to be regarded as independent (micro)phonemes or as rule-generated realizations of [ɔ]/[ɛ] ? Cases like *arra* can be explained by (lexically conditioned) compensatory lengthening, despite (surface) minimal pairs. But if the name of the letter E is underlyingly a short /e/ (=[ɛ]), how can its surface lengthening block the application of a morphophonological rule like LVL (cf. *e-nek* [ɛ:nɛk] 'for E' ≠ *ének* [e:nɛk] 'song')?

5. Semivowels and diphthongs

According to the traditional classification, Hungarian /j/ is an obstruent, in particular, a fricative. This is not borne out by either its phonetic or phonological properties. Phonetically, the 'elsewhere' allophone of /j/ is a palatal approximant since no noise is generated as it is produced. There is one type of context where one of its fricative allophones appears: postconsonantal final position (before pause). Here, if the preceding consonant is voiceless, a voiceless (fortis) palatal fricative ([ç]) is pronounced: *kapj* 'get-IMP', *rakj* 'put-IMP', *döfj* 'stab-IMP'; if the preceding consonant is voiced, a lenis palatal fricative appears which, due to a very general and very late rule, loses most of its voicing but does not become fortis: *férj* 'husband', *dobj* 'throw-IMP', *szomj* 'thirst'.

Phonologically, /j/ cannot be an obstruent either; if it were, it should participate in voicing assimilation (cf. *ajtó* *[ɔçto:] 'door', *fáklya* *[fa:gjɔ] 'torch').

5.1. But if /j/ is not a fricative, what is it? The offhand answer to this question is that it is a semivowel (glide). But then another question arises: are there diphthongs in Hungarian? Inaccurate questions deserve inaccurate answers: whether we answer yes or no, we miss some of the truth. The point is that we have to distinguish phonetic and phonological diphthongs. The existence of phonetic diphthongs is not a matter of analysis: it is a matter of fact. It is the phonological analysis of (phonetic) diphthongs (which unquestionably do occur in Hungarian utterances) where argumentation is necessary (or at all possible).

Now there are quite reliable arguments that there are no diphthongs in the **phonological** system of Hungarian. First of all: since /j/ may occur before/after almost any vowel, introducing diphthong-phonemes would almost triple the inventory of Hungarian vowels without the description gaining anything at all. Secondly, Hungarian 'diphthongs' never alternate with monophthongs (cf. English *crime/criminal* etc.). Further arguments are provided by the selection of the definite article before jV-initial words (*a játék* 'the game', **az játék*) and the form of the instrumental suffix on Vj-final words (*vajjal* 'with butter', **vajval*). Finally, the fact that /j/ can be geminated (as in *vajjal*) is in itself sufficient to exclude the possibility of a diphthongal analysis.

5.2. In short, *jV* and *Vj* sequences cannot be analysed as phonological diphthongs. But are there other types of diphthongs in Hungarian? There is one possible candidate left: *au* as in *autó* 'car', *augusztus* 'August', *tautológia* 'tautology', *kalauz* 'ticket inspector', etc. The first problem is whether *au* in such words is tautosyllabic or not. The intonation of yes/no questions indicates that *autó* 'car' (for a substantial number of Hungarian speakers) is disyllabic (cf. *Megjött már az* ↑*au*-↓*tó*? 'Has the car arrived yet?', and not: *a*-↑*u*-↓*tó*?). However, the same test proves that *kalauz* is definitely trisyllabic; and it is inapplicable to *augusztus*, *tautológia*. Be that as it may, at least in *autó* (and presumably in all compounds in *autó*- or *auto*-, e.g. *autójavító* 'car repair shop', *automatizálás* 'automation') there is phonetic [ɔw] in at least some Hungarians' speech. This can be analysed phonologically in three ways: as a diphthong /aw/, as a vowel+glide sequence /a/+/w/, or as a vowel sequence /a/+/u/ (with a—possibly optional—realization rule /u/ $\longrightarrow$ [w]/ a ___). Which analysis is correct? Given the more or less marginal lexical load and the overall variability of the whole phenomenon, the third solution appears to be the most preferable; at any rate, the first possibility can be safely excluded, hence the last putative diphthong can be eliminated from the system.

5.3. Returning now to the question of how to classify /j/, we have seen that it is not an obstruent—but not the nonsyllabic portion of a diphthong either. Consequently, it will either be a glide or a liquid. Although traditionally the label 'liquid' (and the corresponding combination of major class features) is reserved for /l/ and /r/, there are good reasons to believe that the whole idea of 'glides' subsuming—in English—prevocalic /j/ and /w/ as well as the nonsyllabic portion of diphthongs like /aɪ/ and /aʊ/ is misguided in the first place. Hence, it appears feasible, even in English, to extend the category of 'liquids' (nonnasal sonorant consonants) to include prevocalic /j/ and /w/ along with /l/ and /r/ and reserve the category 'glide' (nonsyllabic nonconsonant) to the offglides of diphthongs. (Notice that the central postalveolar approximant [ɹ] and the palatal approximant [j] differ in place of articulation only; in all other respects (including distribution) they are completely parallel.)

In Hungarian, the solution sketched here is even less controversial: we are not aware of any argument that would diminish the appeal of a classification that recognizes six sonorant consonant phonemes in Hungarian: nasal /m n n^y/ and nonnasal /l r j/; call the latter 'liquids' if a label is needed.

6. Palatalization

Let us define 'palatalization' as a phonological process in which a consonant is affected by a following palatal consonant, i.e. /j/, /t^y/, /d^y/, or /n^y/. (In particular, let us exclude the fully automatic, low-level, non-neutralizing—and probably non-language-specific—type of 'phonetic palatalization' that is triggered by nonlow front vowels and /j/ and produces more or less palatalized velars/dentals/labials as in *kín* 'torture' vs. *kút* 'well'. This will be classed as 'no palatalization' below.) In Hungarian, two major types (and several subtypes) of palatalization can be distinguished.

6.1. Lexical palatalization

There is, first of all, the grammatical (i.e. 'pre-phonological') palatalization of the *lát–lássa* 'see/let him see' type. This is non-neutralizing (as there is also *látja* 'he sees it'). We are not going to discuss this type here.

The classical, 'par excellence' type of palatalization is also triggered by /j/ but the result is a palatal consonant in the strict sense. This rule applies across certain types of morpheme boundary only, e.g.

látjátok [la:t^y:a:tok]	vs.	*átjárok* *[a:t^y:a:rok]
'you-pl. see it'		'I (often) go through'

Such differences should provide an important criterion for determining the domain of application of a rule (i.e. whether it is lexical or postlexical).

What segments are palatalized by /j/? Labials and velars are immune to palatalization: *szomjas* 'thirsty', *bakjuk* 'their buck'. Consider next the behaviour of sibilants before /j/. Sequences like /sj/, /žj/ are fairly rare: their infrequent occurrence is partly due to the pre-phonological rules mentioned earlier in this section (cf. 8.4 on possessive *-j-*). But sibilant + /j/ sequences are not prohibited in general: *grízjellegű* 'farina-like', *Vászja* 'Vassya', *elegem van az uram "kuss"-jaiból* 'I am fed up with my husband's "shut up"s', *az amerikaiak a Nimitzjeikkel* 'the Americans with their Nimitzes'. Strictly phonologically, then, sibilants are not affected by /j/.

Finally, /r/ also refuses to undergo palatalization. Hence, the scope of the rule includes /t d n l/ and, vacuously, /t^y d^y n^y/. Examples: *látja* [-t^y:-] 'he sees it', *hídjuk* [-d^y:-] 'their bridge', *bánja* [-n^y:-] 'he regrets it', *vallja* [-j:-] 'he professes it'; *bátyja* [-t^y:-] 'his brother', *hagyja* [-d^y:-] 'he allows it', *hányja* [-n^y:-] 'he tosses it'. Lexical palatalization results in coalescence, i.e. mutual assimilation: the /j/ palatalizes the preceding segment and then gets fully assimilated to it (alternatively, palatality spreads leftwards and the rest of the features of the first consonant spread onto the /j/).

A minor asymmetry is introduced by the behaviour of /l/: instead of the expected long palatal lateral [-ʎ:-], we get [-j:-]. One way of accounting for this is to assume that palatalization produces intermediate $l^y l^y$, which is then phonetically interpreted by a rule $l^y \longrightarrow$ [j], e.g. /vallja/ $\longrightarrow$ val^{y}l^{y}a $\longrightarrow$ [vɔj:ɔ]. Alternatively, /l/ $\longrightarrow$ [j] can be directly built into the rule of palatalization.

6.2. Postlexical palatalization

This process, too, affects /t d n l/, this time before any palatal consonant, but there are several complications. Before turning to these, let us point out the most important difference between lexical and postlexical palatalization: the latter does not (in general) result in coalescence: *mit jelent* *[mitʸ:ɛ-] 'what does it mean', *van joga* *[vɔnʸ:o-] 'he has the right to', *védjegy* *[ve:dʸ:ɛ-] 'trade mark'.

The simplest case involves noncontinuants both as target and as trigger: the (branch of the) rule that turns /t d n/ into [tʸ dʸ nʸ] before /tʸ dʸ nʸ/ is obligatory (automatic, exceptionless). Examples: *van gyufa* [vɔnʸdʸ-] 'there are matches', *két nyúl* [ke:tʸnʸ-] 'two rabbits'. (It is unclear, however, whether the cluster-initial consonants in words like *rongy* 'rag', *satnya* 'stunted' are underlyingly palatal, i.e. /ronʸdʸ/, /šatʸnʸa/; or derived via this postlexical rule, i.e. /rondʸ/ ⟶ [ronʸdʸ].) Cases like *hat tyúk* [hɔtʸ:-] 'six hens', *mit gyártanak* [midʸ:-] 'what do they produce' appear to be counter-examples to our claim that postlexical palatalization does not result in coalescence. In fact, however, they are simply cases where LCF (Long Consonant Formation, cf. **2.4** above) applies to the output of Palatalization either directly (*hat tyúk*) or after Voice Assimilation (*mit gyártanak*).

It is before /j/ that the picture becomes somewhat blurred. For /t d/ it appears that the rule applies optionally: *mit jelent* [mitʸjɛlɛnt] ~ [mitjɛlɛnt] 'what does it mean', *védjegy* [ve:dʸjɛdʸ] ~ [ve:djɛdʸ] 'trade mark'. Similarly, /l/ remains unaffected in formal speech; in colloquial styles, however, full coalescence appears as in word-internal environments:

hol jelent meg	[holjɛ-]~[hoj:ɛ-]	'where did it appear'
hiteljuttatás	[-ɛlju-]~[-ɛj:u-]	'granting of credit'
följön	[följön]~[föj:ön]	'come up'

Even more colloquially, the /l/ can be simply dropped (with or without compensatory lenghtening of the preceding vowel) before palatalization could apply. Before palatal noncontinuants, /l/ has the first and third options, but not the second:

sült tyúk	[šültʸu:k]~[šü:tʸ:uk]	'roast hen'
fél győzelem	[fe:ldʸö:-]~[fe:dʸö:-]	'half-victory'
elnyúlik	[ɛlnʸ:-]~[ɛ:nʸu:-]	'lie prostrate'

It has been suggested in the literature that whether /lj/ coalesce postlexically or not depends on syntactic structure, stress, and the like. Whether cases like *angol játék* [-golja:-]~[-goj:a:-] 'English game' differ significantly from cases like *Az angol játszik* 'The Englishman is playing' remains to be explored. (We do not think they do.)

The behaviour of /n/ differs from that of /l/ in an interesting way. For instance: *argentín játék* [-tinja:-]~[-tĩ:ja:-] but *[-tin^y:a:-] 'Argentinian game'. Thus, /n/ behaves in dissimilar ways before /j/ within and across words. Postlexically, no palatalization takes place; in formal speech /n/ remains unaffected, whereas in colloquial speech something quite different happens: the rule of *n*-vocalization turns /n/ into nasalization before continuants (i.e. fricatives, *r, l, j,* and *h*, bleeding palatalization: cf. *bánja* [ba:n^y:ɔ] 'he regrets it' vs. *Bán Jani* [bã:jɔni] ⟨proper name⟩.

7. How many affricates?

The number of affricates in Hungarian is somewhere between two and six. /t^s/ and /č/ are definitely affricates in terms of their phonetic makeup, and phonologically they are obviously independent (= monophonematic) members of the inventory of phonemes. Their voiced equivalents, [$\widehat{dz}$] and [$\widehat{dž}$] are also undoubtedly affricates but their monophonematicity is less obvious. Finally, /t^y/ and /d^y/ represent the opposite case: there is no doubt as to their phonemic status, but what is questionable is whether they are affricates or not. Let us start with the latter issue.

7.1. The first question, then, is whether the two palatal obstruents are stops or affricates. Their surface realization may be affricate-like to a variable extent, depending on phonetic context. Before stressed vowels (*tyúk* 'hen', *gyár* 'factory') and word finally (*fütty* 'whistle', *vágy* 'desire') they are quite strongly affricated; before an unstressed vowel—especially for /d^y/ as in *magyar* 'Hungarian'—much less, and before an oral stop (*ágyba* 'to bed') not at all. The fricative component is usually absent before /r/ (*bugyrok* 'bundles'); before /l/ lateral release can be observed as with stops (compare *fátylak* 'veils' with *hátlap* 'reverse side'), and only under strong emphasis do we find a fricative component as with true affricates (cf. *vicclap* 'comic journal'). Of the nasals, /m/ may be preceded by slight affrication (*hagyma* 'onion'), but /n/ and /n^y/ may not (*hagyna* 'he would leave some', *hegynyi* 'as large as a hill'). The degree of affricatendness depends further on style and rate of speech: in slow, deliberate speech it is much stronger than in fast or casual styles. This wide range of variables and varieties should raise our suspicion that we have basically stops here which, under the appropriate circumstances, get more or less affricated due to well-known physiological factors; notice that true affricates do not exhibit such extensive variability. Consider English /t/ as an analogous case: in some dialects and in some environments it is affricated into [t^s]—but this obviously does not affect its place in the consonant system of English.

Yet, other facts seem to indicate that the affricate analysis has something to recommend it, too. In initial consonant clusters, /t^y/ and /d^y/ never occur as first members: /pr, pl, tr, kr, kl; *t^yr, *t^yl/; /br, bl, dr, gr, gl; *d^yr, *d^yl/; and very rarely as second members: /šp, sp, etc; *št^y/; but /st^y/ as in *sztyeppe* 'heath'. The obvious explanation would be that they do not occur in initial clusters because they are not stops. However, it is more likely that this is an 'accidental gap' (except presumably */t^yl, d^yl/: cf. */tl, dl/): since almost all cluster-initial words are loanwords, they will not include segments/combinations that do not occur in the languages they are borrowed from. The existence of words like *sztyeppe* (as well as the fact that names like *Sztyepan* are not difficult for Hungarians to pronounce) seems to indicate that among sibilant + stop clusters, /st^y/ is possible (though infrequent). (*/sd^y/ is of course impossible, just like */sb, sd, sg/.)

Returning to word internal /t^y d^y/, the pre-stop position offers another argument (beyond the fact that affrication is not generally found here, except in a very emphatic style). In such position, stops can be realized by their non-released allophones, e.g. *kapta* [kɔp˺tɔ] 'he got it', *rakta* [rɔk˺tɔ] 'he put it', whereas affricates obviously cannot, since they do not have such allophones: *bocskor* [bočkor] (*[bot̠˺kor]) 'moccasin' *barack* [bɔrɔt^sk] (*[bɔrɔt˺k]) 'peach'. Now, /t^y d^y/ are usually unreleased in this position: *hegytől* [hɛt^y˺töl] (*[hɛt^y͡çtöl]) 'from the hill', *hagyd* [hɔd^y˺d] (*[hɔd^y͡jd]) 'leave it -IMP'; in some cases (before velars?) there is vacillation: *hetyke* [hɛt^y˺kɛ] (~[hɛt^y͡çkɛ]) 'pert'. This property shows clearly that they pattern with stops. As a corroboration, consider a fact mentioned in **2.5** above: affricates are less prone to LCF (Long Consonant Formation) across word boundary than stops are, recall *Gács Csaba* vs. *Tóth Tamás*. Now if we look at phrases like *ramaty tyúk* 'decrepit wench', *nagy gyár* 'big factory', we find that LCF applies automatically and obligatorily—as it is expected for stops, as opposed to true affricates. This should not come as a surprise, given that a geminate stop is nothing else but a sequence of an unreleased and a 'normal' allophone of the same stop consonant.

In sum: /t^y d^y/ are palatal stops in Hungarian; in the appropriate phonetic contexts, under appropriate conditions in terms of stress, speech rate, and speech style, they get affricated, as is to be expected for physiological reasons and can be observed in other languages that have palatal stops. Their defective distribution (*#__r, *#__l, *#š__) is not sufficient to disconfirm that they are stops.

7.2. Turning now to [d͡z], [d͡ž]: here we have to consider if these are monophonematic affricates like [t͡s], [t͡š], or stop + fricative clusters. In terms of the transcription system proposed earlier in this paper, where the number of (non-superscript) symbols is meant to reflect directly the number of phonemes in a form, hence [t͡s] and [t͡š] are represented as /t^s/, /č/ respectively, our problem can be reformulated as follows: Does the consonant inventory of Hungarian include /d^z/ and /ǰ/ or are there /d-z/, /d-ž/ clusters in the words concerned?

7.2.1. The speech sound [d͡z] can come from three sources in Hungarian. It can be a voiced allophone of the phoneme /t^s/ (*lécből* [le:d͡zböl] 'out of lath', *táncba* [ta:nd͡zbɔ] 'into the dance'), where obviously no underlying /d^z/ is involved. It can occur in words like *pénz* [pe:nd͡z] 'money', *benzin* [bɛnd͡zin] 'petrol'; here, however, we have /nz/ clusters where [d] is an inorganic, epenthetic segment like [p] in *szomszéd* 'neighbour', [b] in *oromzat* 'gable', [t^y] in *München* 'Munich', etc. Finally, in words like *madzag* 'string', *bodza* 'elder', *pedz* 'nibble', [d͡z:] can be analyzed in one of two ways (accepting the geminate analysis of 'long consonants'): either as geminate /d^{z}d^z/ ⟶ [d͡z:], cf. *vicces* 'funny' /t^{s}t^s/ ⟶ /t͡s/, or as /d-z/ ⟶ [d͡z:], cf. *játszik* 'he plays' /t-s/ ⟶ [t͡s:]. The first solution would involve positing a phoneme /d^z/.

But this phoneme would have a rather skewed distribution: it would not occur word initially or postconsonantally at all; preconsonantally it would occur in a handful of suffixed forms; whereas intervocalically and finally (between vowel and word boundary) it would only occur doubled (long). This peculiar distribution, not found for any other member of the Hungarian consonant inventory, would be automatically explained by the cluster analysis (assuming an independently motivated realization rule converting a cluster of stop + sibilant into a long affricate). Let us consider what can be brought up against such an analysis.

7.2.2. Three types of possible counter-arguments come to mind. (a) The surface contrast between long affricates as in *madzag* 'string' and [d]+[z] clusters as in *vadzab* 'wild oats' shows that the former cannot be derived from an underlying cluster. (b) $C_iC_jC_k$ clusters (e.g. *kardvirág* 'cornflag') do not generally get simplified, whereas $C_iC_iC_j$ clusters (e.g. *keddre* 'by Tuesday') do. Given that a stem-final (long) *dz* is shortened before a consonant-initial suffix, it follows that it cannot be a cluster. (c) Words like *vakaródzik* 'scratch oneself' can have short intervocalic [d͡z]; this makes the distribution less skewed and the 'independent phoneme' analysis more plausible.—Are these three counter-arguments valid?

(a) The phonetic difference between *madzag* 'string' and *vadzab* 'wild oats' ([d-z]) is totally parallel to that between *metszi* 'he cuts it', ([t͡s:]) and *hátszél* 'tail-wind' ([t-s]): in *vadzab/hátszél* internal word boundary (compound boundary) occurs between stop and fricative, and it is that boundary that blocks their coalescence into a single long affricate. Hence, any counter-argument based on surface contrast of the *madzag/vadzab* type is unfounded.

(b) Next to another consonant, all Hungarian long consonants get shortened (*sakktól* [šɔktol] 'from chess', *érvvel* [e:rvɛl] 'with argument'); this applies to [d͡z:] as well (*edzve* [ɛd͡zvɛ] 'being trained'). This, however, only proves that the immediate input to degemination is [d͡z:] (rather than a cluster); what it does not prove is that that [d͡z:] should go back to /d^zd^z/ and not /d-z/. Hence, this counter-argument fails, too.

(c) In words like *vakaródzik* 'scratch oneself', there is free variation (for some speakers) between short [d͡z] and long [d͡z:] (as well as simple [z]). This seems to refute our claim above, i.e. that there are no intervocalic short [d͡z]'s. But free variation proves exactly that length is irrelevant in this position: in other words, no short:long opposition is possible here. Since in non-vacillating cases (*madzag*) it is always long [d͡z:] that occurs, it is quite easy to see that in words like *vakaródzik* the segment in question is not short /d^z/ but a long [d͡z:] whose actual length varies (tends to get reduced in long words like this); this [d͡z:], in turn, may just as well go back to a /d-z/ cluster. Hence, all three potential counter-arguments have turned out to be cases that can be easily accounted for in terms of the cluster analysis, too.

The existence of /d^z/ as a phoneme, therefore, is not supported by any valid argument at all.

7.2.3. The case of [d͡ž], however, is different in that arguments for /ǰ/ are more or less balanced by arguments for /d-ž/. Word initial occurrence (as in *dzsámi* 'a type of mosque', *dzsóker* 'Jolly Joker') points toward /ǰ/, whereas the behaviour of word internal [d͡ž]'s is practically identical with that of [d͡z], thus supporting a /d-ž/ analysis. This ambiguity could be resolved, in principle, in three different ways.

1. We could assume that—obviously with the exception of assimilation cases like *rácsban* [ra:d͡žbɔn] 'in grating'—[d͡ž] always goes back to a /d-ž/ cluster. In this case, the scope of degemination should be extended to include word initial position. Since word initial geminates are impossible anyway, such

a redundancy rule (morpheme structure condition or surface phonetic constraint) is needed in any case—it should simply be allowed to operate during a derivation in which an offending representation is created by the coalescence of /d-ž/ into [d͡ž:].

2. Another possibility would be to claim that *dzsámi* 'jami' is /ǰa:mi/ but *hodzsa* 'hodja' is /hodža/; this would explain the ambiguity referred to above but would give /ǰ/ a rather skewed distribution (and it would be impossible to decide whether *lemberdzsek* 'anorak' is /lemberǰek/ or /lemberdžek/ (⟶ lemberd͡ž:ek ⟶ [lɛmbɛrd͡žɛk]).

3. Finally, we could accept the view that [d͡ž] is /ǰ/ everywhere; but then it is to be explained why its intervocalic (*menedzser* 'manager') and final (*bridzs* 'bridge ⟨card game⟩') occurrences are invariably long (with a few exceptions like *fridzsider* [-id͡ži-] 'refrigerator' or *Roger Moore* [-od͡žɛ-]). It might be suggested that a kind of loanword gemination is at work here (cf. *dopping* /-pp-/ 'doping', *szvetter* /-tt-/ 'sweater', *sakk* /-kk/ 'chess', *meccs* /-čč/ 'football match'). This looks quite feasible for items like *menedzser* and *bridzs*; the trouble is that the layer of vocabulary including e.g. *hodzsa* 'hodja' does not exhibit this process, cf. *mecset* (**meccset*, **mecsett*) 'mosque', etc.

The first solution is technically neat and logically coherent; unfortunately, it does not conform to speakers' intuition and is rather abstract. What is more serious, /dž/ as an initial cluster does not fit the overall pattern of permissible initial clusters. Although the second and third solutions are less elegant (and open to the objections raised above), it appears that either of them—or, most probably, some kind of combination, e.g. the gradual diffusion of /ǰ/ through the lexicon, to the detriment of earlier /dž/— is more realistic. Hence, although with certain misgivings, the interpretation of /ǰ/ as an independent phoneme can be accepted.

7.3. In sum, the question in the title of this section can be answered as follows. The inventory of Hungarian phonemes includes three affricates: /t^s/ as in *cica* 'kitten', /č/ as in *csúcs* 'peak', and /ǰ/ as in *dzsem* 'jam'. Hungarian speech sounds further include three more affricates: [t͡^{y}ç] as one of the allophones of the voiceless palatal stop /t^y/ (*tyű!* 'phew!'), [d͡^{y}j] as one of the allophones of the voiced palatal stop /d^y/ (*gyere!* 'come!'), as well as [d͡z] as the coalesced (and then degeminated) realization of the cluster /d-z/ (*edzve* 'being trained'), as the voice-assimilated version of /t^s/ (*kócból* 'out of hurds'), or as the result of the 'affrication' of /z/, i.e. the insertion of [d] before it in casual speech (*pénz* [-nd͡z] 'money'). Just like any Hungarian consonant, these six speech sounds can also occur long (either as phonemic geminates or as coalesced clusters):

[t͡s:]	–	/t^{s}t^s/	– *moccan* 'budge', *vicc* 'joke';
		/ts/	– *látszik* 'can be seen';
[t͡š:]	–	/čč/	– *loccsan* 'splash', *reccs* 'crack';
		/tš/	– *szítsa* 'let him stir it up';
[d͡ž]	–	/ǯ/~/dž/	– *menedzser* 'manager', *bridzs* 'bridge';
[t͡^{y}ç:]	–	/t^{y}t^y/	– *pottyan* 'plop', *fütty* 'whiste';
		/t^{y}j/	– *bátyja* 'his brother';
		/tj/	– *látja* 'he sees it';
[d͡^{y}ʝ:]	–	/d^{y}d^y/	– *buggyan* 'spout up', *meggy* 'sour cherry';
		/d^{y}j/	– *hagyja* 'he allows it';
		/dj/	– *védje* 'let him defend it';
[d͡z:]	–	/dz/	– *bodza* 'elder', *edz* 'train (verb)' (since /d^z/ does not exist, geminate /d^{z}d^z/ is also impossible; [d͡z:] can only arise through coalescence).

8. Linking vowels

The term 'linking vowels' seems to be overused (i.e. it refers to too many different things). We do not want to suggest that it should be avoided; rather, we would like to restrict its scope to cases where the occurrence **and** quality of the inserted vowel is phonologically predictable (regular), e.g.

*part**o**t* 'shore-ACC' *kert**e**k* 'gardens' *fürt**ö**s* 'curly'

The vowels in bold face are 'default vowels' in the sense that they need not be fully specified, their quality follows from independent principles; hence we could have written

partVt *kertVk* *fürtVs*

or even

part+t *kert+k* *fürt+s*

since the mere presence of linking vowels is also predictable in such cases.

8.1. Lowering stems

The problem exemplified by words like *ház**a**t* 'house-ACC', *fül**e**s* 'long-eared' is that their 'linking vowel' is not the fully predictable (mid) default vowel as above (**házot, *fülös*); rather, stems like *ház* 'house', *fül* 'ear' require a low vowel (*a*, *e*) before certain consonant-initial suffixes. (Notice that this distinction is another reason to assume mid, as well as low, *e*'s.) Another property that such 'lowering stems' have in common is that they always require epenthetic vowels, even if this is phonotactically not motivated (*házat*, not **házt*; cf. *gázt* 'gas-ACC'). Although certain subregularities can be detected (e.g. 'shortening stems' like *nyár* 'summer', *kéz* 'hand' are always 'lowering' as well: *nyarat* 'summer-ACC', *kezet* 'hand-ACC'), the class of 'lowering stems' as a whole appears to be an arbitrary class; consequently, each of its members has to be lexically marked (it is a matter of technical detail whether this is done by 'rule features', 'floating autosegments', 'empty V slots', or some other device).

8.2. Multiple suffixes or multiple stems?

In an agglutinating language like Hungarian each suffix is a new stem in that it does not know what happened left of it. That is, when (say) the fourth morpheme is added to a complex word form, the properties of the immediately preceding (= third) morpheme are sufficient to determine what type of 'linking vowel' is required: the leftmost stem (the root) has nothing to do with it. For instance, *utasokat* 'passengers-ACC' is not the plural accusative of *utas* 'passenger'; it is the accusative of *-k* (the plural morpheme): *...-kat*. Whatever went before is irrelevant. Similarly, *utasok* is not the plural of *utas* but that of *-s* (nominalizing suffix): *...-sok*. This is, in fact, what agglutination is all about: it is always the immediately preceding item that a new suffix is attached to: there are no fused or synthetically inflected word forms.

Is this really true? Is it always the case that the left-hand environment is irrelevant for adding suffixation to a particular morpheme? Vowel harmony is an obvious counter-example—but then VH is a (lexical) phonological issue, not a morphological one. On the other hand, as far as the presence and height of 'linking vowels' is concerned morphemes are fairly independent in this sense. In *utasokat*, for instance, *ut-* 'road' is a lowering stem (cf. nominative *út* and **8.1** above on the correlation between shortening and lowering), *-s-* is a normal (non-lowering) stem, *-k-* is lowering again, and *-t* is not a stem since it cannot be further suffixed (it is an 'ending'). Hence *utAsVkAt*; similarly *fülAsVkAt* = /fülĕšeket/ 'ear+ADJ+PL+ACC'.

8.3. Linking vowels vs. vowel-initial suffixes

So far we assumed without discussion that linking vowels are epenthetic. Notice, however, that it is also possible to analyse them as part of the appropriate suffixes. For example, the accusative ending could be *-at/et/ot/öt*, with vowel truncation after vowel-final stems (cf. *ház-at* 'house-ACC', *kert-et* 'garden-ACC', *part-ot* 'shore-ACC', *füst-öt* 'smoke-ACC', *kapu-t* 'gate-ACC'). The quaternary vowel alternation could be accounted for by an appropriate extension of vowel harmony; vowel truncation, however, is a much less clear-cut matter than it might appear to be.

In particular, there seems to be a 'strength' continuum of linking vowels/suffix-initial vowels. At the weakest end, we find linking vowels of the 'classical' type: the vowels of the accusative, the plural, etc. never occur after vowel-final stems (hence it is possible—actually, preferable—to analyse them as epenthetic). The vowel of the superessive suffix is next on the strength scale: it looks like a linking vowel since it never appears after vowel-final stems: *karalábé-n* 'on kohlrabi', *kapu-n* 'on a gate', *fá-n* 'on a tree'—yet it cannot be epenthetic as it is always a mid vowel (i.e. it is 'strong' enough to override the lowering effect of 'lowering stems' cf. *ház-on* 'on a house', ...*-k-on* 'on ... plural'). Hence, the underlying form of the superessive suffix must be *-On* with a vowel that is truncated after all vowel-final stems, rather than *-n* with a linking vowel where necessary.

The adverbial ending *-An* is an example of the next degree of strength: the appearence of its vowel depends on the height of the stem-final vowel. The probability of truncation increases as we move from high to low stem vowels:

(a)	high stem V:	*szomorú-an*	*keserű-en* ~ *keserű-n*
		'sadly'	'bitterly'/'bitter' (adv.)
(b)	mid stem V:	*bántó-n* ~ *bántó-an*	*kérdő-n* ~ *kérdő-en*
		'offensively'	'questioningly'
		forró-n	*kett-en* (cf. *kettő* 'two')
		'hot' (adv.)	'two of them'
(c)	low stem V:	*sántá-n*	*hülyé-n*
		'limpingly'	'crazily'

The next higher degree of strength is represented by the adverbial ending *-Ul*; its vowel is never truncated, but the stem-final vowel is always retained as well: *urdu-ul* 'in Urdu' *csacsi-ul* 'foolishly', *kutyá-ul* 'as (sick as) a dog'.

Finally, the verbalizing suffixes *-Ul*, *-ít* begin with the strongest type of vowel; here, it is the stem-final vowel that is dropped (if it is weak enough, i.e. low): *béna* 'paralysed' – *bén-ít* 'paralyse' – *bén-ul* 'get paralysed', *hülye* 'crazy' – *hüly-ít* 'make crazy' – *hüly-ül* 'get crazy'. If, however, the stem final vowel is also too 'strong'(?) to be truncated an epenthetic *-s-* helps resolve the problem: *forró* 'hot' – *forró-s-ít* 'make hot' – *forró-s-ul* 'get hot', *minő* 'what quality' – *minő-s-ít* 'qualify (sg)' – *minő-s-ül* 'qualify (as)'.

8.4. Possessive *-j-*

The presence vs. lack of possessive *-j-* in 3sg is somewhat analogous to the linking vowel issue. After palatals and sibilants there is no *-j-*: *ágya* 'his bed', *kénye* 'his pleasure', *gáza* 'his gas', *háza* 'his house', *húsa* 'his meat', *cucca* 'his clobber'. This is an overriding regularity. Elsewhere, however, lowering stems appear to correlate with non-*j*-stems:

	Lowering stems			Normal stems	
	ACC	3sg poss		ACC	3sg poss
'foot'	*lábat*	– *lába*	'marsh'	*lápot*	– *lápja*
'ear'	*fület*	– *füle*	'net'	*tüllt*	– *tüllje*
'picture'	*képet*	– *képe*	'garden'	*kertet*	– *kertje*
'coal'	*szenet*	– *szene*	'gene'	*gént*	– *génje*

It might be suggested that *-jA* is productive and the *-A* class is closed/archaic; this would make a nice correlation with the archaic/non-productive character of the A-declension (lowering stems). Unfortunately, a number of counter-examples exist:

	Lowering but -j-			Normal but non-j-	
'dish'	*tálat*	– *tálja*	'damage'	*kárt*	– *kára*
'tub'	*kádat*	– *kádja*	'number'	*számot*	– *száma*
			'beer'	*sört*	– *söre*
			'root'	*gyökōt*	– *gyöke*

Couldn't we save the system somehow?

8.5. Summary

The term 'linking vowel' should be restricted to default vowels; a general rule can be formulated to account for the occurrence of these. The rest of the phenomena mentioned in this section deserve further study since they represent a substantial portion of Hungarian morphophonology.

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TOWARDS A NATURAL PHONOLOGY OF HUNGARIAN

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1. Introduction

Natural Phonology (NPh), as founded by Stampe (1969; cf. Donegan–Stampe 1979; Hurch 1988a, b) and developed in Dressler (1984, 1985), bases its theory 1) on extralinguistic foundations of phonology (particularly of a physiological, neuropsychological and sociopragmatic nature), 2) on a semiotic metatheory (based on Peircean semiotics), 3) on a naturalist rather than conventionalist science theory, and investigates the empirical validity of its claims derived from this theory in all conceivable areas of phonological behaviour (including all the domains of substantive or "external" evidence, cf. Zwicky 1975, Dressler 1979a). Due to limits of space, we can only adumbrate this theory in a very simplified manner and apply it to small fragments of Hungarian phonology without being able to discuss thoroughly any of the problems touched.

Within any language, both its phonemes and their phonetic realizations are the outputs of (language specific) phonological processes which are the remnants of universal natural process types which are available to the child in first language acquisition. In acquisition, children adapt these universal processes to the data they receive by either fixing options on the hierarchy of a universal process, i.e. by limiting the process, assigning it prelexical and/or postlexical status and regulating its interactions with other processes and other linguistic components or by suppressing a process. For example, the universal process type of final consonant devoicing (a weakening of sonority in the syllable coda) is fixed as a syllable-final process in many German dialects, whereas it is restricted (inhibited) to word-final position in Russian and Polish or to a subset of obstruents in other languages (cf. Dinnsen–Eckmann 1977), be it as an allophonic or phonemic/neutralizing process; in French it appears only in casual speech to repair violations of the sonority fall in word-final syllables (e.g. by devoicing the final sonorant in *livre*). In Hungarian and English, final devoicing must be suppressed by children in language acquisition. However, this radical inhibition may be disturbed in aphasia (cf. Dressler 1988a) and

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under the influence of alcohol (cf. Lester–Skousen 1974). If children acquire a first language (e.g. Yoruba) which has no final obstruents, then the process remains a latent process (cf. Hurch 1988b), which may appear only when acquiring a second language that has word/syllable-final obstruents: thus Yoruba speakers have been observed to devoice word-final obstruents in their English or French.

In Hungarian, according to Ilona Kassai (personal communication), children devoice final obstruents in prepausal position such as small English children do. Later on (after age 3) they learn to suppress final devoicing in formal speech whereas in casual speech even adults devoice final obstruents but pronounce them with shorter duration than phonemically voiceless obstruents (for similar final devoicing without neutralization in German and Polish, cf. Dinnsen 1985; Port–O'Dell 1985; Slowiaczek–Dinnsen 1985).

Prelexical phonological processes merge conceivable sounds into the phoneme inventory of each language and govern the phonotactics of these phonemes (phonemes being defined as sound intentions). Postlexical processes change phonemic inputs into phonological and, finally, phonetic outputs. Usually a universal process type is limited to either a prelexical or a postlexical function, but it may also be split into both roles. Postlexical processes can be conceived as signs whose signatum is the input, and whose signans is the output of the respective process. All these language-specific signs are conventional (symbolic) but may also be—to a greater or smaller degree—iconic and indexical so that their respective naturalness can be graded (cf. Dressler 1984).

This brief characterization of NPh may suffice to show important differences to the families of both structural phonemics and of generative phonologies (including Natural Generative Phonology, cf. Hooper 1976). Much closer related to NPh are Bailey's "Phonetology" (cf. Bailey–Maroldt 1983), Ohala's "Experimental Phonology" (cf. Ohala–Jaeger 1986), and Kodzasov's process phonology (as in the first chapter of Kibrik *et al.* 1972).

There is one superficial similarity between NPh and Natural Generative Phonology (NGP): their comparable concreteness. But whereas relative concreteness of phonological representations follows from conventions of descriptive simplicity in NGP, it follows as the most natural option from the deductive system of NPh as sketched above.

2. Morphonology

Both NPh and NGP distinguish morphonology from phonology (cf. Dressler 1985) whereas morphonological rules form the core of phonology in most generative phonologies (e.g. as the great bulk of lexical rules in Kiparsky's Lexical Phonology). Although we do not want to deal with morphonology in this contribution, we feel obliged to show at least briefly why Hungarian Vowel Harmony (cf. Kornai 1987) is morphonological—like Turkish vowel harmony (cf. Dressler 1985, 230ff.)—and therefore does not belong to the main topic of this contribution.

Root harmony is represented by prelexical morphonological rules which have many exceptions incompatible with prelexical phonological processes:

a) There are the non-harmonic (neutral) vowels /i, i:, e:/.

b) There are non-harmonic root-internal sequences either with neutral vowels (a) such as *bika* 'bull' or in recent loanwords, which show no sign of being harmonized, such as *bürokrata* 'bureaucrat', *föderatív* 'federative'.

Suffix harmony is represented by postlexical rules which must be morphonological because they do not represent constraints on pronounceability and perceptibility (such as phonological processes must do). This can be shown in the following way:

a) Neutral vowel stems take either front or back suffixes, e.g. among verbs with /i/ or /i:/ two thirds take back suffixes (e.g. *irt* 'extirpate', *nyit* 'open', *ír* 'write', *hív* 'call') whereas one third of them takes front suffixes (e.g. *int* 'wave', *visz* 'carry', *csíp* 'pinch').

b) There are non-alternating (non-harmonic) suffixes such as temporal *-kor* 'at', *-beli* 'related', as well as all neutral-vowel suffixes, e.g. *-ért* 'for', *-ig* 'as far as', infinitive *-ni*.

c) There are vacillating items, both native and loanwords, which may prefer either front or back suffix harmony, e.g. *hotel*, *dzsungel*, *farmer* 'jeans', *destruktív* 'demoralizing'; note cases like *honvéd* 'soldier' with its derivative *honvéd-ség* 'army', but its vacillating ablative *honvéd-tól* ~ *honvéd-től*.

d) Non-harmonic suffixation may occur in slangy and low style vocabulary, e.g., *gründ-ol* 'start a business' (from G. *gründ-en*), *steiger-ol* 'raise (prices, rents)' (from G. *steiger-n*), *stír-öl* 'stare at' (from G. *stier-en*).

Nevertheless vowel harmony fits the predominantly agglutinating type of Hungarian in so far as it is more productive than other morphonological rules in languages of other types (see Section **6**).

Similarly "linking vowels" as in the accusatives *ház-at* 'house' vs. *kert-et* 'garden' vs. *part-ot* 'shore' vs. *füst-öt* 'smoke' vs. *kapu-t* 'gate' is a question of morphonological rules rather than of phonological processes.

Another morphonological rule is vowel shortening of the type *nyár* 'summer', acc. *nyar-at*.

3. Phonemic inventory

As a consequence of distinguishing phonology and morphonology (see Section **2**) we obtain the following Hungarian vowel phonemes as sound intentions of the younger generations of urban speakers (Educated Colloquial Hungarian = ECH, see Nádasdy–Siptár in this volume):

i	ü		u	i:	ü:		u:
(e)	ö		o	e:	ö:		o:
ɛ		(a)	ɔ	(ɛ:)		a:	(ɔ:)

These phonemes are differentiated by the distinctive features [long], [palatal], [labial], and three degrees of height.

The assumption of the bracketed vowel phonemes needs justification:

1. Short unrounded [a] as in ECH *spájz* 'larder', *halló* 'hullo', *Mozart* (cf. Nádasdy–Siptár in this volume, **4.1**) which often varies (according to lexical phoneme input switches, cf. Dressler–Wodak 1982) with short, labial [ɔ] in certain cases, and with long, illabial [a:] in others. In these words labialization or length respectively represent no constraint on pronounceability or perceptibility; nor can the bidirectional fluctuation with the two other phonemes be explained as unidirectional fast/casual speech processes; at least some speakers have minimal pairs such as *halló* 'hullo' with [a] vs. *haló* 'dying' with [ɔ] vs. *háló* 'net' [a:] (cf. Nádasdy–Siptár in this volume, **4.1**). Therefore so-called "*a*-adjustment" (Szépe 1969; Vago 1980, 3; Abondolo 1988, 29–32; Kornai 1987) of short <a> is a morphonological rule; it cannot be a phonological process because it neither represents a constraint on pronounceability/perceptibility nor a phonostylistic fast/casual speech process.

2. Short mid [e] occurs only regionally outside Budapest, but is included here for the sake of completeness.

3. Low, long [ɛ:] and [ɔ:] are very marginal phonemes which occur a) as pronunciations of the letters <e, a> in the alphabet and in abbreviations, b) in the pair *erre* [ɛ:rɛ] 'this way'–*arra* [ɔ:rɔ] 'that way' (isochronically identical with, but not necessarily derivable by a synchronic rule from [ɛr:ɛ], [ɔr:ɔ]) and in *merre* [mɛ:rɛ] 'which way'; more casually they occur also in non-deictic items such *varrógép* [vɔ:ro:ge:p] 'sewing-machine' with vibrant shortening and compensatory vowel lengthening; c) they may be outputs of lengthening processes in emphatic speech (cf. Nádasdy–Siptár in this volume, **4.3**).

4. Phonological processes

The set of universal natural phonological process types (and of their correspondent language specific processes) is the most important element of NPh. In this section, we are going to classify and illustrate them with evident or, at least, relatively simple examples from Hungarian phonology, whereas more difficult and debatable Hungarian processes will be dealt with in Section **5**. Within the trichotomy of process types (see Donegan–Stampe 1979; Dressler 1984, 1985, chapters 3, 4; Luschützky 1988), prosodic processes, foregrounding ("fortition") and backgrounding ("lenition") processes, we will deal systematically with the two latter ones. According to the psychological and semiotic principle of figure and ground, prosodic hierarchies and processes articulate intention and execution of speech production and speech perception into prosodically strong vs. weak units (phonological words, feet, syllables) and positions (ceteris paribus: word/syllable-initial = prosodically strong vs. word-medial/final and syllable-final = weak). This prosodic rhythmicity can be enhanced by segmental phonological processes which foreground the figure and background the ground, respectively, hence the term foregrounding vs. backgrounding process types. From the universal semiotic principle of figure and ground we can derive the subordinated "rich-get-richer-principle" of process hierarchies which says that comparatively "weak" elements are more liable to be further weakened rather than strengthened whereas comparatively "strong" elements are more likely to be strengthened than weakened.

4.1. A simple way of subdividing backgrounding processes is by way of differentiating articulatory gestures materializing them and optimizing ease of articulation wherever perceptual backgrounding is feasible or even desirable.

4.1.1. A first type of universal backgrounding processes is articulatory shortening, particularly in prosodically weak positions (rich-get-richer-principle).

4.1.1.1. This can be illustrated with consonantal degemination in the syllable fall (syllable coda) before a consonant, as in *sakk* 'chess' with [k:] vs. *sakktábla* 'chessboard' with [k] (cf. Vago 1980, 41ff.; Obendorfer 1975, 326). Degemination must be divided into parts which are either obligatory or optional in the word domain and phonostylistic in the phrase domain, i.e. degemination is generalized in casual speech (cf. Kerek 1977): *add meg* 'give it back' $\longrightarrow$ [ɔdmɛg]. (In displaying the following data no explanations are offered, if several are conceivable but not yet testable at this point. Syllable-initial geminates are excluded both pre- and postlexically.)

If a geminate obstruent is in the syllable fall and another obstruent occurs in the immediately following syllable rise within the same word (either simplex or derived or compound), then degemination is obligatory, unless the word is cited in a metalinguistic way such as in

I said *lakktól* 'from varnish', not *laktól* 'from cottage'.

Beyond the word domain degemination is generalized according to a hierarchy of casualness and of boundary strength (see below).

If one of the consonants is an obstruent, the other one a sonorant (e.g. in *sakk+ra* 'to chess', *menny+be* 'into heaven'), degemination may be avoided in formal speech, but always applies in casual speech. In larger domains it is generalized according to the degree of casualness and of boundary strength. This latter hierarchy can be illustrated with the following examples:

menny+be	'into heaven'	– affix boundary
menny#bolt	'firmament'	– compound boundary
menj be	'go in!'	– clitic boundary
menj balra	'go left!'	– word boundary
menj, Béla	'go, Béla!'	– phrase boundary
menj, bár	'go, although...!'	– clause boundary
Menj. Balfelől	'Go! On the left-hand side...'	– sentence boundary

If the geminate consonant is ambisyllabic then it is in a prosodically stronger position than in the syllable fall (as above). This may explain why ambisyllabic geminates are less likely to be degeminated than syllable-final ones. Even in cases of suffixation degemination may be avoided in very formal speech, such as in *liszt+től* 'from flour'. However if the geminate is derived by assimilation, degemination is practically unavoidable such as in *liszttel* ⟵ *liszt+vel* 'with flour'. Otherwise the same hierarchies of casualness and of boundary strength apply, e.g. in *párt#tag* 'party member' > *tart tőle* 'be afraid of'. So far for cases where—before degemination—the syllable fall is more complex than the following syllable rise, which is not an optimal syllable contact (see below).

Syllable contact is better if the syllable rise is more complex than the immediately preceding syllable fall. This may explain why in this context degemination of ambisyllabic geminates is still less likely than in the former context. Therefore, it is only in very casual speech that, e.g., *szép#próza* 'prose fiction' or, even more so, *más sport* 'a different sport' undergo degemination and thus become homophonous with *szép Róza* 'beautiful Rose' and *más por+t* 'different powder-acc.'

4.1.1.2. Phonostylistic shortening of long vowels does not affect vowel quality (thus [e:, a:] ⟶ [e, a]) and seems to follow at least the following hierarchies:

a) the hierarchy of (sociopsycholinguistic) casualness (see above);

b) in closed syllables rather than in open ones: whenever vowel duration—counted in the syllable fall—is checked by a tautosyllabic consonant, vowel shortening is more likely. Hungarian low and mid long vowels may shorten only in closed syllables;

c) geminate consonants (cf. Obendorfer 1975) are "lighter" than consonant clusters. Therefore low and mid long vowels shorten rather before the latter than before the former. For example, the first (stressed) vowel is shortened in less casual speech in *érthetetlen* 'incomprehensible' than in *étterem* 'restaurant';

d) it seems that unstressed long vowels are not much more likely to undergo shortening than stressed ones: this fits the typological character of Hungarian as a syllable-timed language. But similar to many other syllable-timed languages with word-initial accent, Hungarian seems to have a secondary prominence peak on the final syllable. This may be connected with the resistence of final syllables to vowel shortening (whereas monosyllabic lexical words never shorten): in ECH only high final vowels (and in polysyllables only) may shorten, such as in *fiú* 'boy';

e) as we have seen (b, d) high long vowels are more liable to shorten than low and mid ones: this fits to their less sonorous character and to the importance of sonority for strength of the syllable peak. Thus it is only in the most formal style that the first vowel in the compound *vízcsap* 'water-tap' is not shortened;

f) alternating vowel length (in high vowels) is easier to shorten than non-alternating (fixed) one: thus morphonological shortening in acc. *ut+at* from nom. *út* 'way' seems to have initiated a process of lexical diffusion in the whole paradigm in ECH with the result that length in closed syllables (e.g. dat. *útnak*, compound *úttörő* 'pioneer, lit. road-breaker') is preserved only in very formal speech, but in open syllables (e.g. loc. *úton*) even in less formal speech, i.e. lexical diffusion spreads through morphological categories according to phonological hierarchies (cf. Dressler 1985). But length is obligatory in the monosyllabic nominative *út*.

g) suffixes are more subject to this phonostylistic backgrounding process than lexical morphemes (cf. Dressler 1985). Respective suffixes are the closed syllable mid vowel suffixes elative *-ból/ből*, ablative *-tól/től*, delative *-ról/ről*. (Note that in these suffixes shortening is "categorical", i.e. it does affect vowel quality, unlike in most of the cases discussed above.)

4.1.2. There are many obligatory and/or optional consonantal assimilations in Hungarian phonology. Assimilatory process types background the patient of the process by easing articulatory transitions (cf. Lindner 1975). They seem to be governed by the following principles: 1. a phoneme is more liable to be assimilated to an adjacent similar phoneme than to a dissimilar one (cf. Hutcheson 1973); 2. there are phonetic bases for different degrees of assimilability; 3. adjustments of the syllable rise (in the syllable onset) or the syllable fall (in the syllable coda) occur if a consonant violates successive increase of sonority in the syllable rise or successive decrease of sonority in the syllable fall; 4. Similar to speech errors, assimilations are rather anticipatory than perseveratory.

4.1.2.1. In agreement with 2., Hungarian—like most languages—assimilates the articulatory position of nasals to that of subsequent obstruents rather than the reverse, obligatorily in the word domain, optionally (i.e. in casual speech) in the phrase domain, and irrespective of allophonic or phonemic change, e.g. allophonically in *láng* 'flame' in all styles; in casual styles according to the already mentioned boundary strength hierarchy, e.g. in *ezen kívül* 'apart from this' (velar); *jöjjön gyorsan* 'come quickly', *vén tyúk* 'old hen' (phonemic, palatal); *kín+ban* 'in torture', *van bor* 'there's wine', *jön Pál* 'Paul comes' (phonemic, labial).

Often phonemic and neutralizing assimilations are equated; however /m/ and /n/ are allophonically neutralized before labiodentals as in *hamvad* 'smoulder', *szenved* 'suffer', *három virág* 'three flowers', *jobban van* 'feel better'.

Universally dental /n/ is more prone to assimilate than labial /m/, whereas palatal /ɲ/ has an intermediate position. This underlies the following restrictions:

1. Nasal assimilation is anticipatory (cf. **4.1.2:** 4), thus *láb-nál* 'at foot' never assimilates to *[la:bma:l]. However /mn/ never assimilates to *[n:] (e.g. in *kém-nő* 'female spy', whereas /nm/ assimilates to [m:] as in *min mulatsz* 'what are you laughing at?', *mondd meg* 'tell it!' ⟶ [mom:ɛg] (Kerek 1977).

2. Whereas /n/ assimilates to many articulatory positions (cf. Vago 1980, 33, 36, 43 ff.), /m/ assimilates only to labiodentals, the natural class of consonants which is most similar to labials, cf. above and *terem-t* 'to create' (never

*[tɛrɛnt]). However, earlier /m/ also assimilated to dentals, and this has remained as an unproductive morphonological rule such as in *bom-l(ik)* 'fall apart' vs. *bon-t* 'take apart'.

3. Dental /n/ assimilates to palatal /ɲ/ e.g. in *ilyen nyúl* 'such a rabbit', but never the other way round. Palatal /ɲ/ does not undergo (phonological) place assimilation; phonetically it may accommodate to all articulatory places but retain its palatality (except before dental stops in very casual speech) as in *arany tető* 'golden lid', *hány fazék* 'how many pots?', *kemény burok* 'hard wrapping', *sovány kutya* 'lean dog'.

For nasal place assimilation after consonant deletion, see **4.1.4**; for vowel plus nasal fusion, **4.1.3.3.**

4.1.2.2. Obstruent voicing assimilation is also only anticipatory (Vago 1980, 34 ff.; Nádasdy 1985, 242 ff.). It is obligatory in the word domain (even in loanwords and foreign names such as *Macbeth* pronounced with [gb]), in larger domains it is the default option: if it is suppressed, it creates the impression of pause, even if no physical pause occurs. Thus non-assimilation is restricted to emphatic or hesitant speech. Examples in compound formation are e.g. *homok#zsák* 'sand-bag', *zseb#tolvaj* 'pickpocket' and, with assimilation to voiceless /h/, *gyöngy#ház* 'mother-of-pearl', *tév#hit* 'misbelief'.

4.1.2.3. Also sibilant assimilation which leads to geminate formation is anticipatory. It applies optionally word-internally such as in *nehéz+ség* [sš, š:] 'difficulty', in compounds, phrases etc. only in more and more casual speech, e.g. in *nehéz sors* 'hard lot'. Of course, morphosemantically opaque compounds—due to diagrammaticity—are liable to be morphotactically opaque as well and may thus have obligatory assimilation. A case in point is *egészség* [š:] 'health' from *egész* 'whole' as contrasted with its derivational homonym *egész+ség* 'wholeness' with assimilation in casual speech only if no misunderstanding may arise.

Assimilation feeds degemination (cf. **4.1.1.1**) such as in *törzs#szám* 'prime number' with /rž#s/ $\longrightarrow$ [ršs] (voicing assimilation) $\longrightarrow$ [rs:] (sibilant assimilation) $\longrightarrow$ [rs] (degemination).

Note that in all types of speech errors anticipation is more general than perseveration (cf. Dressler 1988). Thus performance constraints in speech planning and execution seem to be at the basis of the cross-linguistic preference for anticipation.

4.1.3. Fusion or coalescence processes (Vago 1980, 37, 39–40; Kerek 1977) are also backgrounding processes in so far as they reduce the number of consonants in the speech chain. Of course, fusion processes are only possible if the distinctive feature composition of the two adjacent consonants allows a natural coalescence (cf. Dogil–Luschützky 1988). Fusion is one of the main sources of geminate consonants (cf. Obendorfer 1975).

4.1.3.1. This is the case with the fusion of plosive and fricative into the corresponding long affricate due to suffixation, e.g. *tud+sz* /tud+s/ ⟶ [tut^{s}:] 'you know' (cf. Szende 1974) in the syllable fall, *öt+ször* '5 times' in ambisyllabic position. Fusion is obligatory in the prosodically weaker syllable fall but only optional in the stronger ambisyllabic position.

Casual speech generalizations of these fusions in compounds, phrases etc., however, are obviously restricted to ambisyllabic position such as in *két sonka* 'two hams'. Thus fusion eliminates the dispreferred syllable contact of more consonantal strength in syllable-final than in syllable-initial position (cf. **4.1.4**). Compounding, phrase formation etc. do not seem to offer an occasion for fusion to occur in the syllable fall.

[d^{z}] only originates via synchronic fusion (see Nádasdy–Siptár in this volume **7.2**).

4.1.3.2. Dentals plus /j/ fuse to long palatal stops, obligatorily in suffixation such as in *lát+ja* 'he sees it', *ken+je* 'let him smear it' with /t+j, n+j/ ⟶ [c:, ɲ:]. Across word and phrase boundaries (etc.), the dental is palatalized in casual speech (e.g. /t/ ⟶ [c]), and fusion (or rather absorption with compensatory lengthening?) occurs in still more casual speech, e.g. *öt játék* 'five games', where also original /c/ absorbs a following /j/ such as in *fütty#jel* 'whistle signal' with /c:#j/ ⟶ [c$^{\$}$j] (optional degemination) ⟶ [c:] (optional fusion/absorption).

4.1.3.3. Another fusion process of casual speech is vowel plus nasal fusion (Kerek c; Nádasdy 1985, 241; Nádasdy–Siptár in this volume, **6.2**) before continuant consonants (fricatives, liquids, approximants) as in *van helyette* 'there is (something) to replace it' ⟶ [vɔ̃:hɛjɛt:ɛ], *van joga* 'he's got the right (to)' with fusion of vowel and /n/ rather than of /n/ and /j/ (cf. **4.1.2.1**); /n+j/ must be differentiated from underlying palatal /ɲ/, which may be weakened in casual speech to a nasalized approximant [j̃]. Due to the strength hierarchy among nasals (cf. **4.1.2.1**); /m/ is neither weakened nor fused in casual speech.

4.1.4. Kerek (1977) is devoted to consonant deletion in fast/casual speech, a phonostylistic backgrounding process type of many languages. Principles of NPh can explain the following instances of stop deletion (cf. also Tompa 1968, 29; Kontra 1988, 15 (6)):

If two syllables are put together in morphological derivation or when juxtaposing words, then resyllabification may occur (cf. Vennemann's 1988 syllable contact laws). For example, if the syllable fall of the first syllable consists of two consonants, whereas the syllable rise of the second syllable consists of only one consonant, and if, at the same time, the last consonant of the first syllable is less (or at least not more) sonorous than the first consonant of the second syllable, then the last consonant of the syllable fall can be reassigned to the following syllable rise, because the syllable rise is stronger and thus tends to be more complex than the syllable fall.

This holds for Kerek's examples *tömb#mulatság* 'city-block dance party', *mondd meg* 'tell it!', *mosd meg* 'wash it!', *Ödönt nem szeretem* 'I don't like Edmund', *dobd le* 'throw it down!' *galamb#fióka* 'babypigeon', *domb#vidék* 'hill area'; cf. also *részt vesz* 'take part', *azt mind* 'all that-acc.', *rázd fel* 'shake it up!'. Here syllable-final /b, d, t/ should be resyllabified as first consonants of the following syllable rise. However, Hungarian syllable rises do not permit consonant sequences */bm, dm, tm, tn, dl, bf, bv, tv, df/ (or their assimilated counterparts */pf, tf/). The ensuing conflict between syllable-initial constraint and syllable-contact preference is resolved by deleting the problematic plosive.

Whereas two plosives may close the syllable fall, they may not start the syllable rise. Now in *lisztből* 'from flour', *most pedig* 'and now', *dobd bele* 'throw it into it!', *mosd ki* 'wash it out!' a biconsonantal stop-final syllable final comes in contact with a monoconsonantal syllable rise; resyllabification of the syllable-final consonant, according to the above-mentioned syllable complexity preference yields the incorrect syllable rises */tb, tp, db, dk/. Thus resyllabification automatically entails deletion of the stop to be resyllabified and not of the stable consonant that initiates the syllable rise.

Now one might argue that a much simpler generalization about stop deletion might be to assume that it is always the central member of a consonant cluster that is dropped (if it is a stop). However, one advantage of the former analysis is that it explains deletion of /t/ in *kert+ben* 'in a garden' and non-deletion in *kert+ről* 'about a garden', another one that it is in line with the explanation of fusion (cf. **4.1.3.1**). As with many other phenomena of casual speech much more work is needed for deciding this question.

If the deleted syllable-final stop occurs after a nasal, then this nasal is not automatically subject to place assimilation, but only in still more casual/fast speech, e.g. *jelentkezik* 'present oneself', *pont két* 'exactly two', *rendben* 'in order', *mind bent* 'all in', stop deletion first gives [$n^{\$}k$, $n^{\$}b$], before—in still more casual speech—/n/ is assimilated to the velar/labial.

In still more casual speech also underlying /n/ assimilates which is allophonically velar in formal speech. This results in the following sequence of forms on the casualness scale for *bankban* 'in a bank', *kering benne* 'circulates in it': [ŋgb] ⟶ [ŋb] ⟶ [mb]. This may be a case where the labial [m] is derived from the underlying dental /n/ rather than from the allophonic velar [ŋ] (cf. Dressler 1975).

4.1.5. Vowel centralization in weak unstressed position of the English, German and Russian type (with generalization in fast/casual speech) is rare in Hungarian. Kerek (a, c) illustrates the reduction (and thus backgrounding) of /ɛ/, /o/ to schwa in very casual speech with *rántsd le* 'pull it down!' and *azt mondja* 'he says (it)' going to [rã:žlə] and [ɔsəɲɟɔ]. Schwa may also replace sequences of vowels and sonorant consonants in fast speech: *szocializmus* 'socialism' ⟶ [sot^{s}əzmuš], *Kossuth Lajos utca* 'K.L. Street' ⟶ [koštəšut^s:ɔ] (cf. Kálmán in this volume).

4.1.6. Deletion of unstressed vowels in fast/casual speech is much rarer than consonant deletion (cf. **4.1.4**). An example given by Kerek (a, c) is *azt mondja* 'he says (it)' (cf. **4.1.5**) ⟶ [ɔsɲɟɔ].

Another type of vowel deletion can be observed in *ne sziszegj*, *ne szuszogj* 'don't hiss/puff' [nɛs:ɛgj, nɛs:ogj], *add ide/oda* 'give it here/there!' [ɔd:ɛ, ɔd:ɔ] with mid and (preferably) high vowel deletion preferably between identical consonants. The first condition fits syllable-timed languages, the second one facilitates articulation more than different consonantal environments would (cf. Dressler 1977). *Asszem* 'I think so' is a lexicalized/fossilized casual variant of *azt hiszem*.

Still another type of vowel "deletion" via gliding can be observed in *enynyiért* 'for so much' [ɛɲ:e:r] and *Imiék* 'Imi and his people' with the following scale of casualness: [imie:k] ⟶ [imje:k] ⟶ [im'e:k] ⟶ [ime:k]. Originally due to the same process, the casual form *mér* (still reducible to *mé*) is now a lexicalized/fossilized variant of *miért* 'why?'. Other instances of vowel hiatus deletion occur in the low-colloquial, "uneducated" rendering of loanwords such as *kolleg(i)ális* 'friendly, team-spirited', *szoc(i)alizmus*, *mete(o)rológia*, *vák(u)um*.

In contrast to consonant deletion, vowel deletion (and gliding) reduces the number of syllables and thus changes foot structure.

4.2. Foregrounding processes serve perceptual optimization in general and in particular they either obey the principle of figure and ground (cf. 4) or prevent backgrounding processes where these are undesirable (at least in slow/careful or emphatic speech). In both respects foregrounding processes are antagonistic to backgrounding processes.

4.2.1. Vowel lengthening (antagonistic to vowel shortening in **4.1.1**), as expected, occurs in emphatic or superslow speech and in prosodically prominent positions, i.e. either in the stressed first or the final syllable (cf. **4.1.1.2**), e.g. *akkora* [ɔ::k:orɔ] 'so big', *nem akarom* [nɛm ɔkɔro:m] 'I do not want it', *nem* [nɛ::m] 'no!' (cf. Nádasdy–Siptár in this volume).

4.2.2. Vowel insertion processes are antagonistic to deletion processes (cf. **4.1.4**, **4.1.6**). Our account of Hungarian vowel insertion in the syllable fall (a generative diachronic study is Mészöly 1976) basically runs as follows. Hungarian does not tolerate syllable falls which contradict the decrease of sonority, in accordance with the basic universal sonority hierarchy (cf. Vennemann 1988; Dogil–Luschützky 1988 for debatable details). That is, each rise of sonority in the syllable fall is excluded and, in addition so are many consonant sequences with equal sonority. If such undesirable syllable falls cannot be readjusted by assimilation processes (because the two consonants are not sufficiently similar to each other, cf. **4.1.2**) or by fusion processes (because no natural fusion process is feasible, cf. **4.1.3**) or by some other backgrounding process (cf. **5**), foregrounding processes are called for (cf. also **4.2.3**). One way is vowel insertion between the two problematic consonants, if thus the problematic syllable fall is improved to a permitted sonority decrease, and if the new syllable rise and syllable fall also agree with the sonority hierarchy.

4.2.2.1. In this way we can first explain why the following word-final syllable falls are permitted: a) fricative + stop: *liszt* 'flour', *fest* 'to paint', *gerezd* 'slice'; b) sonorant + obstruent: *szörp* 'juice', *szerb* 'Serbian' (native items in /rb/ are lacking), *kert* 'garden', *kard* 'sword', *korty* 'swig', *tárgy* 'object', *mersz* 'courage', *borz* 'badger', *vers* 'poem', *érv* 'argument', *perc* 'minute' etc.; *talp* 'sole', *bolt* 'shop', *föld* 'earth', *hölgy* 'lady', *nyelv* 'language', *polc* 'shelf', *bölcs* 'wise' etc.; *komp* 'ferry', *domb* 'hill', *nemz* 'to beget', *csont* 'bone', *rend* 'order', *ponty* 'carp', *rongy* 'rag', *tönk* 'stump', *láng* 'flame', *lánc* 'chain', *kincs* 'treasure' etc.; velar-final clusters are somewhat problematic: /-rk/: *sark* 'pole', *pörk* 'scab', whereas all other native items have vowel inserton, e.g. *torok* 'throat', *bürök* 'hemlock', /-rg/: loanwords such as *dramaturg* whereas all native stems have vowel insertion, e.g. *forog* 'to turn round', *pörög* 'to revolve'; /-lk/: *halk* 'soft', whereas all other stems have vowel insertion, e.g. *tülök* 'horn', *lélek* 'soul' /-lg/ in *közeleg* 'approach, come closer' vs. *közelg-ő* 'oncoming', *andalog* 'go about dreamily' vs. *andalg-ó* 'dreamy' etc., whereas there is no vowel insertion in the rare and stilted examples *rivalg* 'clamour', *uralg* 'to reign'; the only /-lg/ noun, with vowel insertion, is *dolog* 'thing'; /-sk/ in loanwords like *maszk* 'mask', *kioszk*, but always vowel insertion in native words (e.g. *piszok* 'dirt').

4.2.2.2. Second, we can explain insertion of a harmonic vowel before the word-final consonant in the reverse clusters which contradict the sonority hierarchy: *bokor* 'shrub', *bátor* 'courageous', *lepel* 'veil', *pokol* 'hell', *söpör* 'to sweep', *kuruzsol* 'to do quackery', *izom* 'muscle' etc. This inserted vowel is not taken as underlying as is shown by the loanword *motor*: in substandard Hungarian it is integrated into this set of vowel-insertion nouns so that the accusative may be *motr+ot* instead of standard *motor+t*. (On the other hand, stop + fricative clusters as in *taps* 'applause', *kedv* 'frame of mind', *copf* 'pigtails', *gipsz* 'gypsum', *keksz* 'biscuits' do not have epenthesis.)

4.2.2.3. Third, we can predict problems when two consonants of equal (at least universal) sonority close the syllable fall. There is always vowel insertion in /-lm/ (e.g. *forgalom* 'traffic', *késedelem* 'delay') but not in the isolated loanword *film*; similarly *három* 'three' *terem* 'hall' etc., but all loanwords such as *farm*, *reform* etc. tolerate /-rm/; similarly *töröl* 'to wipe', *perel* 'to sue' etc., but the isolated loanword *görl* 'chorus-girl' rests unchanged; finally there is contradiction among native words (or very old loans) in *szörny* 'monster', *szárny* 'wing' vs. *torony* 'tower', *horony* 'fluting'.

Final stop clusters occurring in loanwords such as *akt* 'nude' (in the arts), *perfekt* 'perfect', *recept* 'recipe' *smaragd* 'emerald' resist epenthesis as expected; whereas native items (only velar-final clusters occur) normally trigger vowel insertion: *szitok* 'invective', *titok* 'secret', *átok* 'curse' (but note the place-name *Detk*), *szutyok* 'dirt', *bütyök* 'gnarl' (but *Batyk*); similarly for affricate + stop clusters: *tücsök* 'cricket', *vöcsök* 'grebe', *mocsok* 'filth' (but *Recsk*) and *pocok* 'field-vole', *vacok* 'den', *pecek* 'peg' (but *barack* 'peach', *palack* 'bottle', *tarack* 'stolon').

4.2.2.4. Fourth, we can explain the formation of hypochoristics and diminutives in *-i* (cf. Dressler 1987, 74ff.) where stems are first truncated to the maximal first syllable, i.e. a monosyllable with the maximal syllable fall allowed; then the suffix *-i* is added. In accordance with **4.2.2.1** we find—without consonant deletion after the first vowel—*Orsolya* ⟶ *Ors+i*, *Erzsébet* ⟶ *Erzs+i*, *Kriszt(in)a* ⟶ *Kriszt+i*, *Eszter* ⟶ *Eszt+i*, *Gusztáv* ⟶ *Guszt+i*, *Andor* ⟶ *And+i*, *Antal* ⟶ *Ant+i*, *Nándor* ⟶ *Nánd+i*, *Franciska* ⟶ *Franc+i*, *Zsombor* ⟶ *Zsomb+i*, *Csongor* ⟶ *Csong+i*, *Olga* ⟶ *Olg+i*, *Árpád* ⟶ *Árp+i*, *Márta* ⟶ *Márt+i*, *Boldizsár* ⟶ *Bold+i*, *Zoltán* ⟶ *Zolt+i* (but also *Zol+i*!), *Szilvia* ⟶ *Szilv+i*.

In accordance with **4.2.2.2** the final consonant of the would-be syllable-final consonant cluster is deleted: *Andrea* ⟶ *And+i*, *Miklós* ⟶ *Mik+i*, *fagylalt* 'ice-cream' ⟶ *fagy+i*, *Zsigmond* ⟶ *Zsig+i*, *Ágnes* ⟶ *Ág+i*, *István* ⟶ *Ist+i*.

As to the group **4.2.2.3**, the second, equally sonorant consonant is usually deleted in hypochoristics/diminutive formation: *Vilmos* ⟶ *Vili* (but maybe from G. *Willi*, because of *Vilma* ⟶ *Vilm+i*), *Imre* ⟶ *Im+i*, *Viktor* ⟶ *Vik+i*, *szaktárs* 'comrade' ⟶ *szak+i*, but *Magda* ⟶ *Magd+i*.

However, we must acknowledge that in a few instances there is consonant deletion in hypochoristic formation although the would-be first syllable fall (before suffixation) would not contradict sonority decrease: a) *Borbála* ⟶ *Bor+i*, however, normal *Barbara* ⟶ *Barb+i*, b) (somewhat irregular) *György* ⟶ *Gyuri*, c) *Oszkár* ⟶ *Osz+i*. Of these forms c) behaves as native words do (cf. **4.2.2.1**), for a) there are no native correspondences, hence deletion and non-deletion are equally expected (cf. **4.2.2.1**), irregular b) remains unexplained, unless we assume prevention of homonymy with female *Györgyi* 'Georgina'.

4.2.2.5. Since there do not seem to exist any popular or phonostylistic vowel insertions in loanwords (such as putative **filem*) or in other foreign words and names ending in *-lm*, e.g. *Ulm*, *Kulm* etc., one might question the phonological character of vowel insertion. However, the process is quite general in native words (although not totally regular, cf. Dressler 1985, chapter 5 for the difference), i.e. exceptionless (with very few exceptions). Further work on diminutive/hypochoristic formation and on word-internal syllables is needed in order to see whether there are any systematic differences to word-final vowel insertion.

4.2.3. Phonological metathesis is another foregrounding process which readjusts disallowed consonant clusters. This seems to be the case (cf. Vago 1980, 118–9) in Nom. Pl. *terh-ek* vs. Sg. *teher* 'load', *pelyh-ek* vs. *pehely* 'fluff', *kelyh-ek* vs. *kehely* 'chalice' (loaned from MHG *kel(e)ch*). Due to its non-productivity and to the existence of counter-examples (cf. **5.3**)—whatever direction is assumed for this metathesis—it is probably a morphonological rule.

4.3. Among prelexical foregrounding processes we want to mention the "peripheralization" of vowel phonemes with the effect that Hungarian is among the numerous languages that have no central (schwa type) phoneme. Thus fronting is applied to Russian central high jery as in R. *bylina* 'Old Russian heroic poem' ⟶ H. *bilina* and in any personal name, e.g. *Gromyko* ⟶ *Gromiko*, *Kosygin* ⟶ *Koszigin* (cf. Elekfi 1972, 183). According to Farkas (1979), fronting or backing plus rounding processes are applied to non-standard loanwords of Roumanian high central <î>: *rînd* 'line' > H. *rind*; *văzînd* 'seeing' > H. *vezund*.

5. Special problems of phonological analysis

5.1. A special problem is posed by the Hungarian phoneme /j/ (Nádasdy–Siptár in this volume, **5**, **5.1**, **5.3**). For the negative reasons given by the authors, /j/ should not be classified either as part of a diphthong or as a glide. They classify it as a non-nasal sonorant such as the liquids /l, r/. However, they did not provide a positive justification, either general phonological or phonetic, for including it into a natural class with /l, r/; moreover, /j/ shows a behaviour that is not shared by Hungarian liquids, as will be shown directly.

Therefore, we propose here the alternative of treating it as an approximant: similar to the German approximant /j/, it may become long and fricative in emphatic speech in prosodically strong position, e.g. in *jjó*! 'ggood!', i.e., it undergoes fortition processes under the expected phonostylistic and prosodic conditions.

As an approximant it need not participate in normal voicing assimilation of obstruents (cf. **4.1.2**).

However /j/ becomes a fricative in word-final position after consonant (cf. Kerek 1977), if a fusion process (cf. **4.1.3**) is impossible, e.g. in the imperatives *lép+j* 'step!', *rak+j* 'put!', *vár+j* 'wait!', and in *férj* 'husband', *szomj* 'thirst', whereas in this environment a vowel is inserted before /l, r/ (cf. **4.2.2.2**). According to the nature of this preceding consonant, /j/ loses much or all of its voicing. This (at least partial) devoicing and seemingly articulatory fortition recalls German, Russian etc. final devoicing which must be interpreted as a backgrounding process in the prosodically weakest position, i.e. as backgrounding (and thus diminution) of sonority (cf. **1**). The specific Hungarian context is prosodically doubly weak, i.e. word-final position and as the last consonant of a syllable-final consonant cluster.

The non-occurrence of possessive /j/ after palatals and sibilants (Nádasdy–Siptár in this volume, **8.4**) might be a "therapeutic" dissimilation (dissimilatory loss), due to the approximant ("near-fricative") character of /j/.

If we look at diachrony, then /j/ goes back to a lenition of a palatal fricative. Therefore, our synchronic hypotheses entail the assumption of a diachronic rule inversion which maintains the phonological character of the phonological process (without morphologization, cf. Dressler 1988b).

5.2. /l/-drop (Nádasdy–Siptár in this volume, **6.2**; Kerek 1977) cannot be handled as a single backgrounding process, rather we must assume at least two distinct processes.

5.2.1. If due to morphological concatenation /l/ comes to stand between two consonants, this incorrect consonant cluster must be simplified (cf. Kerek 1977). These consonant deletions may be compared with stop deletion in **4.1.4.** However, in the isolated example *ajánl* 'to offer' there is a final sonorant cluster with equal sonority which is difficult to pronounce. Therefore either /l/ is deleted (especially in derived forms such as *ajánl+gat* [ɔja:ŋgɔt]) or /n/ (via intermediate vowel nasal fusion and compensatory lengthening of /l/): [ɔjã:l] ⟶ [ɔja:l:] ⟶ [ɔja:l] with degemination in the syllable fall, cf. **4.1.1.1**).

5.2.2. A quite different process of "/l/-drop" must be assumed, however, in the optional deletion of /l/ in *csal+d meg* 'deceive him/her!', *elment* 'went away', *küld+d vissza* 'send it back!' (Kerek 1977), in the first syllable of *hol jelent meg* 'where did it appear?', *följön* 'come up!', *sült tyúk* 'roast hen' (Nádasdy–Siptár in this volume, **6.2**), etc. We offer the following reasons for assuming a quite different process: 1. This is a backgrounding process of casual speech—if it occurs in formal/slow speech, it is considered to be substandard or dialectal. Note that in all languages standard casual speech is of dialectal origin, because a standard is first introduced only for formal speech situations and thus has no casual forms of its own (cf. Dressler 1975). 2. If the vowel preceding the deleted /l/ is short, there is compensatory lengthening of this vowel or of a following /j/. (This condition has precedence.) 3. The deleted /l/ always immediately follows a vowel, i.e. is at the beginning of the syllable fall, not at its end (as with deleted stops). 4. /l/ deletion precedes stop deletion, e.g. *csald meg* gives [čɔ:dmɛg], not *[čɔlmɛg]. 5. Between fully pronounced /l/ and its deletion, there is an intermediary stage with an approximant pronunciation of the /l/, i.e. the tongue approaches, but does not reach the articulatory target of a lateral consonant—which is difficult to perceive (such as an analogous casual speech process in Breton).

5.3. The most thorny problem we want to touch here is the question of the phonemic identity (or non-identity) and of the deletability of [h] and [x] written as <h> or <ch> according to orthographic traditions (cf. Nádasdy 1985, 241;

Nádasdy–Siptár in this volume, cf. **4.2.3**; Kerek 1977, b). Our very tentative proposal runs as follows:

As in many languages (Hurch 1988), the universal process of /h/-deletion is suppressed only in the strong prosodic position of syllable-initial and (simultaneously) antevocalic position, thus /h/ is pronounced as the usual laryngeal fricative/approximant (like in Germanic languages), e.g. in *hat* 'six', *hindu* 'Hindu', *irha* 'husk' (a medieval German loanword), but it is obligatorily deleted in the syllable fall (going back to a diachronic process of the 16th century), e.g. in *méh* 'bee' (and the homonym 'womb'), Dat. *méh*$^{\$}$*nek* (with deletion: [me:, me:nɛk]), whereas it stays in the second syllable rise of Pl. Nom. *mé*$^{\$}$*hek* (without deletion) (Vago 1980, 129); *juh* 'sheep' vs. *ju*$^{\$}$*h+ok*; *düh* 'rage' vs. *dü*$^{\$}$*h+ök*; *rüh* 'scab' vs. *rü*$^{\$}$*h+ök*. As predicted, the morphonological rule of epenthesis precedes phonological *h*-processes. Analogous alternations occur in *oláh* 'Wallachian (Roumanian)' vs. *olá*$^{\$}$*h+ok*, *éh* (obsolete, literary) = *éh*$^{\$}$*ség* 'hunger' vs. *é*$^{\$}$*hes* 'hungry'; *cseh* 'Czech' vs. Pl. *cse*$^{\$}$*h+ek*. There is no [h] in *Cseh-erdő* 'Bohemian Woods', *Cseh-ország* 'Bohemia', due presumably to compounding after *h*-deletion. Old German loans (from <ch> = /x/ [ç]) are *céh* 'guild' vs. *cé*$^{\$}$*h+ek* and *pléh* 'sheet-metal' vs. *plé*$^{\$}$*h+ek*.

Prosodic strength favours foregrounding and disfavours backgrounding processes not only in the syllable. Word-initial position is stronger than word-internal position. In the latter, weaker position /h/ is voiced in moderately casual speech and then deleted in still more casual/faster speech (cf. Szende 1988, 180), both backgrounding processes, e.g. in *tehát* 'hence', and in the above examples with intervocalic [h]. There is a hierarchy for these backgrounding processes, due to boundary and stress prominence: e.g. in *a hír* 'the news' the effect of word boundary within the noun phrase between proclitic article and noun has the effect that /h/ will never delete, though it may get voiced in sufficiently casual speech situations.

Long syllable-final /h:/ is not deleted, due to the rich-get-richer-principle, i.e. weaker short /h/ is still further weakened in the prosodically weak syllable fall via voicing or deletion (see above), whereas stronger long /h:/ is maintained and either realized as [h:] or even further "strengthened" via a foregrounding (and fortition) process to [x:]; this fortition is explainable as a preventive strategy for avoiding lenition and deletion of /h:/ where it is susceptible to degemination and/or other backgrounding processes in prosodically weak positions (diachronically this is again a partial rule inversion of the 13th century change $x > h$, cf. Benkő–Imre 1972, 55). This /h:/ occurs in German (or medieval Latin) and oriental loanwords and names such as *pech* 'misfortune' [pɛh:, pɛx:], *cech* 'restaurant bill', *Bach* [bɔh:, bɔx:], *fach* 'box', *sarlach* 'scarlet', *almanach* 'almanac', *krach* 'business crash', *sah* 'shah', *padisah*, *moloch*, *eunuch*. Here [x] is the most educated pronunciation in the polysyllabic examples. Diachronically, G. *-x* was loaned as H. *-kk* in some words such as *sakk* 'chess', the obsolete measure *su/okk* (cf. Kobilarov-Götze 1972) and in many dialect and substandard forms (e.g. *pekk* for *pech*) which shows another strategy of strengthening the syllable-final fricative.

On the other hand, native *doh* 'must', *moh* 'moss' (normally *moha*), *potroh* 'abdomen (of an insect)' have non-geminate /h/: is it maintained in order to avoid phonotactically incorrect short word-final /o/?

Bolyh /bojh/ 'nap of cloth, fringe', a literary, retrograde formation of the Language Reform (in 1796) from *boly$h+os* 'fluffy' and rather obsolete, literary *enyh* /ɛɲh/ 'relief' are the only syllables where fricative /h/ follows an approximant or a sonorant. Here /h/ is pronounced as (optionally palatalized) [x].

The pronunciations of *technika* 'technique' as [tɛx$nikɔ, tɛh$nikɔ] can be derived from underlying /h:/ with obligatory degemination (**4.1.1**). This backgrounding process applies after the (albeit optional) foregrounding process (/h:/ ⟶ [x:]) according to Stampe's principle "fortition before lenition" (cf. Donegan–Stampe 1979). However, the further backgrounding process of /h/ deletion is not allowed to apply to this derived short [h], a feeding prohibition which often occurs in casual speech phonostylistics, but not with otherwise obligatory phonological procsses. The same holds for the German loanword *yacht* 'yacht' and the book-word *ih$let* 'to inspire; inspiration', i.e. a medieval Hungarian word which was revived during the Language Reform (in 1816) in its written form (i.e. with spelling pronunciations).

The same principle "fortition before lenition" explains what happens in abbreviations such as *MÉH* (Nádasdy 1985, 241); i.e. the name of this firm would be unrecognizable if the third phoneme of its abbreviation were deleted. Thus the laryngeal approximant/fricative /h/ is strengthened to [x]. Note that [x] is only intrinsically palatalized after palatal vowels, whereas a pronunciation [ç] is identified as upper-middle class *Européer* (i.e. German background) pronunciation.

As often in loan-phonology, various phonological strategies of integration come into conflict with foreign names where no routine pronunciation has been imposed. Let us take the German toponym *München*:

1. A rather uneducated variant is [mün$hɛn] where <ch> is identified—such as in all clearly foreign names—with /h:/. Since long consonants are not permitted in syllable-initial (non-ambisyllabic) position, degemination applies.

2. If before degemination fortition applies, we get /münxɛn/ pronounced as [mü̃:xɛn] with vowel cum nasal-fusion.

3. The attempts to pronounce the name in its German way induce strong palatalization before the (Hungarian!) palatal vowel: [müɲçɛn] with nasal place assimilation triggered by a non-Hungarian member of the natural class of palatal sounds where it otherwise applies in Hungarian.

4. Since neither [ç] nor, a fortiori, [nç] exist in Hungarian, the uncommon syllable contact is alleviated by medial insertion of an intrusive /c/.

5. In more casual realizations, the syllable-final nasal can be fused with the preceding vowel: [mü̃:hɛn, mü̃:çɛn].

6. People who do not speak German, but know that in some foreign names <ch> should be pronounced as /k/, may produce [müŋkɛn] (or even induced by <h>: [müŋkhɛn]) with nasal place assimilation.

6. Notes on typology

6.1. As far as prosodic typology is concerned (cf. Bertinetto 1981, 168ff.; Vayra–Fowler 1987; Pompino-Marschall *et al.* 1987), Hungarian is a syllable timed language (cf. Elekfi 1972, 190). Typological symptoms are:

1. Fixed place of accent—on the word-initial syllable—and preference for a trochaic rhythm, realised in Hungarian by alternation between unstressed and secondarily stressed syllables (cf. Hammond 1987, although his account is presumably too mechanical).

2. The phonological and phonetic shapes of accented and unaccented syllables are similar, due to similar application of both prelexical and postlexical processes (cf. also Saporta 1963, 68).

3. Accented vowels are not significantly more lengthened (or otherwise foregrounded) nor are unaccented syllable peaks significantly more shortened (or otherwise backgrounded) than their contrasting classes, cf. **4.1.1.2**, **4.2.1**.

4. And even backgrounding vowel bleaching to schwa is extremely restricted (cf. **4.1.5**). This is typical for vowel-harmony languages, because vowel bleaching obscures vowel harmony. Thus it tends to occur only in those vowel harmony languages where there are anyway many other exceptions to vowel harmony (such as in Chinalug, cf. Dressler 1977, 54 ff.). In this way, the typological criteria of syllable timing and agglutination favour each other (cf. below).

6.2. The application and suppression of prelexical and postlexical segmental phonological processes may condition each other, but such typological criteria (cf. Dressler 1979b) do not seem to allow important typological generalizations about Hungarian at this stage of inquiry. More research on Hungarian in terms of Natural Phonology and on phonetic investigations of the Hungarian base of articulation is needed.

6.3. As of now, there exists no broad and explicit explanatory account of correlations between morphological and phonological typology. However, morphological typology has clear consequences for morphonology (cf. Dressler 1979b, 1985). Thus Hungarian vowel harmony is consistent with its appurtenance to the agglutinating type (cf. Skalička 1935, 1979); and both its many exceptions to vowel harmony and the existence of many other morphonological rules are consistent with the marginally fusional/inflecting element in Hungarian morphology.

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ON STATUS AND FUNCTIONS OF INTONATION

IVAN FÓNAGY

On defining intonation

In spite of my reluctance to the magic number three in science it seems reasonable to distinguish in the case of intonation, as well as in that of other phonetic entities, a physical, a perceptual and a linguistic level. The physical and the linguistic level are clearly distinguished in recent discussions (Libermann 1979; Ladd 1980; Pierrehumbert 1980; Gussenhoven 1984; Hirst 1987), the perceptual level is generally discarded, except by the phoneticians of the Dutch IPO Research Centre (see e.g. 't Hart–Cohen 1973). Perception is function-dependent, perceived contrasts do not coincide, however, with linguistic oppositions, neither in the case of segmental nor in that of prosodic features.

Let us start on the level of **perception**, and follow the intuition of an early European musicologist, Aristoxenus (first century B.C.). He defines melody in terms of movements in space. In his 'Harmonical fragments' he claims that in musical analysis "we must start with the description of the spatial movement of sounds", and distinguishes between a smooth, continual movement, and discontinuous tone-steps (1868, 10). "Pitch can do little else but rise and fall", as stated more recently by Dwight Bolinger (1986a, 202). He opposes, like Aristoxenus, glides and jumps (op. cit. 224 ff.). Let us call the perception of tonal movement **speech melody**.

The main **physical** basis of speech melody are the changes in fundamental frequency, to a lesser degree intensity (see Rossi *et al.* 1981, 54–63) and vocal colour. This latter comes to the fore in whispered speech to supersede fundamental frequency.

I should reserve the term of **intonation** to well integrated, distinctive melodic patterns. Linguistic rules determine the forms and limits in the realisation of intonation patterns according to text and context, allowing for expressive 'distorsions'. Further studies of the functions of speech melody may lend a concrete content to the term **distinctive**.

Intonation is one of a number of prosodic entities. I think the extension of the term of **intonation** to encompass all prosodic features furthermore 'voice-timbre' (Vasil'ev 1965) is impractical and might be misleading.[1] In sticking together all the prosodic components or all the prosodic features, or both, we make more difficult the specification of the respective role of the different prosodic components—such as stress, juncture, intonation—in the realisation of the diverse linguistic tasks. Herbert Pilch (1966) defines intonation as a complex of all features that characterize syntactic structures as units: pause, stress (Akzent), vocal height (Tonhöhe). This definition, applied to modal intonation patterns, would imply that stress and pause contribute to the distinction of the assertive vs. the interrogative mode, just like speech melody. Let us add that the features subsumed do not always belong to the same level of linguistic hierarchy. 'Akzent' (stress) belongs to the linguistic level, 'Tonhöhe' (vocal height), loudness, voice quality (timbre) to the perceptual level.

The fashionable and widespread confusion of stress, lexical or grammatical tone and intonation by means of the jocker-term **pitch-accent** is, I think, still more deceptive. The term **stress** as defined at the level of speech production by Jespersen (1932, 119), Laziczius ([1944], 1963, 126 ff.) refers to the greater global effort of the muscles of the speech apparatus in producing one of the syllables. The greater effort is reflected by changes in sound-pressure, by pitch-movements, changes in duration and in the modification of the sound spectra of vowels and consonants, and in delayed release (Lisker–Abramson 1967), allowing for the correct identification of the stressed syllable.[2] The greater muscular effort, hypothesized by Jespersen, could be later demonstrated by means of physiological measurements (Ladefoged 1958; Fónagy 1954, 1966; Simon 1967). The acoustic projection of greater muscular effort is well established and tightly associated with the stressed syllable. The acoustic stress-image or parts of the image, may stick to the usually stressed syllable in case of an occasional shift in articulatory effort: the stressed syllable is signalled in such a case by the acoustic stress-symbol or stress-mask. Stress-masks are language-dependent. The modifications in vowel-timbre, for instance, are more pronounced in Russian and English than in French or Hungarian.

In most languages changes in fundamental frequency are the best stress-indicators (see Fry 1958). This does not imply, that a syllable pronounced

[1] "In the Soviet view melody is only one component of intonation which is considered to be a complex of pitch, stress, loudness, length, tempo, rhythm, pause and quality" as resumed by Rose Nash (1973).

[2] "Der Hörende versetzt sich sympatisch auf den Standpunkt des Sprechenden: wie überhaupt eigentlich das Gesprochene nur dadurch auffaßt, daß er dieselben Artikulationen still mitmacht (schwach innerviert), so beurteilt er die Stärke der Silben nach der darauf verwandten Artikulationsenergie" (Jespersen 1932, 119).

with a high and/or rising pitch is necessarily perceived as stressed. The tests carried out by Katwijk (1969), 't Hart–Cohen (1973) show that only a clearly circumscribed subset of such syllables is heard as stressed. The fundamental frequency curve of the syllable perceived as stressed correspond to that of syllables produced with greater expiratory effort. On the other hand, stressed syllables are correctly identified in whispered speech, but not the modal intonation patterns (Fónagy 1969b).

Historical linguistics who would attempt to apply consequenty a definition which reduces stress or 'accent' to pitch movement could not account for stress-related sound-changes such as lengthening of vowels and consonants or diphtonguization in stressed syllable, on the one hand, shortening and centralization of vowels, relaxation of articulation, loss of vowels or consonants in unstressed syllables, on the other.

The term of **pitch accent**, introduced by Dwight Bolinger (1958), risks to blur the difference between F0 movement as a correlate of stress, and melodic movement—carried by the stressed syllables—as a constituent of tone or intonation. The term may cover indeed both meanings. Thus, Janet Pierrehumber (1980) considers pitch accent as a stress component (1981, 225) a way of marking stress (1980, 185), as the melodic correlate of stress, in speaking of the accented or stressed syllable (op. cit. 64, 71), of nuclear accent (op. cit. 16, 72 f.). At the same time, it appears that pitch accents are made up of tones (op. cit. 23). Dwight Bolinger considers in his major work on intonation pitch accent as a stress-mark, admitting even its physiological basis, in the frame of historical but not of synchronical linguistics ("that is no doubt true in a historical sense") (1986a, 20). The terms of reversed accent, inverted accent clearly refer, however, to speech melody, as well as climax and anti-climax presented as manifestation of accent (1986a, 77–84, 178; 1970, 115).—Eva Gårding applies the term to both distinctive Swedish 'word-accent' i.e. stress dependent lexical tone, and to French stress and intonation patterns (1982, 117–35). Other autors (Öhman 1968; Jensen 1980) clearly distinguish between 'stress' and 'accent' (lexical tone).

The case of Hungarian yes/no questions may illustrate the advantage of a clear-cut distinction of stress and intonation, and the difficulties which might create its neutralization by means of the concept of 'pitch-accent'. As we know (Csűry 1925; Deme 1962; Fónagy–Magdics 1967) speech melody may assume three different shapes in the last stress group of yes/no questions in function of stress-placement. If the stress falls on the last syllable of the sentence, the melody is rising; the stress of the penultimate syllable elicites a rise-fall in the last syllable; if the ante-penultimate syllable is stressed the melody is rising in the penultimate syllable, and falling in the last one. This is a transparent case of stress-determined combinatory variation. The rise does not take place "without regard to the lexical stress", as suggested by Robert Ladd (1980, 750 ff.). It is true, however, that in the case of emotive shift of stress the melodic configuration depends on the actual stress placement, and it is not determined by 'abstract stress', i.e. the traditional place of stress.

How could we describe stress-dependent variation in the frame of pitch-accent theory? If pitch accent is a stress mark how to account for the divergencies of the three patterns? If it is an intonation pattern, the concept of stress had to be reintroduced to account for the choice of each of the three 'pitch accents'.

'Intonation' is a plural

Lecturers in French as a second language are compelled to teach intonation patterns such as the tune of questions expressing doubt and disbelief, or that of expressing evidence in face of doubt which contrasts with a quite similar pattern, that of neutral yes/no questions (Fónagy–Bérard 1973). Hardly any teacher would, however, feel obliged, to teach how to express anger or tenderness by vocal means. It seems advisable to distinguish in the analysis of intonation **primary emotions** (Plutchik 1980), **social attitudes** and **modes**. They differ essentially on the level of expression, as well as on the level of content.

Primary emotions, such as anger, fear or joy are reflected simultaneously at all levels of the vocal apparatus: at the respiratory and glottal level, as well as the pharyngeal and oral level (Fónagy 1981; Scherer 1985). **Social attitudes**, for instance the expression of doubt, in face of evidence, or that of evidence in face of doubt, may dispense with thoracal or oral mimetics. **Modes**, such as yes/no questions, are expressed exclusively by speech melody. The tonal expression of attitudes and modes is characterized by a high degree of precision. The French echo-question expressing disbelief is characterized by an intersyllabic rise of eight half-tones and a subsequent fall of four half-tones. At the same time, an intrasyllabic rise in the last and in the penultimate syllable differentiates such question of the pattern of childish mockery (Fónagy–Fónagy–Sap 1979).

A reduced marge of variation in intersyllabic intervals and a high intrasyllabic regularity of the F0 function are the distinctive features of a subset of attitudinal and modal melodic patterns, we could label 'melodic clichés' (Fónagy–Fónagy–Bérard 1983). One of the Parisian French clichés requires a gradual descent in quarter of tones. The high intrasyllabic regularity of such patterns prompt us to admit a third dimension in the description of speech melody, that of **melodicity** (Fónagy–Magdics 1963, 39–41; Ladd 1978; Libermann 1979). Melodicity might be occasionally distinctive (Ladd 1980, 169–85; Fónagy–Bérard 1980).

The high degree in tonal precision corresponds to a higher degree of semantic organization in the case of attitudes. A Hungarian falling-rising cliché (fall of a third followed by a rise of a flat third):

Ott

tam

vol-

implies that the speaker who is supposed to have failed to come to a meeting, rejects the accusation (refuses the supposition) more or less indignantly. It is significant that in a number of cases the attitudes expressed by such intonation patterns can also be conveyed by means of lexical or grammatical signs (Schubiger 1958, 1965; Nikolaeva 1974; Ladd 1980, 121–3). The above quoted intonation pattern is the equivalent of *hiszen*, a derivative of *hiszem* 'I believe it'. The melodic cliché applied to the sentence *Megmondtam* 'I told it' presupposes either the partner's pretense that the speaker did not tell it, or that the partner ignored a previous warning of the speaker.

Modal intonation patterns represent the highest level of semantic organization that can be reached by intonation. Modal categories correspond to the most essential, the most general attitudes. Verbal communication could not do without them. It is not easy to draw a demarcation line between moods (modal categories) and attitudes. Attitudes are emotionally coloured; attitudinal intonation patterns are always felt as stylistically marked. Modal intonation patterns may be neutral, stylistically unmarked. Stylistical markedness is, however, an elusive feature. The easiest, and probably the most satisfactory way of tracing a demarcation line is offered by the grammar itself. Non-markedness and generality is acknowledged by the grammar in providing grammatical morphemes constantly linked with some basic mood. Languages might widely differ in this respect. Most (probably all) languages have non-prosodic markers to distinguish assertive vs. interrogative or assertive vs. imperative sentences. Few languages have, however, grammatical markers for such moods as **probabilitive, necessitive, precative, pejorative mood** that are inherent features of the verbal system in Vogoul (Kálmán 1965). Consequently, we will have to consider 'imploring' as an (emotive) attitude for Indo-European languages, and as a grammatical mood as far as Vogoul is concerned.

Emotions are expressed by a combination of prosodic and segmental gestures. The vocal performance aims originally at tension reduction. It is expressive in the literal sense of the term. It is meant to express, to project virtual elements creating tension. The expression of the speaker's mental state contains valuable informations for the hearer. In the frame of Karl Bühler's model of verbal communication (1934) the primary function of emotive vocalisation is expression; its impressive function (Appel-Funktion) is a derivative of the primary expressive function.

Attitudinal intonation patterns are essentially and primarily hearer-oriented (impressive). This accounts for their high phonetic and semantic precision. Their high precision does not involve, however, conceptual analysis.

Functions of intonation

There is a more or less general agreement concerning the functions of segmental linguistic units. Phonemes as such have a unique function: the distinction of lexical and grammatical morphemes. The contextual (combinatory) variants may have a demarcative function, free variants an impressive or expressive function (Laziczius 1966 [1935]; Trubetzkoy 1939, 16–29; Jakobson–Halle 1956, 8–11; Jakobson–Waugh 1979, 36–55).

We meet with a greater diversity of opinions as far as the functions of intonation are concerned (see Malmberg 1966). Three functions are attributed in most cases to intonation, but rarely the same functions. Vilém Mathesius (1937) posits a **structural**, a **primary modal** and a **secondary modal** function. Georges Faure (1962) adopts Karl Bühler's (1934) triadic functional modal and distinguishes a **representative**, an **expressive** and an **appellative** level. De Groot (1945) stresses the linguistic relevance of intonation: the sole means that can determine the function, the actual meaning and the modal category of the sentences. František Daneš (1960) distinguishes the **structural**, **modal** and the **expressive** function, and Milan Romportl (1957, 1973) explicits the hierarchical rapports between the three functions:

```
                intonation
             + /          \ -
      non-terminal      terminal
                     + /        \ -
           interrogative          non-interrogative
           + /        \ -          + /        \ -
        emotive    neutral      emotive    neutral
```

Alan Cruttenden (1970) admits a **culminative**, a **demarcative** and a "**modal**" function, put between quotation marks, allowing only for the distinction of definiteness vs. tentativeness. The three functions accounted for in Herbert Pilch's (1972) phonological theory are the distinction of **morphosyntactical** categories, the vocal marking of different **genres** such as sermons, and the vocal **characterization of the speaker**. Marie-Christine Hazaël-Massieux (1983) distinguishes the three functions: **integration**, **segmentation**, **signification**, where 'signification' includes the distinction of modes and the expression of attitudes and emotions.

Differences might be merely terminological. Mathesius (1937) considers the expression of emotions as a 'secondary-modal function'. Artëmov's (1969) **predicative** function coincides with the 'primary-modal' function of Mathesius. Lee's **demonstrative** function (1960b) corresponds to the **emphatic** function of other authors. The **linking** function admitted by Kličnikova (1965) does not differ from the function of **unification**, **cohesion**, **integration** proposed by other authors (Karcevskij 1931; Hazaël-Massieux 1983). The terms of **distinctive** function and **disambiguization** (Boulakia 1978) generally cover the same domain. (The terms 'culmination' and 'focalization' are pseudo-synonyms, since they belong to different levels of discourse organization. Culmination is a means of focalization.)

On the other hand, identical terms may cover more or less different contents. The **appellative** function in Faure's model covers the expression of emotions, attributed in most theories to the **expressive** function (Daneš 1960; Rigault [1962], 1964; Artëmov 1969; Martin 1973; Rossi *et al.* 1981, 181 ff.); Faure reserves this last term to denote idiosynchratic individual features, similarly to Laziczius ([1935], 1966, 38–58). The representative function encompasses lexical tones according to Philippe Martin (1973); it covers essentially the theme/rheme distinction in Rossi's prosodic theory (1980; in: Rossi *et al.* 1981, 181). The **appellative** function provides for announcement, declaration and communication of news in the study of Vera Kachkina (1979). The terms 'culmination', 'emphasis', 'contrast', are often used as synonyms. Hetzron (1977) takes objection against their amalgamation. Eva Gårding (1982), in contrast with other authors, carefully distinguishes between the **demarcative** and the **hierarchical** functions.

Actualization (Karcevskij 1931) cannot be considered as a primary function. In positing actualization as one of the two basic functions of intonation, along with cohesion, Karcevskij meant to stress that sequences of phonemes alone do not constitute an utterance and cannot convey a concrete message. The term of 'actualization' is meant to underline in particular the functions Mario Rossi situates at the **enunciative** level.[3]

The conceptual organization of function-terms may differ considerably. The **differentiative** (distinctive) function is an independent set in W.R. Lee's system (1960) including both semantic and grammatical divergences. It is a subset of the representative function according to Philippe Martin's functional model (1973). The **explicative** function characterizes narration, answer and title, following Vera Kachkina (1979). The characterization of narration and title are special cases of the vocal marking of different **genres** in the frame of Pilch's triadic system (1972); the characterization of answers is within the competence of the modal function according to most models.

The opposition of **linguistic** vs. **non-linguistic** functions of intonation (e.g. Léon 1972) is misleading. It suggests (implicitly or explicitly) that some functions such as the expression of attitudes and emotions could be considered as 'non-linguistic'. In fact, the expression of attitudes and of emotions is at the same time conventional ('coded') and motivated, just as modal intonation or intonation patterns resolving syntactic or semantic ambiguities.

The terms **representative** and **distinctive** are sometimes used as synonyms. They correspond, in reality, to two different conceptions of intonation. Intonation can be representative only if considered as a sign, a linguistic unit, composed of a signifier and a signified (as defined by Ferdinand de Saussure [1916] 1976, 97–100); and it cannot be distinctive only if considered as a sign-element, a part of the signifier. Kenneth Pike (1965) compares the double aspect of intonation to that of light, particular and ondular at the same time.

The term **distinctive** needs some qualification. Intonation may be **directly** or **indirectly** distinctive. The two categories are rarely set apart in the discussions as they are in the papers of Stockwell (1972), Faure (1970) or Léon (1972). In most examples advocated by the authors intonation is only

[3] "Au niveau énonciatif, l'intonation assure l'identification de l'apport d'information, elle modifie l'extension de l'unité rhématisée par l'indication, l'identification et la sélection exclusive, elle présente le thème à différents degrés d'emphase" (1980; in Rossi *et al.* 1981, 323).

indirectly distinctive. Intonation may become distinctive in reflecting the syntactic and semantic articulation of the sentence, by virtue of its **demarcative** capacity. In one of the French prosodic 'minimal pairs' cited by Danielle Laroche-Bouvÿ (1971) to illustrate the distinctive function of intonation, *La belle # ferme le voile*, with a juncture placement after the first word, the sequence conveys the meaning 'The beauty draws the veil'; if the juncture is shifted rightwards, *belle ferme #* will be interpreted as a nominal phrase, 'the beautiful farm' *voile* as a verb, and the whole sentence will get the meaning 'It is veiled by the beautiful farm'.

Similarly, the fallacy of a 'dative' vs. 'genitive' or a 'nominative' vs. 'genitive' intonation in Hungarian utterances (Fónagy–Péchy 1965) can be easily uncovered by highlighting the primary role of the demarcative function (Fónagy–Magdics 1967, 112, 121). The sequence [*ɔkɔrom*] is the segmental basis of a Hungarian minimal pair, meaning either 'I wish [it]' or 'my arm', according to the prosodic pattern assigned to the sequence. In fact, Hungarian is far from being a tone-language. The two intonation patterns: ↘*ɔkɔrom* vs. *ɔ* ↘*kɔrɔm* assigning to the first the meaning 'I wish [it]' and to the second 'my arm' (Varga 1983) are demarcative: they signal morpheme-boundaries, and are stress-dependent (Fónagy 1958a).

The primacy of the demarcative function is less obvious but real in cases such as: *He did not go to Holland because his Dutch was weak*, meaning either that (a) 'He did not go, since his Dutch was weak' or (b) 'It is not true that he did not go because his Dutch was weak' (Lee 1955–1956, 1960a).[4]

The semantic distinction may be founded on the culminative role of intonation. Thus, the distinctive intonation in the two of *C'est pas le jour qui me convient* advocated by Mario Rossi (1973), lends to the sentence two different meanings, (a) 'It is not the right day for me', and (b) 'I am not concerned with the date'. In (a) the negation is put forward and the negative morpheme *pas* gets the emphasis; in the variant (b) the word *jour* is focalized by prosodic means, stress, high tone and lengthening. In sentences such as the the Hungarian *Természetesen beszél angolul* the first word, the adverb, is focused and

[4] In fact, in the first case (a) we have to do with two propositions which are in causal relation, where the weakness of Dutch, implies the not-going to Holland, $(w\ D) \rightarrow (\neg\ g\ H)$. In the second case the validity of the implication is negated: $\neg\ [(w\ D) \rightarrow \neg(g\ H)]$. In the case (b) the two propositions are tightly linked, since the whole statement is negated. The melodic movement—the descent starting with *did not*—reflects the semantic unity of the negated statement, in contradistinction to (a) where the two propositions keep their independence. In his paper on the interpretation of negatives, Janet Mueller Bing (1980) cites a similar example, *I didn't come because he told me* and separates the two independent propositions of the (a) version by means of pause, and assigns a unifying melodic pattern to the (b) version where the implication is negated as a whole.

starts with a high fall, if the sentences means 'He speaks English quite naturally'. If the melodic peak is shifted on the verb, the adverb, put into anacrusis, and pronounced on a mid-low level tone, is transformed into a sentence modifier: 'Of course he speaks English'. The prosodic patterns differenciate in the same way the semantically strong adverb from its semantically weak homonym, for instance, the adverb of place, in its full local meaning, forms the corresponding adverb, 'weakened' since transfered into a more abstract dimension, that of time or mode (Fónagy 1973).[5]

A certain type of allusive focusing may illustrate a distinction based on a more hidden presence of demarcation. In the negative statement cited by Janet Mueller Bing (1980), *Bob didn't solve some of the problems* the indefinite numeral is pronounced with an emphatic rise-fall, in the (b) version, suggesting that he solved not some but all of the problems; in contrast with the non-marked (a) version, meaning that 'the set of unsolved problems contained some of them'. The focusing on *some* runs against expectation, since the indefinite numeral as such is not supposed to be put into relief. It is meta-linguistic (de dicto) emphasis, it refers to a previous statement, real or imaginary, or to an expected subsequent statement. It got a contrastive emphasis suggesting: 'He solved them *all*', with an emphatic rise-fall emphasis on all, pointing back to *some*, in echoing its melodic pattern. This second half of the complete statement, the utterance is 'one-legged': elliptical and allusive. The intonation is demarcative in showing that the utterance is left open. The author qualifies the emphasis as **ironical**. A certain kind of emphatic rise-fall intonation is indeed quite typical for ironic statements (Fónagy 1971).[6]

[5] Similarly, the adjectif *certain* may be distinguished by means of dynamic and melodic emphasis from the indefinite pronoun *certain* in sentences such as *I have certain proofs* cited by Daneš (1960). In French examples quoted by Faure (1970) the tranformation of an adverb (*c'est* ↗ *bien* ↘ *ce que tu dis* 'It's very good as you said') into a 'phrase adverb' (*C'est* ↘ *ce que tu* /\ *dis* 'I think it is what you meant') is incidental to the loss of emphasis, just as in Hungarian or English. In some other cases the distinction is carried out by demarcative patterns: *Il a mangé naturellement* 'He ate naturally' vs. *Il a mangé* ↗ *naturellement* 'Naturally, he has eaten' (Hagège 1978). This seems to be true for most of English sentence modifiers.

[6] "The encounters between intonation and grammar are casual, not causal. Grammar uses intonation on these frequent encounters but intonation is not grammatical" states Bolinger. "The uses grammar makes of it are catch-as-catch-can" (1957, 36). "Intonation is all emotion" (1986a, 260). "Intonation has more in common with gesture than with grammar" (1986b, p. VIII)—Intonation has no distinctive function, according to L.S. Hultzén (1959), it simply signals the point of information as a kind of exclamation mark.—Alan Cruttenden (1970) traces back the grammatical functions ascribed to intonation to other functions, such as demarcation or to more general contrasts of meaning such as definiteness and

This indicates that intonation patterns may be distinctive on the strength of an **attitudinal meaning** associated with one and the other intonation pattern. Anthony Hind (1987) analysed systematically, in the framework of a diversified autosegmental theory, the distinctive function of intonation patterns [e.g. those opposing *not any* a) 'none' vs. b) 'no matter which'] tracing them back to patterns signalling emotive attitude ('categorical') vs. 'snoby', 'choosey'. Occasionally, intonation may distinguish between the literal and the metaphoric meaning. The sentence ↗ *Il m'a passé* ↘ *un de ses savons*, said with a non-marked assertive intonation pattern means 'He gave me one of his soaps'. Pronounces according to one of the Parisian French exclamative melodic clichés: ↘ *Il m'a passé* ↗ *un de ses savons* cannot mean but 'He gave me a tongue-lashing' (see Boulakià 1978).

We have to consider, however, the distinctive function as **primary**, if the same prosodic patterns are constantly linked with semantic features that differentiate an open set of minimal pairs. This is the case of the allusive focus which can be opposed to the simple, non-marked emphasis, which has much in common with Janet Mueller Bing's 'one-legged' utterance. Thus, in the Hungarian neutral statement *Kati tudta* 'Kate knew it' both the subject and predicate are characterized by a falling melody. The fall starts at a deeper level on the (equally stressed) second word. A plain emphasis on the subject entails a tonal rise to a high level in the first (stressed) syllable if *Kati* followed by a sudden fall in the second syllable and a deep level tone in the second word. If the verb is focused, *tudta* will show a high fall, preceded by a level tone at mid level in *Kati*. In contrast with both cases of plain emphasis, the **allusive emphasis** of the subject, the tone gradually rises in the first word, followed by a moderate step downwards, allowing for a secondary (weaker) emphasis on the verb, consisting in a mid-high level tone in the first (stressed) syllable and a subsequent deep fall in the last syllable. The last pattern can be used in all instances of allusive emphasis. Allusive emphasis suggest that the predicate applies to the given subject (here for Kati), but certainly **not** for some others, the speaker preferes not to name. Allusive emphasis on the subject differs from plain emphasis, as far as the other subjects, though unnamed, are well known by both the speaker and the hearer, and constitute a closed set. In the case of a plain emphasis of the subject the virtual subjects to whom the predicate does not apply are unknown and form an open set.

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tentativeness.—Herbert Pilch (1977, 90; 1980) sees in intonation a conventional rhetorical figure, its content is not that of a linguistic sign.

Pierre R. Léon (1970, 68) postulates an **implicative** rising-falling intonation pattern with a general 'implicative' meaning, its concrete content is different according to the context.

Michel Martins-Baltar (1970, 1977) contributed substantially to the semantic and prosodic analysis of **elliptical** sentences introduced by *si* or *et*, where intonation plays a primary distinctive role. Thus, *Et alors?* with final rise implies 'And what happened then'; the same sequence characterized by a slightly descending melodic line, a melodic cliché, suggests 'I don't care' ('Que veux tu que cela me fasse').

In the case of **asyndeton**, ellipsis of the conjunction, intonation may take over the conjunctive role. In his paper on intonation and syntax, Charles Bally (1941) offered some French examples: ↗ *Il fait froid* ∅ ↘ *nous ne sortirons pas.* In Parisian French the causal relation between two subsequent utterances is expressed, somewhat paradoxically, by cancelling the juncture between the two sentences, united by means of a melodic arc, a tonal rise of nearly an octave, immediately followed by descent of a septime (Fónagy–Fónagy–Bérard 1983). We owe a systematic analyses of conjunctive role of intonation, centered on the expression of causal links, to Martins-Baltar (op. cit.) and Alain Nicaise (1987).

There are contrasting intonation patterns associated with positive vs. negative factive predicators (Lyons 1977, 794), such as *I thought I was married* with low rise in *married*, suggesting that she really was. The sentence with high fall on *married* presupposes that J was in fact not married (Oakeshott-Taylor 1984). Similar French examples were presented and analysed by Georges Faure (1970, 100).

In languages which admit nominal predicates, intonation may distinguish nominal phrases from the corresponding sentence where the qualifier of the nominal phrase functions as nominal predicate: (a) *Пётр апостл* 'Peter, the apostl', (b) *Пётр апостл* 'Peter is an apostl'. The tonal distinction can be traced back to the emphasis given respectively to *Пётр* or to *апостл* (Péter 1961). Such examples clearly illustrate the enunciative function of intonation advocated by Mario Rossi (1977, 1981).

An additional function?

Intonation is necessarily **predictive**, as far as it prepares on a dynamic level the subsequent part of the utterance. A kind of 'forward coarticulation' (Kueh–Moll 1972) or 'linking' (Kličnikova 1965) is effective also at the prosodic level. The global, unifying character of intonation allows for reasonable predictions. The increasing tension of the topic prepares the concluding comment (Grammon 1964). A restrictive statement is generally preceded by the intonation pattern, typical of concessive propositions. As a consequence, the hearer can guess in most cases whether the following proposition will be introduced by *and* or by *but* or *though*, as the semantic tests carried out with truncated utterances seem to suggest (Fónagy 1979a; see Grosjean 1983). He can also guess whether the enumeration is still going on or if it will end in the next phrase (Fónagy–Magdics 1967, 166–71).

The transformation of a redundant (syntactically fixed) intonation pattern into a distinctive one does not differ in its dynamic structure of the 'phonologization' of contextual variants at the segmental level. Nasalization of the French vowels in Ancient French, contamined by the following nasal consonant was a redundant feature; it became, however, a distinctive feature as soon as the final *m*, *n* consonants vanished. Similarly, the redundant predictive intonation becomes distinct as soon as the final part of the sentence is delated, as it happens in elliptical sentences, thus in the French interrogative sentences analyzed by Martins-Baltar (1970, 1977).

The speaker's and the hearer's point of view

Pierre Léon (1971) links emotive and idiosyncratic (characterial) prosodic features, assigning to both the same label 'fonction **identificatrice**'. This may seem somewhat surprising from the point of view of the speaker who consciously expresses emotions but conveys only involuntarily confidential informations about his personality structure. Léon's conceptualization could be justified, however, from the hearer's point of view who unknowingly interprets features which reflect the speaker's personality. So much the more as characterial vocal features, prosodic as well as segmental, are essentially fossilized emotive patterns (Fónagy 1983, 152–93).

Functions contested

There is a fundamental divergency between the conceptions of linguists convinced "that it is just the grammatical intonation distinctions which are properly of interest for linguists" (Pierrehumbert 1980, 60), on the one hand, and that of others (Martinet 1962, 28 ff.; Bolinger 1986a, 202; Cruttenden 1981), who question the existence of genuine grammatical functions performed by speech melody, on the other.

It might be of interest that the discovery of the 'intoneme' is preceded by that of the expressive function of speech melody, whereas the expressive function of speech sounds became to the fore some two thousand years after the discovery of the phonemes.

"The grammatical functions of intonation are secondary to the emotional one" emphasises Dwight Bolinger (1986a, 27). In fact, grammatically distinctive intonation patterns grow out from intonation pattern performing some other functions, demarcation, expression of attitudes. The fact, however, that in the above cited examples (and a number of other similar cases) the contrasting intonation patterns can be traced back to other primary functions does not disaffirm their distinctive competence.

Dynamic aspects: functional switches, melodic metaphors

Switches from one functional level to the another are far from exceptional. The distinctive function is generally an amalgame of demarcation, emphasis and the expression of attitudes. In the case of **allusive** intonation pattern, such as allusive focusing or other allusive elliptical sentences (Martins-Baltar 1970), the non-marked (neutral), non-distinctive, intonation pattern becomes distinctive because it clearly shows that the utterance is unfinished: in fact the intonation is the sole witness of the suppressed part of the utterance. A typical example is that of the intonation pattern of the elliptical questions introduced by *and*, respectively by French *et*, German *und*, Russian *i*, Hungarian *és*. The intonation of such sentences is essentially that of a sentence left open.

We could repeatedly assist during the last decades at the transformation of the expressive function raised to the level of a modal intonation mark, as for the change of the expression of misbelief into that of the mark of yes/no questions in Russian (Fónagy 1969).

This might bring us closer to the understanding of the duality of **representation** and **distinction**; intonation conceived as a sign, on the one hand, and as a sign-element, a distinctive feature, on the other. Melodic patterns, expressing emotive or social attitudes can be conceived as global, prosodic gestures, constituting melodic signs. Some essential melodic features of such iconic signs might be deteached, isolated, and used for distinctive purposes.

We have also examples illustrating a seemingly inverse movement: in Hungarian (and in some other languages, Czech, Australian English) the neutral intonation pattern of yes/no questions transferred on imperative sentences acquired a well-defined pragmatic meaning: becaming the expression of polite request (Fónagy 1969a; 1979b, 204).

This brings us back to another hot point: the discussion on **modal** intonation patterns. Cruttenden (1970) puts the term 'modal' between quotation marks, since intonation expresses in fact openness vs. closeness. "There is no intonation that is the property of any grammatical category, and when an intonation seems to support two or more categories this is because of some shared emotive trait" (Bolinger 1986b, 13). "English yes/no questions are reputed to have a terminal rise... It is simply irrelevant, and probably not even true in a statistical sense... But if we take an emotive measure, that of curiosity, we discover why a yes/no question that has a terminal rise seems so quintessentially a question" (Bolinger 1986b, 15).

Odette Mettas (1966) came to a similar conclusion on behalf of semantic tests based on synthesized variant. She could asses a large overlapping of modal and attitudinal evaluations of the same variants. I think, however, that the results are essentially due to an experimental fallacy. The informants had to choose, in the frame of a forced choice test between labels such as: 'question', 'amazement', 'doubt'; that is between categories belonging to different levels of hierarchy subsumed to be of the same level. How to decide under such circumstances whether an informant attributing to the variant an attitude such as 'amazement interpreted the sentence as an amazed question or an amazed assertion?'

There are, however, other arguments which seemingly justify 'modal scepticism'. A statistical analysis of French yes/no questions in the frame of a Twenty questions game showed that only 58.9% of the questions had a rising question intonation; in the other utterances the melodic curve was falling with a rise in the penultimate syllable: it represented a kind of synthesis of the assertive and interrogative intonation pattern (Fónagy–Bérard 1973). The question has been correctly interpreted in the given context, and conveyed at the same time a subsidiary message: 'I am nearly sure that the answer will be »Yes«, I prefer nevertheless to put the question'. An other type of (sharply) falling melody characterizes the question of the inquiring detective. The complementary message could be in such cases: 'I know for sure that you did it / you were there etc.'. A third variety of the paradoxical question intonation is a slight fall in questions of politeness characterizing the indirect request. Similar cases have been repeatedly reported for different languages (Wegener 1885, 102; von Essen 1956, 41, 51 ff.; Palmer 1922, 18; Morgan 1953, 189; Lee 1955, 1956, 361; Daneš 1960, 53; Searle 1975; Davidson 1975; Kiefer 1981).

In all these cases, we are in face of **melodic metaphors**. Their dynamic structure does hardly differ from that of lexical or grammatical metaphors. They convey a composite meaning which results from the synthesis of the basic modal information, in keeping with the context and the situation, on the one hand, and the original meaning of the 'incorrectly' used melodic pattern, on the other hand.

Melodic transfers, far from discarding the modal function of intonation patterns, presuppose the existance of well-established melodic patterns and of tight links between intonation patterns and the corresponding modal categories. The dual message conveyed by the Hungarian polite requests owes, or originally owed, its attitudinal meaning to the precise reproduction of the melody of neutral question. Let us add that (non dialectal) Hungarian speakers usually dispense with the interrogative *-e* morpheme in yes/no questions, so they have to make use of the interrogative intonation pattern (since word order has no modal function), well established and clearly distinct from the different varieties of assertive intonation. This does not hold for English where the speakers generally use *do* or inversion, and where the distinction is precarious (see Uldall 1962). This could account for the fact that English authors are more sceptical concerning the modal function of intonation. We have to account for the **language-dependence** of linguistic theories.

The distinction of assertive vs. interrogative disjunction is less well established in Hungarian, French (Fónagy–Bérard 1980), German or Russian (Benenson-Fougeron 1971).

Is intonation representative?

A **representative** function, **Darstellung-Funktion** according to Bühler (1934), has been attributed to intonation by some authors (Faure 1962; Rigault 1964; Martin 1973). We could be eventually tempted to assign a representative or referential function to modal intonation patterns which represent the highest degree of semantic organisation in the diversified domain of intonation. Roman Jakobson is, however, probably right in rejecting such a claim: "The interrogative sentence is not a reference but only an appeal for reference" ([1939] 1971, 289). In contrast to words such *question* and *answer*, interrogative or imperative intonation patterns does not denote but only signal these basic attitudes. They share this limitation with other, more specific, attitudes. The lack of the representative function in intonation clearly appears in comparing the functional capacities of tone and intonation. Tones are inherent features of signs denoting object, they are distinctive at the morpheme-level. They participate in the distinction of signs relying on conceptual thinking. Intonation operates on the sentence and utterance level, it does not refer to objects. Tone is **objective** in the literal sense of the term: it refers to phenomena conceived as facing the speaker, a relation more clearly present in the German **Gegenstand**. Intonation is **subjective**, in the literal sense of the term: it expresses, i.e. it projects internal mental contents.

But how about non-lexical signs? Morphemes or word order denoting a subject/object relation, morphemes expressing spatial, time or causal relations are no less objective as the lexical variables of these causal or time functions. The examples cited by Bally and other authors (Martins-Baltar 1977; Nicaise 1987) indicate that intonation occasionally may be substituted to conjunctions in order to suggest causal relations. We cannot pretend, however, that the languages advocated, French or English, dispose of intonation patterns constantly associated with the contents represented by conjunctions such as *because* or *therefore*. Intonation can only suggest logical relations on the basis of its attitudinal meaning or on behalf of the tension/relaxation principle in a given context.

The distinction of logical operations, such as inclusive and exclusive disjunction, admitted by some linguists (Varga 1981) is merely apparent. Semantic tests clearly show that in such cases hearers perceive the contrast of a voluntary and permissive attitude which may or may not coincide with logical operations (Fónagy–Bérard 1980).

Speech melody may be, if not representative, but at least **imitative**, especially in artistic vocal performances (Fónagy 1958b, 229–31; Fónagy–Magdics 1967, 291–4; Fónagy–Fónagy 1983, 199). Thus, tonal movement may suggest spatial displacement, upward or downward movements, in the physical or in the metaphorical dimension (Bolinger 1986a, 212–4).

An evolutionary regard on functions

Philip Lieberman (1967) studied sentence prosody in a biological perspective, considering speech melody as a kind of vital curve. Speech melody is in fact an acoustic projection of mental tension and relaxation. The increasing tension followed by relaxation is at the basis of the function of **unification**. Tonal tension followed by relaxation is best suited to reflect syntactic and semantic units of content. Unresolved tension, a rising or high level tune, creates expectation. It lends itself particularly well to characterize the **topic** in preparing the hearer for the subsequent **comment**. It is at the basis of the **demarcative** function of intonation.

If the speaker maintains the tension, the unresolved tension functions as an appeal for resolution. As a matter of fact, question intonation is generally characterized by a rising pattern and/or a high tone level (Bolinger 1964a). Sudden relaxation lends itself to the expression of the imperative or the exclamative mood. In other terms, **modal** function of intonation can be traced back to the tension/resolution strategy.

The linguistic exploitation of the tension/resolution mechanism can be best studied during the genesis of the structured bipolar utterances in child languages. Dyadic utterances arise from sequences, generally pairs, of monolithic utterances ('holophrases'), separated by a pause. Initially each utterance has a rising-falling intonation. In a second phase the first utterance does not resolve the melodic tension, and so suggests that something is to follow. The pause gradually shortens, and the two utterances become united. The two utterances, initially interchangeable, become topic and comment, and strongly suggest syntactic relations such as subject and predicate, predicate and direct object, predicate and adverbial modifier etc. (Fónagy 1972).

Units and variants

Paradigmatic units

The number of levels proposed for intonation analysis varies between two and twenty-four.[7] There is also considerable variance concerning the number of distinctive tonal **configurations**[8] as stated by David Crystal: "Apart from the basic division of nuclear tones in English into falling and rising, there is only partial agreement in the literature, when one compares inventories of different scholars" (1969, 210). Others dispense in their analysis with a definite number of tonal levels. Dwight Bolinger rejected the notion of distinctive levels from the very start (1949, 1951), and maintained this position (1986a, 28–34). He considers differences in level as a gradient phenomenon, opposed to all-or-non oppositions reflected by means of contrasting configurations (1961, 38 ff.) David Crystal presents discrete (contrastive) tones and gradient pitch ranges as two independent parameters (1969, 212). Robert Ladd, in agreement with Bolinger, considers intonational meaning as involving both all-or-non contrasts

[7] Two for English (Sweet 1900; Liebermann 1978, 17), for German (Issatschenko–Schädlich 1964); three for English (Hockett 1955; Stockwell 1956), for Spanish (Stockwell–Bowen–Silva-Fuenzalida 1956; Kvavik–Olsen 1974), for French (Hazaël-Massieux 1983); four for English (Hockett 1958; Pike 1945; Wells 1945; Trager–Smith 1951; Pittenger–Hockett–Danehy 1960); five for English (Halliday 1967; Crystal 1969), for French (Delattre 1966; Faure 1962, 182; Di Cristo 1971; Léon 1970; Rossi–Hirst–Di Cristo 1980). Pierre Léon traces five lines but distinguishes in fact 9 levels (1970). William Cantrall adopted eight pitch levels ("arbitrarily", 1969). The musical notation proposed for Russian intonation by Bunning–Schooneveld (1960) accounts for 24 levels (two octaves).

[8] Three patterns are selected for German by Otto von Essen (1956; 1962, 41); seven distinct patterns are proposed by Henri Zingle (1980).—Similarly, two tunes are distinguished for British English by Armstrong–Ward (1926); Palmer–Blandford 1939; Lee (1955–1956); there are three basic patterns in English according to Trager (1941), House–Johnson (1986); five tunes according to Crystal (1969); Halliday (1970) postulates seven basic patterns; O'Connor–Arnold (1973) arrive at ten distinctive tone groups; Kingdon (1958) posits one static and five kinetic tones, giving rise to sixty patterns. Bolinger starts from three profiles, which may, freely combined, form, in principle, 39 contours (1986b, 139–93), enriched by modifications, relative height, such as glide vs. jump, intensity, length (1986b, 139–93, 256–335).

between different configurations and dimensions of gradience within categories (1980, 109).

This essential distinction between discret, language dependant configurations, on the one hand, and para-linguistic gradiation, on the other, needs some qualification. Malmberg (1966) states that "one of the principal way in which suprasegmental phenomena differ from the rest of language is that they involve the systematic use of gradience... This is an aspect of meaning and not merely of form" (op. cit. 203; cf. also Martin 1973, 4). Robert Ladd admits some gradience in gradience. The degree in steepness of the fall in saying *No* are more gradient than that of *Hi*, where there is "a sort of all-or-none difference" between a steep high-fall, and the routine slight fall (1978, 112 f.). Similarly he considers high-rise vs. low-rise as a qualitative, configurational opposition (op. cit. 112, 194). In other languages, however, quite similar differences reflect different grades in semantic intensity.

The assessment of distinctive melodic configurations is not an easy task. László Varga (1983) distinguishes, following László Deme (1962, 503–10), five 'character tones' of linguistic significance for Hungarian at the level of phonological description: (1) a falling (\ ); (2) a rising-falling (/\ ); (3) a falling-rising (\/), (4) a rising (/); and (5) a descending intonation (⟍). This sounds very reasonable. The combination of rise and fall yields four configurations, and a fifth one is added to account for some other relevant distinctions.

The proposed character tones raise some questions of theoretical and practical relevance. They are supposed to cover the domain of all linguistically relevant melodic distinctions—that of syntactic structures, cognitive and thematic meaning, and communicative sentence types. The same character tone must not be applied to formally and functionally distinct melodic patterns. So far as I can see, these requirements are not met by the five-character paradigm proposed by László Varga. Configuration 5, the descending intonation is assigned to the descending melody signalling continuation, and at the same time to a qualitatively different descent in quarter-tones, a chanting melodic cliché characterizing certain types of exclamative sentences (optative, praiseful or joyful exclamations). Both the melody of questions expressing unbelief in one syllabic sentences (*Jó?*) and the sentence final rise of a third preceded by a fall of a fifth, refuting indignantly a false statement (the melodic equivalent of the modal *hiszen*, see above) are represented by character tone (3), though they are quite distinct, both in function and melodic expression. In a previous publication (1981) Varga assigns character tone (3) to the following attitudes: notices, orders, yes/no question expressing hope, assertions implying negative astonishment *csak nem* 'not really'. I think these are not instances of **prosodic**

homonymy but of lacking precision. The five character tones fail to cover such basic modal opposition as disjunctive assertion vs. disjunctive question, both had to be marked by /\.

There is some ambiguity concerning the status of the character tones. It has to be made clear what level of analysis they represent: the level corresponding to that of phonemes or to that of variants. Tone (2) seems to represent question intonation at the level of 'intonemes', and is applied indifferently to the three combinatory variants of the interrogative pattern (see above p. 55). At the same time the signs / character tone (4) and \ character tone are used to distinguish two combinatory variants of the 'intoneme' of continuation.

An **intonational lexicon** as conceived by Mark Libermann (1978, 88–119; cf. also Nicaise 1987, 401–67) would be the best way to account for melodic clichés in Parisian French. Such a lexicon might include modal intonation patterns as well, with application rules providing for combinatory variants and, possibly, for some stable expressive free variants. There are also some emotive attitudes reflected on the prosodic level by means of well circumscribed melodic patterns, such as a classical form of explicit irony, coquettish attitude or menace in Hungarian, or exacerbated discussion in some languages (Fónagy 1981). In general, transformation rules operating on neutral intonation patterns would be more expeditive. These rules should encompass complementary instructions concerning stress distribution and articulary gestures.

Variation and iconicity

There is in general a large agreement concerning the number of phonemic units and variants, free or contextual, in a given language, variants are easily distinguished of phonemes. In contrast to this ideal transparence, there is not easy to determine whether a melodic form has to be considered as a basic form (an 'intoneme') or as a variant (see Malmberg 1966, 107; Bolinger 1986a, 267–73; Nicaise 1987, 337). In the case of segmental units, [l] and [r] are phonemes if in the given languages there are (or there could be) two lexical or grammatical units distinguished by the sole presence of [r] vs. [l], as in Indo-European languages, and they are variants if such an opposition does not exist (as in Chinese or Japanese).

Bertil Malmberg (1966, 99) attributed the real or apparent inconsistencies in the number of tonal levels and configurations admitted for the same language to the different levels of abstraction chosen, explicitly or implicitly, by the author. The choice of the level of abstraction is, of course, not an arbitrary one. It depends on the nature of the melodic sub-set considered by the author. Thus, to levels separated by a semi-tone are sufficient for the distinctions of German assertive and interrogative patterns, and of open vs. closed utterances, as shown by Issatschenko–Schädlich (1966). We need, however, a system allowing for the notation of differences of quarter-tones, for an accurate representation of Parisian French melodic clichés (Fónagy–Bérard 1978, 1984). The system of notation will have to encompass marks for intensity, speed of utterance, for modes of voice-production and articulation (Laver 1980) to describe the vocal expression of emotions (pp. 157–65), but can dispense with this extension in describing modal intonation patterns. The complexity of an adequate representation is, in general inversely proportional to the level of semantic organization of vocal expressions.

There is still another essential reason which may account for the diversity of opinions concerning the number of distinctive intonational units. I attempted in previous papers (1956, 1965) to trace back the fuzziness of paradigmatic articulation of intonation to motivation (iconicity) inherent in intonation. Clearly, the difficulties in segmentation are not due to the phonetic substance. The oppositions of lexical or grammatical tones are just as clear-cut as that of segmental units. There are no natural links between expression and meaning neither in the case of segmental morphemes, nor in that of tones. As a consequence, varying (inside of given limits) the articulation of /r/ or /l/, we cannot create a transitory semantic unit between the words *low* and *row*. All what we can do by means of irregular articulatory performances is to elicit confusions: *row* may be taken for *low*. In a quite similar way we cannot create a semantic unit in between *ma* tone (1) (level) 'mother' and *ma* tone (3) (falling-rising) 'horse', something like 'horse-mother', varying the fundamental frequency, trying to produce a tone half-way between tone (2) and tone (3), since the Mandarin Chinese tonal system has only five tones, and these tones assign meanings to phoneme sequences purely by means of convention, and not on the basis of analogies between tonal and mental movements. There is no transition between the five discrete units, just as we cannot produce transitions by trying to hit between two keys of a piano.

In the domain of speech melody, however, transitions are always meaningful, on the basis of a kind of **self-coding** device. Intonation is ideophonic, ironic, metaphorical: not clearly segmentable, states Marc Libermann (1979, 96 f.). The listener is able and willing to interpret melodic movements in terms of analogous mental events. Self-coding functions, however, in different ways in the different melodic sub-sets, according to the **semiotic level** of speech melody. At the highest level of semiotic organization, best represented by modal melodic patterns. In languages (such as German, French, Russian or Hungarian) allowing for a systematic tonal distinction of statements and yes/no questions, the speaker's choice is strictly binary, and the contrast between interrogative and assertive intonation patterns is as clear as that of the presence or absence of an interrogative morpheme (French *est-ce que*, Russian *l'i*, Hungarian *-e*), or the opposition of the corresponding punctuation marks <*?*> vs. <.> or <*!*>.

The question arises: what about motivated lexical units, onomatopoetic words, comparable to intonation pattern (see Libermann 1979, 93–7; Ladd 1980, 197–202)? If there is a causal relation between motivation and analogous coding, why are motivated lexical items nonetheless discrete units, strictly based on digital coding, showing no signs of gradience? Onomatopoetic words are composed, in the same way as other lexical or grammatical units, on the basis of a small number of distinctive feature constituting sequences of phonemes. Fixed sequences of phonemes are permanently associated by conventional and generally arbirtrary links with meanings. Lexical and grammatical units are interpreted essentially on the basis of these conventional links, quite independently of the original 'meaning' of sound gestures. Associations between meaning and articulatory gestures are contingent. The interpretation of onomatopoetic words does not depend on 'ideophonic analysis' (according to Mark Libermann's wording, 1979, 97), and could easily dispence with 'natural links' between linguistic expression and meaning. 'Ideophonic analysis' does not allow for any individual modification of the phonemic patterns, transitions between vowel phonemes or fricatives, to adapt the sound patterns or phonetic gestures to word meaning.

In contrast with onomatopoetic words, melodic patterns are **all** both conventional and motivated (iconic). Iconicity is inherent in intonation and 'ideophonic analysis' is essential for the interpretation of speech melody. The interrogative and the assertive patterns offer a large scope for variation. All the variants are expressive and meaningful; the degree of expressivity varies in function of their divergence as compared to an ideal unmarked interrogative or assertive pattern, and their meaning depends on the direction of the deviance. A configuration may gradually turn into another configuration, all the transitory configurations being equally meaningful, at the same semiotic level of meaning. Thus, in Hungarian, there is a smooth transition between the patterns of anger and annoyance, or that of menace, warning and suggestion, at the level of expression, as well as at the level of meaning.

Let us add, that a tendency aiming at **crystallization** of emotive patterns is nonetheless omnipresent. In a somewhat fanciful 'experiment' six Hungarian speakers (non-linguists) were asked to repeat a Hungarian sentence (*Ott voltál tegnap este?* 'Have you been there yesterday evening') 50 times as they like.

In spite of a more or less broad dispersion of the intervals we obtained some dominant values. Thus, the rising step in ... *nap es-* was either close to 9 half-tones or close to 3 half-tones. The final fall varied either around of 10 half-tones or 4 half-tones. Presented to a group of ten hearers, specimens of the first type were interpreted as astonished quetions, those of the second type as expressing misbelief and/or menace.

A clear-cut distinction can be and must be made between basic intonation forms ('intonemes') and free variation in the case of modal intonation patterns. The 'opposition' between emotive intonation patterns, is much less evident.

For a quite different reason the term of 'linguistic **variant**' is hardly applicable to attitudinal melodic patterns either, at least to the subset of 'melodic clichés.' Variation is too free to produce distinct variants in emotive speech, it is, on the contrary, much too limited in the case of 'melodic clichés'.

The terms **variant** and **variation** does not cover all perceptible or imperceptible differences between fundamental frequency curves. The three Hungarian melodic patterns marking yes/no question are contextual variants determined by stress-placement. Divergencies in the F0 curve which contribute to signal the stressed syllable are stress markers and no contextual variants. We can still less consider as contextual variants two F0 functions which differ by the sudden decreases in F0 due to the presence of voiced occlusives or fricatives, and the absence of such decreases in the other fundamental frequency curve containing only liquids and nasals and semi-vowels and vowels. Such changes in fundamental frequency are not perceived as melodic changes but as features contributing to the characterization of the consonants. Gaps may be filtered out in the graphic representation of speech melody by means of a procedure of smoothening ("procédure de stylisation") to come closer to the perception of melodic movements, as it is practiced by the phoneticians of the research group of Aix, who devoted the most attention to 'micro-prosodic' redundant features (see Rossi *et al.* 1981, 40–97).

There is, however, some danger inherent in the procedure of smoothening. Differences in intrasyllabic regularity of the F0 curve are not perceived in terms of differences of melodic movement but they lend to speech melody a higher or lower degree of **melodicity** (see p. 80), which has an aesthetical and might have occasionally a distinctive relevance. This 'third dimension' risks to be lost in consequence of indiscriminate 'smoothening'.

Hierarchy of syntagmatic units

The divergences in the syntagmatic articulation of speech melody might be partly due to the fact that the authors have different levels of melodic organisation in mind. Otto von Essen (1956, 26) considers the **rhetoric syntagm** as the basic unit. The rhetoric syntagm may comprehend quite a number of sentences embraced and reunited by the intonation arc. In fact, the sentence is rarely the highest unit of melodic organization in dialogues or lively narratives (Schaffer 1983). The para-sentential unity is signaled by the non-resolution of melodic tension, essentially by the lack of sentence final boundary tone, a deep fall or a sharp high rise in some languages, thus in colloquial French.

There are still other melodic features relating and linking sentences. **Melodic parallelism** is one of the most characteristical prosodic features of narratives. The pattern used in enumeration within the sentence is extended on a number of sentences (sometimes ten or more) relating a sequence of events constituting a narrative unit. Another melodic figure transcending the sentence could be compared to the classical sentence figures of **climax** and **gradation**. A rising–falling melodic configuration is echoed at gradually enhanced levels. A successful combination of segmental and prosodic features may create in the hearer the image of garland, reminding of the formula of **gradation: a b b c c d**...

Still another melodic figure, a kind of echo or **melodic rhyme**: a salient melodic configuration of a preceding sentence is precisely reproduced, echoed so to speak, some sentences later; showing that the subsequent sentences are narrowly related at the level of content. We made an attempt in earlier papers at the acoustic and pragmatic analysis of paraphrastical prosodic structures in narratives, lively conversation and poetry (Fónagy 1975; Fónagy–Fónagy 1983).

Intonation patterns which signal paraphastic text units do not obliterate smaller syntagmatic units, intonation patterns signaling the end of the sentence, or reflecting the syntactic and semantic articulation of the utterance. We have to admit the largest, as well as the smallest unit, both obeying to the principle of tension and release. As a consequence we will have to account for a number of simultaneous syntagmatic tonal units, ranging from phrasal intonation patterns up to 'rhetoric units'. I attempted to resolve the contradiction by considering the highest paraphrastical pattern as an 'articulated unit' (gegliederte Einheit, 1965), and in proposing a hierarchical model of superimposed and integrated melodic patterns, thaf of phrases, propositions, sentences, 'paragraphes'. This theoretical model took a concrete shape in a series of studies of J. 't Hart, A. Cohen and R. Collier (e.g. 't Hart–Cohen 1973; 't Hart–Collier 1975).

We owe to Sven Öhman (1968) a model accounting for the superposition of stress, tone (Swedish 'accent') and intonation. Hence, we will have to distinguish: (a) the superposition of different prosodic structures (accent, tone, intonation); (b) the superposition of intonation structures belonging to different levels of verbal organisation: phrases, propositions, larger units of communication, expression of emotions and attitudes.

We have also to reckon with (c) the superposition of intonation patterns belonging to the same level of organisation. In contrast to the former ones, they are optional and occasional. The superposition of melodic patterns expressing contrasting attitudes is quite typical in artistic interpretation (Fónagy 1979c; Fónagy–Fónagy 1987), though they may occur in everyday conversations as well. The integration of modal intonation patterns in speech may leave permanent marks in language. Thus, the superposition of the interrogative rise-fall and the exclamative sharp fall gave rise in Hungarian to a pattern characterized by a level high tone followed by a sudden fall in the last syllable (Fónagy 1987).

The linear character of intonation has been stressed by Janet Pierrehumbert (1980) and, independently, by Mario Rossi (1980 in: Rossi *et al.* 1981, 324). The physical substrate of intonation patterns, the fundamental frequency as a time function is necessarily linear, as well as the successives changes of the sound spectrum, as it was thrust into prominence by Ferdinand de Saussure ([1916] 1976, 103). Syntagmatic linearity of intonation is the result of a linearization procedure of hierarchically ordered prosodic components.

A realistic description of syntagmatic intonation units will have to consider compulsory and optional superposition and integration of melodic patterns, a procedure restricted to melodic structures. The combination of lexical elements in puns is a distant relative of integrated melodic patterns. So far as I can see, integration of superimposed intonation patterns constitutes the principal difficulty in determining the number of syntagmatic units; just as motivation (iconicity) of melodic patterns makes more difficult the assessment of the number of distinctive configurations and levels.

Some reflections on distinctive features

Intensity may play a non-neglibile role in the distinction of some intonation patterns. Dwight Bolinger who repeatedly insists on the primary importance of pitch movement in conveying prosodic information, states that the same melodic configuration may have different meanings in function of other vocal features, for instance, intensity (1986a, 12). The semantic tests of Allan Grundstrom carried out on the basis of synthesised variants of Canadian French sentences show that the changes in intensity are relevant for the perception of modal intonation patterns (1973, 49). This also holds for Parisian French interrogative, assertive and exclamative sentences: the shape of the intensity curve alone may decide, if all other conditions are equal, whether the utterance will be perceived as a question or an exclamative statement (Fónagy–Bérard 1973). The dynamic strategy of the speaker is of crucial importance in the expression of some emotive attitudes. In the synthesized versions of the pseudo-Hungarian sentence /*kisɛrɔ me:rɔ ba:vɔtɔg*/ the raising melodic pattern was perceived as a menace only if supported by an important gradual raise of intensity. An other melodic configuration characterized by a rise and a sudden fall in the last syllable was interpreted as coquettish only if accompanied by a parallel sudden fall in intensity, otherwise most informants interpreted the utterance as a warning (Fónagy 1981; Fónagy–Fónagy in prep.) As a consequence, the application rules of the intonation patterns have to provide in such cases appropriate intensity patterns.

The distinctive features of an intonation pattern are "dispersed along the time axis" (Nicaise 1987, 381). All the segments constituting the melodic configuration are not equally important for the correct identification of the pattern. The last stress group is generally considered to be the most relevant. Nonetheless, in some cases the message may be conveyed by the initial sequence when the kernel is removed. Semantic tests indicate that the interrogative vs. assertive modality of Hungarian, French or Russian utterances can be correctly identified if only the preceding syllables are presented (Fónagy–Magdics 1967, 50–3; Nicaise 1987, 374; Benenson-Fougeron 1971). The application rules will have to provide for the secondary distinctive feature, the more so, since the melodic preliminaries may become distinctive in cases of melodic ellipsis.

The intra-syllabic F0 movement may be distinctive in utterances having identical shapes. Both in the Hungarian assertive sentence *Hozza a széket* /*'hozzɔ ɔ "se:ket*/ 'He brings the chair', with the focus on *széket*, and in the corresponding question *Hozza a széket?* 'Does he bring the chair?' the melody culminates in the first syllable of *széket*. The two melodies are nearly identical, with the difference that the F0 curve is rising and steeply falling in the stressed syllable, and in the question the curve is slowly rising (eventually, slightly falling).

A complex bundle of melodic features opposes the interrogative and the assertive disjunction in French and Hungarian. According to the semantic tests on the basis of truncated natural utterances, synthesised variants, and truncated synthesised variants 'question'-responses positively correlate with: (a) the overall height of the utterance, (b) a higher tonal peak, (c) a steeper rise, (d) a higher final level in the conjunction, French *ou*, resp. Hungarian *vagy* 'or', (e) a higher final tonal level, (f) by a floating or slightly rising final tone. We found the best correlation between interrogative modality and steep rise (Hz/csec), final height and the intrasyllabic rise in the last syllables.

Different conclusions could be drawn from these experiments. A bundle of distinctive features contribute in varying degrees to the successful transmission of the modal information. Individual speakers use different features at different occasions. In contrast to Hungarian or French yes/no questions there is much hesitation and improvising in the signalling of modality in disjunctive sentences. It is not easy to decide which features to retain in a phonological description of interrogative disjunctive intonation.

Differences in quantity may turn into qualitative contrasts, yielding linguistically relevant distinctions. According to semantic tests following the presentation of variants of the Hungarian one-word sentence *Jó /jo:/* 'Well' synthesized with falling-rising tune, the utterance is interpreted (a) as a semantically marked assertion, suggesting, 'well, if you insist, I don't mind' if the final level does not reach the initial tonal level, and (b) as a more or less astonished question, if the final level reaches or exceeds the initial level. The same sentence synthesized with a rising-falling pitch pattern, is perceived (a) as a categorical statement, (b) as an expression of misbelief, (c) as an ironical question in function of the angle of the rise (Fónagy 1969a). The steeper the ascent the more likely the utterance will be perceived as a categorical statement (Fónagy 1969a).

The difference between **glides** and **jumps** proved to be relevant for English (Bolinger 1986a, 224 f.), as well as the opposition of **fall** and **descent** for Hungarian (Deme 1962, 504; Varga 1983). Let us add the no less intrinsic difference between steep and slow rise, at least for modal intonation. Steep final rise opposes exclamative utterances to the corresponding interrogative ones characterized by slow rise (Fónagy–Bérard 1973), and contributes to the distinction of the modal aspect of disjunctive sentences.

A dynamic tone might be opposed to a corresponding static tone. The presence of an audible glide characterizes according to Rossi, Hirst and Di Cristo French yes/no question intonation, in contrast with that of continuity characterized by the absence of audible glissando (Rossi *et al.* 1981, 160). Dwight Bolinger stresses that **glides** and **jumps** "are not necessarily variants of each other but may be in contrast" (1986a, 224), with reference to Greenberg–Zee's perceptual study (1979).

We have to account for a third dimension of intonation: **melodicity** (Fónagy–Magdics 1963, 39–41). Melodicity or **stylised** intonation (Ladd 1980, 179 ff.) is a perceptual answer to the intrasyllabic regularity of the F0 function which can be quantified in measuring the total variation or the autocorrelation of the changes of fundamental frequency within the syllable, or approximated in calculating the transition probability of the subsequent cycles (Fónagy–Fónagy–Bérard 1983); it cannot be equated with level tone (Bolinger 1986, 226 ff.), since a rising or falling tone may also have a high degree of melodicity as in a number of French melodic clichés.

Melodicity has essentially an aesthetic function but may be occasionally distinctive in English as highlighted by Robert Ladd (1980, 742): or in the case of French clichés. Thus, *Il n'est pas là, puisqu'il a raté son train* pronounced with plain intonation, means 'He is not here, because he missed the train'. It could mean, however, also 'He is not here, I already told you he missed the train' (see Nicaise 1987, 248), if the second half of the sentence is produced with chanting voice, with a slight descent in quarters of tone. Melodicity may substantially contribute to the characterization of interrogative disjunction in face of assertive disjunctive sentences (Fónagy–Bérard 1980).

This means, that we must be careful in smoothening the intonation curve ('lissage'); see Di Cristo–Espesser–Nishinuma–Rossi (1979, in: Rossi *et al.* 65–82). Changes in fundamental frequency, which are not perceived as melodic divergencies, might be perceived as melodic quality: melodicity. More generally, we have to distinguish thoroughly between conscious distinctive competence and preconscious performative competence. Even well-trained Hungarian subjects are unable to perceive the tonal fall in Hungarian questions with two syllabic final stress groups because of the very weak intensity of the last segment. They perform, however, in pronouncing and also in distinguishing minimal pairs such as *A kar? /ɔ 'kɔr/* 'The arm?' and *Akar? /'ɔkɔr/* 'Will he?' distinguished by such a slight fall in the last segment of *Akar?*. The informants invited to propose a linear transcription of the sentences, generally transcribe both by marking only the ascent: ↗.

Performative tonal competence enables even totally unmusical French speakers, to produce melodic clichés implying the distinction of quarter of tones. In lively conversation yes/no questions may elicite a multiple rise pattern: ↗ ↗ ↗. The three rises arrive to nearly the same level with the qualification that either the second rise is depressed by a quarter of tone, or the three peaks form a slightly rising or descending line where the subsequent rises reach a level a quarter of tone higher respectively lower than the preceding ones (Fónagy–Bérard 1973, 58; 1983, 165–8).

The interpretation of distinctive intonation patterns is a highly complex procedure, involving a comparative analysis of segmental and prosodic events considering the gestural messages as well as the conventional values of pitch movements, reckoning with the probability of occurrences in function of a given context and in the frame of a given situation. We attempted in a previous paper (Fónagy–Bérard 1972) to infer the incoding and decoding procedure of attitudinal messages by means of semantic tests on the basis of variants of the sentence *Il est huit heures* 'It's eight o'clock' pronounced by a French actress attempting to suggest narrowly circumscribed situations. It appeared, among others, that the Parisian French cliché of slight descent (in quarter tones) combined with slow speed, and a tender labial gesture (protrusion and rounding of the lips) suggested mainly calls containing tender reproach; with higher speed and scornful labial gesture chiefly suggested nonchalent responses. In most cases the interpretations proposed by the listeners were more or less disparate. The listeners may concentrate on some prosodic or segmental distinctive features neglecting some others. One of the variants was supposed to express the mother's anxious concern realising that it is eight o'clock and her daughter was expected to be back at six. Some informants did not notice the vocal cues of surprise and suggested 'deception', 'lassitude', 'sorrow'; others missed the prosodic and articulatory features expressing sadness and imagined the actress casting a frightened look at the wall-clock in a hounted castle.

Phonemes and 'intonemes'

Lastly, I shall attempt to state, or rather to restate, briefly some reasons for putting systematically the terms **intonemes** (resp. 'suprasegmental phonemes', Trager–Smith 1951; 'contouremes', 'expressemes', Rossi 1973) and **intonology** between quotation marks (in spite of my personal aversion towards the extended use of these punctuation marks).

The quotation marks are meant to express a certain reserve in face of the recent—honourable and partly justified—endeveour to lend more rigour to prosodical analysis and to raise the analysis at the level of segmental phonology. It is suggested that the methods proved to be the most appropriate in the analysis of speech sounds might be applied just as successfully in the description of speech melody: intonation has to be analysed in the same way as the segmental features (Malmberg 1967; Hirst 1975; Quilis 1979; Gussenhoven 1984). "Tone and intonation are manifestly segmental phenomena", states Rossi (Rossi *et al.* 1981, 13).

So far as I can see, intonation is not articulated neither along the paradigmatic, nor along the syntagmatic axis in the same way as are tones or phonemes. The messages conveyed by intonation differ in quality of those conveyed by tones or phonemes. Iconicity is inherent in intonation, it is an accessory quality of a very limited part of the lexicon. The proposed parallel (Libermann 1979; Ladd [1978] 1980) between intonation and onomatopoetic words is based on a superficial analogy.[9] Further, tones and phonemes are clearly sign-elements, distinctive features; intonation may function as a melodic distinctive feature, as well as a sign.

Ladd (op. cit. 119–37) discussing the alleged 'around the language' status attributed to intonation (Bolinger 1964b) declares that intonational meaning is no less structured and not on a lower level than messages transmitted by means of lexical units. Emotions can be also expressed by means of lexical units, he argues (op.cit. 123–8). Ladd refers to cases highlighted by Maria Schubiger (1965), showing that English intonation patterns can be rendered by means of German modal particles. This are, indeed, very remarkable cases of prosodic and segmental equivalence. I referred above to similar functional overlapping in Hungarian (*hiszen* and a specific final falling–rising intonation pattern). We may dispence in the same way with other Hungarian modals, *bizony*, *hát*, and replace them by adequate stress or intonation pattern. Ferenc Kiefer (1981) alluded to intonation patterns playing the same role as the morpheme *-hat/-het* corresponding to 'may'. Attitudinal intonation patterns may substitutes for some Hungarian 'sentence adverbs', for instance *tőlem* suggesting: 'for all I care'. In all such cases the equivalence is due to heavy semantic losses incurred by lexical or grammatical morphemes which undergo a functional regression: they lose their referential (descriptive) function. More generally, segmental morphemes may give up their descriptive capacity; into-

[9] Ladd correctly attributes to intonation a dual status on the level of expression: contrasting (phonological) configurations and gradience. Gradience is necessarily absent in onomatopoetic words. At the level of meaning: onomatopoetic words may have a referential (Bühler 1934: representative) function, in contradistinction to intonation.

nation patterns, however, in contrast with to tones, cannot reach the level of 'Darstellung' as defined by Karl Bühler (1934).

We implicitly admit the difference between lexical and intonation meaning in qualifying as **elliptical** some utterances spoken with a definite allusive intonation pattern, thus in instances of allusive focusing (see p. 63). Yet, the meaning is present in the utterance at the level of intonation. We perceive nonetheless the utterance as elliptical because the information conveyed by prosodical means cannot fully replace an explicit formulation by means of lexemes.

Concerning the second argument, the expression of emotions by means of lexical units is a description (Darstellung) based on **conceptual analysis**, has nothing in common with the direct **ex-pression** (the acting out) of emotional contents by means of prosodic and vocal gesturing. Hence, iconicity (the presence of the content at the level of expression), contingent in the case of lexical morphemes, is of general validity and essential for speech melody. "Both intonation and gesture, like Antaeus, cannot survive without the contact with the earth" (Bolinger 1986a, 198).

The recent results of neurophysiological investigations are in good agreement with both the hypothised evolutionary primacy and evolutionary complexity of intonation. A right hemisphere domination is generally admitted for intonation on the basis of different approaches (Blumstein–Cooper 1974; Kent–Rosenbek 1982; Ley–Bryden 1982; Danly-Shapiro 1982; Shapiro–Danly 1985; Tompkins–Mateer 1985; Ross *et al.* 1988). This advantage is more salient in the case of emotive intonation than in the case of more language specific patterns (Shipley-Brown–Dingwall 1988). In contradistinction, dichotic listening studies of pitch-differences in Thai show a clear left-hemisphere advantage for the correct identification of tone-words (Lancker–Fromkin 1973).

Just because its semantic and functional limitations intonation has to express contents below the level of conscious conceptual ideation. If intonation should be a prosodic analogue to lexemes and grammatical morphemes we could easily dispense with it, and Stanislavskij could not have asked his actors to convey fourty different messages by means of the Russian phrase *сегоня вечером* 'this evening' (cited by Roman Jakobson [1960] 1981, 23).

I think, in entire agreement with Dwight Bolinger, who strongly and convincingly reacted against excessive intellectualization in contemporary 'intonology' (1986a, 202). that the essential function of intonation consists in conveying pre-verbal messages: attitudes and emotions (Bolinger 1986b), not covered by other linguistic means. We have to reckon, at the same time, with the no less basic endeavour of intonation to move towards higher levels of linguistic processing, even if it cannot reach the level of conceptual organization.

'Scientific rigour' does not require to give of intonation a very clear but totally inadequate picture, neglecting aspects and functions which are secondary in the case of tones and phonemes but of primary importance in that of intonation. A faithful description will have to account for such embarrassing contradictions that intonation is at the same time iconic and conventional; a distinctive feature and a sign; that it follows opposed trends; that of crystallization and differentiation; that it serves the expression of emotive contents and accomplishes at the same time higher functions in reflecting the articulation of the sentence and discourse, in clarifying syntactic and semantic ambiguities, in allowing for the distinction of social attitudes and modal aspects. 'Scientific rigour' forcing intonation into the mould of tone or that of phonemes, could strongly remind of self-contained parental rigour, and would be no less devastating in its consequences.

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VOWEL HARMONY: INTERRELATIONS OF SPEECH PRODUCTION, SPEECH PERCEPTION, AND THE PHONOLOGICAL RULES

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Introduction

Vowel harmony as a phonotactic rule occurs only in 84 out of 693 languages examined. The extension or effectiveness of this rule and also the number of people speaking languages in question—even within this 12% of the sample—seems to be very different (cf. Wiik 1988). The literature on Hungarian vowel harmony (VH) is rather extensive—the sets of rules proposed, however, are partly based on the investigation of written corpora, and partly on introspection, i.e. the authors' own knowledge of their mother tongue (Szépe 1958; Papp 1975; Vago 1976; etc.). A survey conducted in terms of the VH annotations of *A magyar nyelv értelmező szótára* (Explanatory Dictionary of the Hungarian Language, 1959-1962) revealed that 77 items in that corpus were irregular with respect to the general rules and a further 185 items admitted both alternants of harmonizing suffixes (von Ohst 1988).

The major rules of Hungarian VH can be schematically summarized as follows:

1. (stem)$V_{pal} \longrightarrow$ (suffix)V_{pal} *öreg – öregnek* 'old/DAT'

2. (stem)$V_{vel} \longrightarrow$ (suffix)V_{vel} *ablak – ablaknak* 'window/DAT'

3. (stem)$V_{vel}+V_{pal}/V_{pal}+V_{vel}$ (suffix)V_{vel}
where V_{pal}=[i, e, e:] *hamis – hamisnak* 'false/DAT'
rigó – rigónak 'blackbird/DAT'

4. (stem)$V_{pal/vel}+V_{vel/pal} \longrightarrow$ (suffix)$V_{vel/pal}$ (respectively)
kaszkadőr – kaszkadőrnek 'stuntman/DAT'
amőba – amőbának 'amoeba/DAT'

5. $(\text{stem})V_{[i\sim i:]} \longrightarrow (\text{suffix})V_{pal/vel}$ – with meaning contrasts:

nyír < *nyírnek* 'birch/DAT' / *nyírnak* 'he trims/they trim'

szív < *szívnek* 'hearth/DAT' / *szívnak* 'he inhales/they inhale'

6. $(\text{stem})V_{pal/vel}+V_{[e,\ e:\ i]} \longrightarrow (\text{suffix})V_{vel\sim pal}$

farmer – farmernek~farmernak 'blue jeans/DAT'

Experience shows that words belonging to set 6 are very often vacillating even within the speech of the same speaker. Kontra–Ringen (1986) were the first to experimentally investigate speakers' behaviour with respect to this set of words. They conducted an experiment on such vacillating (loan)words with native Hungarian speakers (the subjects had to fill in the appropriate endings in sentences presented in writing). (The results obtained in an extended and refined version of this test were presented at the 1988 Phonology Meeting in Krems, Austria). Their results showed that the subjects predominantly used front-vowel suffixes for the words in question.

In view of the foregoing, the question arises how this fundamental phonotactic regularity of Hungarian takes shape in the process of language acquisition. Child language, and the way adult rules gradually impose themselves on the linguistic development of young children, are assigned crucial importance in the framework of natural phonology as well. "...early stages of language acquisition show more heavily conventionalized language of normal adults" (Dressler–Schaner-Wolles–Grossmann 1985, 16). Child-language data may function as a kind of filter: general regularities of language acquisition may throw light on the process/strategies by which a child acquires VH as well as serve as a source of information as to the reasons underlying the vacillation found in adult usage. The order in which various meanings are expressed in phonetic forms in child language is said to be a function of perception, comprehension of functional relations between objects and events, frequency of occurrence of patterns in the language presented to the child, or some combination of these factors (Menyuk 1977, 79).

These facts lead to the formation of universal rules. Those universal rules have been chosen from Slobin's theory which may have a major effect on the formation of Hungarian VH:

(i) pay attention to the ends of words;

(ii) the phonological form of a word can be modified;

(iii) underlying semantic relations should be clearly and overtly marked: avoid homonyms, full forms appear earlier than short ones;

(iv) avoid exceptions: overgeneralization, rules applied to larger class first, consistent rules acquired before inconsistent.

The first point is particularly important in Hungarian because of its agglutinative character; most words are first acquired in some suffixed form which is frequently heard/used, and the child—in accordance with general rules—often 'deduces' the unaffixed form subsequently. This is unambiguously demonstrated by incorrect 'lexical' forms used by children, e.g. **tork* 'throat' (for adult *torok*, cf. *torkod* 'your throat', *torkom* 'my throat' (3;0)); **körm* 'fingernail' (for adult *köröm*, cf. *körmöd* 'your fingernail' (3;2)); **torny* 'tower' (for adult *torony*, cf. *tornyok*, 'towers', *tornya* 'its tower' (3;1)); **jeg* 'ice' (for adult *jég*, cf. *jeges* 'icy' (3;1)); cf. Gósy (1984).

The phonological form of words (cf. item (ii) above) depends, among other things, on the acquisition of VH rules. The physiological limitations of children's articulation often facilitate the acquisition of phonological rules in general. Relevant examples include a tendency to avoid consonant clusters or a preference for sound sequences involving lesser articulatory differences. Item (iv) in the quote above covers the various strategies involved. The most conspicious of these is overgeneralization (earlier literature on Hungarian child language refers to this phenomenon as 'analogy'). In this connection, let me go into some detail about two examples involving VH. The first of these is the phrase *add oda* 'give it to me' (for adult *add ide*, cf. *oda* 'to that place' vs. *ide* 'to this place'); in terms of meaning, this phrase represents a single concept in the child's production and speech understanding system. (It is rather beside the point that the possibly often heard sentence type "Add oda ezt vagy azt ennek vagy annak" [Give such-and-such to so-and-so] may play a role in the genesis of this unified concept since children not attending nursery school and having no brothers or sisters will also develop it.) The use of *add oda* (for adult *add ide*) becomes interesting at and after the age of 5 when the child is otherwise quite capable of something utterances into constituent words and of understanding spatial directions, with a correct use of directional adverbs (*ide* 'to this place', *oda* 'to that place', *itt* 'here', *ott* 'there', *erre* 'this way', *arra* 'that way', etc.). At that age the verb and adverb are clearly semantically distinct for the child; the question therefore is the following: what is more compelling for him: semantic accuracy (in identifying directions) or vowel harmony. Experience shows beyond reasonable doubt that the latter factor prevails: this is what makes the child persist in using the back-vowel adverb instead of its front-vowel counterpart.

The other example is partly based on overgeneralization, but partly also on a minor 'inconsistency' in the conjugation system of Hungarian. The first person singular conditional suffix *-nék* 'I would' is anomalous from a VH point of view in that it has no back-vowel alternant in (standard) adult speech. Children, however, tend to observe the general VH rule and say *(én) aludnák* 'I would sleep', *tanulnák* 'I would learn' for adult *aludnék*, *tanulnék*. It might be suggested that in this case the 'avoid homonyms' strategy clashes with the 'avoid exceptions' strategy, cf. *(ők) tanulnák a leckét* 'they would learn their home assignment'. Shouldn't we expect that the clash be resolved by acquiring exactly the adult pattern (*én tanulnék, ők tanulnák*)? The explanation lies in the **timing properties of mother tongue acquisition**, VH, as we shall see, is acquired very early; conditional forms, on the other hand, come rather late, around age 3. By that time, however, the phonotactics is firmly established; consequently VH overrides the special pattern (and 'avoid exceptions' overrides 'avoid homonymes' in this case). Obviously, the earlier-acquired pattern will resist modification for some time. (Substandard adult use of first-person *-nák* may or may not be explained along similar lines.)

Empirical evidence

In what follows the development of VH will be analysed in terms of the universal rules mentioned above, on the basis of data taken from the literature and those collected from the author's own children's speech.

1. The data in the literature almost unambiguously support the claim that **a Hungarian child will never violate VH**. This conclusion is particularly well demonstrated by children's invented (i.e. erroneously or playfully derived) word forms which are obviously not repeated as wholes but rule-generated on the spot: *cipőjécskéje* 'his/her little shoe' (adult form: *cipőcskéje*), *nadrágája* 'his/her trousers' (adult form: *nadrágja*) or *nadrágoja* 'id' (the latter from S. Meggyes 1971, 44). Such forms clearly show that the child becomes able to inflect words in accordance with the VH rules very early on. Especially striking, in that respect, are words that are created by the child: they support the same conclusion even more convincingly: *itvanka* 'sg that is here' (cf. *itt van* 'it is here', *-ka/-ke* 'diminutive suffix'), *(megyünk a) fujaszéba* '(we go for a walk) into the blowing wind' (cf. *fúj a szél* 'the wind blows', *-ba/-be* 'into') (S. Meggyes 1971, 36, 58). We often find traces of a tendency to simplify 'mixed-vowel words' (those containing both front and back vowels) into pure back-vowel forms like *pakká* (for *piskóta* 'sponge-cake') (1;9), cf. Jablonkay (1935, 58), or *szaga* (for *ceruza* 'pencil') (1;8), cf. Gósy (1978, 92). Only one

author, Kenyeres (1924, 31) mentions four examples in which the child violates VH in inflection: *papanyek* (for *papának* 'for Daddy'), *mamának* (for *mamának* 'for Mummy'), *papahesz* (for *papához* 'for Daddy'), and *gépnál* (for *gépnél* 'at the machine'). It is worth mentioning that the child in that study, É., started talking very early (at 0;7); the four words cited were recorded between 1;3 and 1;7. Of course, they can be actually 'mispronounced' forms, or else the transcriber's mistakes, a possibility that cannot be excluded.

2. I have also analyzed the speech of my two sons (A. and P.) from the VH point of view, on the basis of recorded material and written notes. I studied the phonotactic structure of their utterances from the transition phase between babbling and early speech. Although a statistical analysis was not conducted, it is easy to see that babbled sound sequences tended to imitate Hungarian VH structures: most of them contained either all front or all back vowels. Examples: *hotkáká*, *gou*, *gougú*, *tokáj*, *katta*, *ógodgú*, *gyügyő*, *dedödödő*, *didledle*, *gyögyő*. Less frequently, mixed-vowel sequences were also found: *hogi*, *legga*, *étan*, *emma*, etc.; very few instances were found to contradict the stem-harmony regularities: *jöhka*, *külszka*. Sound sequences observed in this transitional phase, as opposed to babbled sequences in earlier months, tend to reflect adult patterns more closely in other languages as well (Vihman 1987, 54).

Only a single utterance was found in A's material (in his second year) that was ambiguous with respect to VH: *gyógyszer* 'medicine', a front-harmonic compound (cf. *gyógyszernek*/DAT, **gyógyszernak*) appeared in the accusative as [ɟo:t͡s:elot] at 1;10, with a back linking vowel (the adult accusative is *gyógyszert*, with no linking vowel at all). I should also mention a couple of dissimilation cases which, occurring as they did between stem and suffix, appear to violate VH. I found two such cases: *nem alszok, csücsülok* 'I'm not sleeping, I'm sitting' (for *csücsülök*) (2;0), *ehöz a tülüló lonty* (adult: *ehhez a törlőrongyhoz* 'to this dishcloth', intended form: *türülő*) (3;0). In both examples the occurrence of back rounded /o(:)/ for front rounded /ø(:)/ is presumably due to the same reason. It is not surprising that the target vowel involved is /ø/ in both cases: this is one of the latest-acquired vowels. In the first example the back-vowel suffix of the previous word affects the suffix in question, yielding dissimilation (or rather long-distance assimilation, cf. Kassai 1978). In the second example two assimilatory effects can be observed, both regressive. The two front rounded vowels in *tülüló* affect the vowel in the suffix of the demonstrative pronoun: vowel height remains unaffected but rounding changes from unrounded to rounded (/e/→/ø/). Also, the back rounded vowel in *lonty* affects the final vowel in *tülüló*: a back, rather than front, rounded vowel appears (/ø:/→/o:/). Another relevant factor in these cases is what is called Ranschburg's inhibition, i.e. the disturbing effect of homogeneous elements (cf. Vértes O. 1955). The form *Grisztikéhöz* (for *Krisztikéhez* 'to Christine'), uttered outside context where, consequently, long-distance assimilation was not among the possible explanations, strengthens the probability of the Ranschburg effect. It is worth pointing out that dissimilatory /e/→/ø/ substitution occurs in seven-year-olds' spontaneous speech as well: *megöltétök* (for *megöltétek* 'you killed it'), *megeszöm* (for *megeszem* 'I eat it'), *kerítésökkel* (for *kerítésekkel* 'with fences'). (Both subjects speak standard Hungarian and live in an environment where dialectical /ø/-forms like the examples are not encountered in adult speech.)

VH overgeneralization becomes apparent as conditional forms are acquired. A's speech included forms like the following from age 3 on: *játszanák* 'I would play', *olvasnák* 'I would read', *volnák* 'I would be', *innák* 'I would drink', etc. (This type of overgeneralization persisted well into his school-days; around age 10 he often corrected himself and his brother who is four years younger.) Apart from the examples of dissimilation mentioned above, **the material of these two children does not include data contradicting VH regularities**; 'vacillating' items practically did not occur in their speech (not surprisingly, in view of the meanings of such items).

Experimental data concerning VH in children's speech

A series of experiments has been conducted to find out how VH, apparently so unproblematic for children's linguistic development in general, will work in handling the 'vacillating' cases. The test words were selected from among those appearing in Kontra–Ringen's materials so that child-language results can be compared to adult data. I tried to select words so that they include familiar as well as unfamiliar ones for children; the latter—functioning as nonsense items as it were—may be even more suitable for testing the automatic application of VH rules, since adult conventions are only observed to a limited extent in such cases. The **purpose** of the experiment was to check child-language behaviour of items that adult subjects inflected partly with back vowels and partly (but predominantly) with front vowels. The test procedure was similar to that of Kontra–Ringen; but it could be exactly duplicated with 9-years-olds only. (The task was performed in a written form, requiring an appropriate level of reading and writing skills.) With younger age groups, I conducted oral testing (using slightly smaller sets of words and endings). The youngest age group with whom this could be done successfully was that of 5-year-old kindergarten pupils.

Method and material

A questionnaire entitled 'Grammar Test' and consisting of twenty test sentences was compiled. Pupils were told to insert missing word endings so that the sentence became grammatically correct. Of course, along with sentences testing VH, distractors were also included. Some of the test sentences were the following: 1. *Láttalak tegnap Ágnes...* 'I saw you yesterday [with] Agnes'; 2. *Beszélgessünk a pantomim...* 'Let's talk [about] pantomime'; 3. *Elutazott Zemplén megyé...* 'He travelled [to] Z. county' (distractor); 4. *Piszkos lesz a kezed a mágnes...* 'Your hands will be soiled [by] the magnet; 5. *Adj egy kis füvet a szalamander...* 'Give some grass [to] the salamander'; 6. *Én mindig esz... kenyeret* 'I always eat [1sg] bread' (distractor). In sentences containing a presumably unfamiliar noun, I always used a verb whose syntactic properties unambiguously determined the suffix to be used, irrespective of whether the child knew the noun or not. I called the children's attention to the possibility of 'nonsense' words. The verbs used in such cases included *hall (valamiről)* 'hear [about sg]', *fél (valamitől)* 'be afraid' [of sg]', *összetéveszt (valamit valamivel)* 'mix up [sg with sg]'.

For oral testing I used the same questionnaire, although—especially with kindergarten pupils—I also had to use physical objects or imitate certain actions to elicit the appropriate responses. The test words were the following: *Ágnes* (Agnes), *fotel* 'armchair', *hidrogén* 'hydrogen', *szalamander* 'salamander', *pantomim* 'pantomime', *mágnes* 'magnet', *szamojéd* 'Samoyed', and *sláger* 'hit tune'. Six of them were examined with the suffixes *-val/-vel* 'with', *-nak/-nek* 'for', *-tól/-től* 'from', and *-hoz/-hez/-höz* 'to'; while two of them—*szamojéd* and *pantomim*—only with the suffix *-ról/-ről* 'about'.

The **subjects** in the written task were boys and girls just starting the fourth year of elementary school, their age range was between 9;2–9;6, a total of 30 children. (The test was administered at 8 a.m.) In the oral experiments the participants were 20 first-year pupils aged 6;2–6;6, the session was held between 9 and 10 a.m. The kindergarten group included 30 children aged 5;0–5;4, we started the sessions right after breakfast. All oral experiments were conducted with one subject at a time. (The children's groups were sociologically heterogeneous.) For comparison, the questionnaire was also administered to a group of 30 adults aged between 30 and 50 years; their educational background was heterogeneous. I used this control group rather than the Kontra–Ringen results since their material did not specify the actual suffixes tested.

Results

The results are summarized in the tables below, separately for children and adults, and also for the two test conditions (written vs. oral). For five- and six-year-olds, it was impossible to test all the suffixes in the questionnaire; therefore, only the overall results are given in Table 1.

Table 1

Words	Suffixes used by children 5-year-olds back/front (%)	6-year-olds back/front (%)
Ágnes	39.6/60.4	10/90
szalamander	47.2/52.8	20/80
hidrogén	60.4/39.6	70/30
fotel	79.2/19.8	40/60
pantomim	79.2/19.8	100/–
szamojéd	72.6/27.4	60/40
average	63.0/37.0	50/50

The data reveal an important difference between the two age groups, even though the average age difference is only one year. The six-year-olds' higher degree of proficiency resulted in a closer correspondence between their suffix choice and that of adults (who revealed a clear preference for front-vowel alternants). While five-year-olds predominantly used back-vowel suffixes, with six-year-olds the occurrence of front and back-vowel alternants was quite balanced. In terms of individual test words, five-year-olds chose front-vowel suffixes for *Ágnes* and *szalamander* in more than half the cases; for all other words, they preferred the back-vowel alternants. A similar tendency can be found with six-year-olds; they further included *fotel* in the front vowel set. Notice, however, that for *pantomim* they exclusively used back-vowel suffixes. At this point the question arises whether the overall tendency apparent in the data can be plausibly extended to children younger than five: whether their choice would reveal an even more marked preference for back-vowel suffixes with respect to words that vacillate in adult usage.—Table 2 summarizes the nine-year-old subjects' responses for each word and for each suffix.

Table 2

Words	Suffixes chosen by 9-year-old children (%)					
	-nak/-nek	*-hoz/-hez*	*-val/-vel*	*-tól/-től*	*-ról/-ről*	average back/front
Ágnes	8/92	–/100	13/87	27/73	–	12/88
fotel	24/76	60/40	40/60	46/54	–	42.5/57.5
sláger	8/92	–/100	–/100	–/100	–	2/98
szalamander	30/70	–/100	20/80	40/60	–	22.5/77.5
hidrogén	30/70	50/50	60/40	40/60	–	45/55
mágnes	–/100	–/100	8/92	–/100	–	2/98
pantomim					93/7	93/7
szamojéd					61/39	61/39

As the percentages in the table show, nine-year-olds converge with adult tendencies even more than six-year-olds do: they use an even higher amount of front-vowel suffixes than the younger group. While with six-year-olds the ratio was fifty-fifty, the average for the older group was 35% back and 65% front-vowel suffixes. Considering all three age groups, the following claim can be made: **the occurrence of back vs. front-harmonic suffixes changes with age.** The younger the child, the more marked preference (s)he has towards back vowels; **as (s)he grows in age, the ratio of front-vowel suffixes also grows** by approximately 15% in each step. Table 3 summarizes the adult control group's data in a format similar to that of the 9-year-old group.

Table 3

Words	Suffixes chosen by adults (%)					
	-nak/-nek	*-hoz/-hez*	*-val/-vel*	*-tól/-től*	*-ról/-ről*	average back/front
Ágnes	13/87	7/93	13/87	13/87	–	11.5/88.5
fotel	13/87	47/53	19.5/80.5	40/604	–	29.8/88.5
sláger	13/87	47/53	19.5/80.5	40/60	–	29.8/70.2
szalamander	27/73	13/87	7/93	7/93	–	13.5/86.5
hidrogén	7/93	7/93	13/87	40/60	–	16.7/83.3
mágnes	–/100	7/93	–/100	–/100	–	1.7/98.3
pantomim					88/12	88/127
szamojéd					72/28	72/28

Again, we see a further shift towards front harmony: the adults chose front-vowel suffixes in 73.36%, as opposed to back-vowel alternants in 26.64%. The tendency is a **marked** one, the only exception being *szamojéd* where adults chose back-vowel suffixes in larger numbers than nine-year-olds did. Suffix choice for *Ágnes*, *mágnes*, and *sláger* is rather similar in the two groups:

front-vowel suffixes are clearly preferred by both children and adults--the children's preference is especially marked as opposed to the rest of the test words. We might suggest that the children probably all know these three words, consequently the reason for this preference may be that these words, present as they are in children's active (as well as passive) vocabulary, are more frequently used/encountered than the others. If this is true, the similarity in suffix choice is obviously due to the influence of the adult pattern. In addition, the phonetic structure of the three words is similar, and their vowels are identical, which is yet another factor that may contribute to their uniform behaviour. In sum, the tendency we saw in the differences between five- and six-year-olds' responses, also appears in the average data of six- vs. nine-year-olds, as well as in those of nine-year-olds vs. adults. Front-vowel suffixes become increasingly more dominant, and back-vowel suffixes lose ground, as subjects grow older. Table 4 illustrates this tendency in a concise manner.

Table 4

Subjects	Suffix choice %	
	back	front
5-year-olds	63	37
6-year-olds	50	50
9-year-olds[1]	26.14	73.86
adults[1]	19.9	80.1

In Table 5, responses given in the two written tests are summarized in terms of back vs. front alternants of individual suffixes:

[1] These percentages were calculated in terms of all the data; previous figures referred to average values based on data obtained for individual words.

Table 5

Suffixes	Responses in (%) 9-year-olds	adults
-nak (dative)	14.3	12.1
-hoz (allative)	17.6	14.3
-val (instrumental)	25.4	14.3
-tól (ablative)	25.3	17.6
-ról (delative)	80	83
-nek	85.7	87.9
-hez	82.4	85.7
-vel	74.6	85.7
-től	74.7	82.4
-ről	20	17

Delative *-ról/-ről* will be excluded from the detailed analysis below since it occurred in a similar—though anomalous—distribution in both children's and adults' responses: both groups unambiguously prefer the back alternant. It remains to be seen if this is due to the test items concerned (*pantomim, szamojéd*) or to the suffix *-ról/-ről* itself. Further investigations are also necessary to test the **hypothesis** that **certain suffixes determine** (predict) **harmonic choice more than others do**. In Kontra–Ringen's material, too, there was one suffix—illative *-ba/-be*—with a striking tendency to appear in its back alternant. Their test sentence was "Tedd a nadrágodat a ..... (*fotel*)" (Put your trousers [into] the armchair). Subjects had to insert the appropriate suffixed form of *fotel* in the dotted position. Their data show that 75% of subjects chose the back-vowel alternant and only 25% chose the front-vowel form (Kontra–Ringen 1988). In our own material, *fotel* was investigated with four different suffixes; some tentative comparisons can therefore be made. The data reveal that the same subjects used different suffix alternants with *fotel*, depending on the type of suffix: for dative *-nak/-nek*, the back alternant was used in 13% of the cases, for instrumental *-val/-vel* in 19.5%, for ablative *-tól/-től* in 40%, and for allative *-hoz/-hez* the back alternant occurred as much as in 47% (cf. Table 3).

Turning now to a detailed analysis of suffixes other than *-ról/-ről*, we can see in Table 5 that *-nak/-nek* and *-hoz/-hez* exhibit similar distribution in both age groups' responses, whereas for *-val/-vel* and *-tól/-től* the back alternant is still represented quite heavily in 9-year-olds' decisions. What can be the reason for this difference? One possible answer involves a parallel between **the order of acquisition of these suffixes and their behaviour in terms of VH**. The data found in the literature and my own material both suggest that

-nak/-nek appears very early in children's speech, and so do *-hoz/-hez/-höz* and *-val/-vel*. On the other hand, *-tól/-től* appears much later. Available data on the development of VH make us expect the following correlation: the later one particular suffix first appears in a child's speech, the longer it takes for that suffix to start obeying adult-language tendencies. In terms of VH, this means that (with the type of word under consideration here) **earlier-acquired suffixes will tend to favour front harmony, and those appearing later will preserve back harmony** for some time before they finally fall into place in the eventually emerging pattern. This hypothesis is well supported by *-nak/-nek*, *-hoz/-hez*, and *-tól/-től*. On the other hand, *-val/-vel* seems to contradict it since it appears in its back alternant exactly as often as the late-acquired *-tól/-től*. This either means that the hypothesis that order of acquisition has something to do with VH behaviour is wrong, or else that some other factor underlies the 'strange' behaviour of *-val/-vel*. A deeper investigation of suffixation in early child language reveals that although the instrumental suffix indeed appears early, nevertheless its **correct** use—including its assimilatory properties—comes rather **later**. The first consonant of *-val/-vel* fully assimilates to the last consonant of the stem, cf. *kaviccsal* 'with pebble', *hallal* 'with fish'. Hence, the child—unlike with other case endings—has to apply several rules at the same time: a) the appropriate use of *-val/-vel* in terms of its semantics; b) the rule of VH, and c) consonant assimilation. In compliance with Slobin's universal rules, the child first obeys rules referring to larger classes, postponing particulars to somewhat later. The acquisition of the semantic aspects is of course essential; VH is there from the very start, so it applies easily (in the core cases); but assimilation is, from the child's point of view, less than fully consistent (it does not apply to vowel-final or *v*-final stems where the suffix remains unchanged). Rules a) and b), on the other hand, are exceptionless (again, from the young child's point of view). In short, although it first appears early, the correct use of *-val/-vel* takes quite some time to be established. Examples where assimilation fails to apply in young children's speech include *malacval* 'with a piglet', *Grisztijánval* 'with Chris' (Gósy 1984, 14); *kalapval* 'with a hat', *késvel* 'with a knife', *kikvel* 'with whom' (Kenyeres 1924, 31–2).

Table 6 summarizes data for comparison, involving only stems that were tested in all four groups:

Table 6

Words	Suffix choice (%)			
	5-year-olds back/front	6-year-olds back/front	9-year-olds back/front	adults back/front
Ágnes	39.6/60.4	10/90	12/88	11.5/88.5
fotel	79.2/19.8	40/60	42.5/57.5	29.8/70.2
szalamander	47.2/52.8	20/80	22.5/77.5	13.5/86.5
hidrogén	60.4/39.6	70/30	45/55	16.7/83.3
pantomim	79.2/19.8	100/–	93/7	88/12
szamojéd	72.6/27.4	60/40	61/39	72/28
average	63/3	50/50	46/54	38.6/61.4

The average values, as well as the data for individual items, clearly indicate the tendency that back-vowel responses decrease with growing age. We have checked if this is also true for the four words that were tested for all suffixes, i.e. this time we have calculated an average over *Ágnes*, *fotel*, *szalamander*, and *hidrogén*. The percentages for back/front alternants, from age 5 upwards, are as follows: 56.6/43.4 – 35/65 – 30.5/69.5 – 17.8/82.2. Excluding *-ról/-ről*, then, the tendency for the above four words is as follows: the difference is the widest between 5- and 6-year-olds, less between 9-year-olds and adults, and it is the smallest between 6- and 9-year-olds. This is just another piece of information concerning numerically-expressible aspects of the acquisition of Hungarian (with respect to the phonetic level).

We have also compared our data with those of Kontra–Ringen. It should be emphasized that, although the words investigated in the two studies are identical, the suffixes used for testing are different; the comparison, therefore, has to be viewed with some reservations. The results are summarized in Table 7. Only seven words are included: the ones that were investigated in all groups of subjects.

Table 7

Words	Suffixes used by groups of subjects (%)		
	9-year-olds back/front	adults back/front	Kontra–Ringen 1988 back/front
szalamander	22.5/77.5	13.5/86.5	8.5/91.5
hidrogén	45/55	16.7/83.3	2.35/97.65
fotel	42.5/57.5	29.8/70.2	75/25
mágnes	2/98	1.7/98.3	3.85/96.5
sláger	2/98	6.6/93.3	4.5/95.5
pantomim	93/7	88/12	90.9/9.1
szamojéd	61/39	72/28	58/42
average	38.3/61.7	32.7/67.3	34.7/65.3

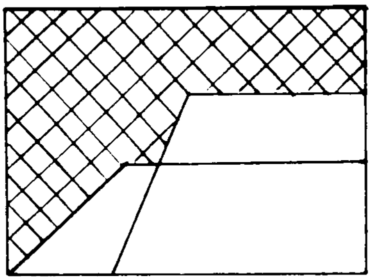
The tendency is shown by these data as well: front harmony is more dominant in both adults' groups than with children.

Discussion

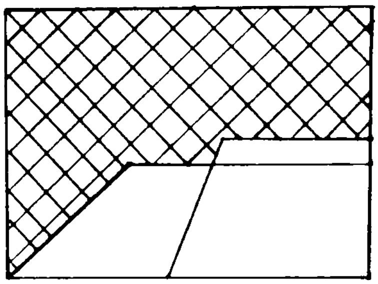
In the introduction of this paper, we asked the following two questions. First, we wanted to find out what the function of vowel harmony was in the acquisition of Hungarian, and second, how VH regularities were observed in various age groups in the case of lexical items whose harmonic behaviour, in adult speech, was ambiguous or vacillating.

Evidence from speech production

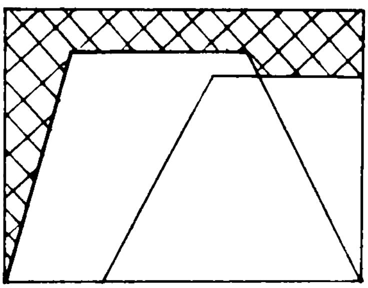
The VH structure of morphologically simple words, as well as the correct suffixation of harmonically unambiguous stems, appears very early in Hungarian children's speech. Even **before** the period of the first words, or holophrases, in what is called the transition phase between babbling and early speech, vowel harmony tends to be obeyed by young children. As a direct consequence, the child's first words will predominantly contain either exclusively back or exclusively front vowels; furthermore, the younger the child, the more (s)he prefers back vowels. What can be the reason for this phenomenon, observed also in the acquisition of other languages (cf. Salakhova 1973; Waterson 1987)? The most straightforward explanation lies in the physiological properties of speech production. It is easier to perform movements where and when an appropriately large space is available. This is especially important for movements as minute as those involved in articulation. If the tongue is retracted, a relatively large open space is formed in the oral cavity in which the movement of participating organs is easier for a less skilled speaker (i.e. the child). It is much more difficult to regulate such movements when the tongue is pulled forward since most of the oral cavity is then filled with the body of the tongue and the available space is smaller. Figure 1 is meant to illustrate that difference very schematically by the adult and child-language pronunciations of two words.



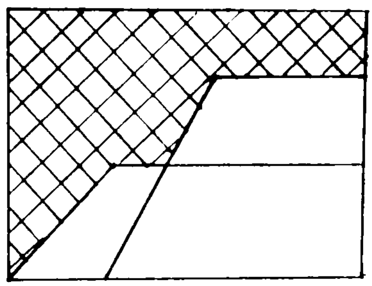
a) *hoppá* ‘oops’



b) *appá* ‘id’ (child-language version)



c) *pelus* ‘nappy’



d) *pájus* ‘id’ (child-language version)

Figure 1. Volume of oral cavity in uttering vowels

The young child instinctively tries to articulate in the largest possible space while keeping the resulting sound sequence as close to the adult model as (s)he possibly can. At the same time, (s)he also instinctively refrains from uttering sequences involving large and abrupt articulatory changes. Hence (s)he will produce [baja:ʒ] for *Balázs* ‘Blaise’ (1;8), [biɟi] for *bugyi* ‘panties’ (1;11), [t͡sist͡sis] for *cica* ‘kitten’ (1;6), [obojkɔ] for *uborka* ‘cucumber’ (1;7), [mɔgnɔ] for *magnó* ‘tape recorder’ (1;5), [hɔsɔ] for *huszár* ‘cavalryman’ (1;6), etc.

The articulatory mechanisms mentioned will interact with a constant confirmatory effect of the linguistic environment the child is exposed to, resulting in an early and strikingly accurate manipulation of VH regularities. It can be safely claimed that children make practically no mistakes with respect to vowel harmony, including harmonic suffixation. This is further facilitated by the fact that harmonically ambiguous or irregular words occur relatively infrequently, especially in utterances addressed to young children. By the time the child encounters such items often enough to include them in his passive vocabulary, the major rules of VH have been firmly established in his speech.

In their experimental-phonology paper, Kontra–Ringen (1986, 3–7) ask the question whether /e/ and /e:/ are harmonically neutral vowels in Hungarian. Analysing young children's spontaneous utterances, it appeared to be initially plausible that mixed-vowel stems with a front unrounded vowel in the last syllable will govern front harmony more generally than in the adult language. But the experimental results proved that exactly the opposite is true. Young children tend to prefer back-vowel suffix alternants in such cases; as they grow, the proportion of front-vowel suffixes grows with them. This phenomenon is congruent with a general phonotactic tendency in child language, i.e. the preference for back vowels. It might be called 'physiological pressure' and is based on children's limited articulatory abilities determining the degree of precision of their pronunciation. The preference for back vowels can be observed even in kindergarten and early school years in unfamiliar or rarely used words. Obviously, the child uses the easier way out, the back-vowel option, in the suffixation of such words. Furthermore, it is also suggested by the experimental results that the choice of suffix alternant is not independent of the phonotactic properties of the stem and the type of suffix. The experimental material is not comprehensive enough to allow us to investigate this point more thoroughly. But this much can be said: the more difficult the stem to pronounce (in terms of number of syllables, speech sounds involved, consonant clusters, syllable types, etc.) the more probable that the suffix will appear in its back-vowel alternant. In all three groups of children, the percentage of back-vowel suffixes chosen for *hidrogén* 'hydrogen' (three different vowels, two closed syllables, one consonant cluster, one 'difficult' consonant, and a probably unfamiliar item for most subjects) is very high indeed.

Evidence from speech perception

The interaction between speech production and speech perception is of a decisive importance, especially in the process of language acquisition. It is worth investigating whether and how the acquisition of a phonotactic rule—in our case, that of VH—is influenced by the development of the child's speech perception. We conducted a series of experiments to demonstrate (i) certain possible changes during the development of speech perception, and (ii) the differences between children's and adults' speech perception.

Within certain limits, the identification of a vowel depends on its formant pattern. It is postulated that the first two formants of the vowels are sufficient to organize them into categories. There are three main hypotheses concerning the possible mechanism of processing the spectrum equivalent curve in the nervous system, namely, (i) the spectrum envelope hypothesis, (ii) the bandpass hypothesis, and (iii) the formant hypothesis (Karnitskaya *et al.* 1975). Recently, there have been several attempts to describe the "internal representation" or "auditory spectrum" of speech and speech-like stimuli (Dubno–Dorman 1987). Perceiving vowels in isolation seems to be the most straightforward approach to this problem. Experiments dealing with the identification of isolated vowels very often use various stimuli differing in spectral peaks along the frequency continuum. Frequency location on the one hand, and the 'critical distance between the formants' on the other seem to be the necessary parameters in vowel perception. However, there are numerous studies supporting the importance of temporal characteristics, intensity changes, and formants' bandwidth (Ainsworth 1972; Gósy 1989; Wodarz-Magdics 1970). On the basis of experimental results with hearing-impaired subjects, the 250–3800 Hz frequency range has been assigned crucial importance for vowels. Other results show that the role of the second and third formants can vary depending on the vowel quality itself (Fujimura 1967). One point should be emphasized: the necessary number of required formants in the correct identification of vowels is in fact ambiguous.

The children seem to learn in fact 'rules' for manipulating the features of a language from exposure to a relatively small number of examples. Which features help children the identification of vowels? Can age-related changes be detected in this identification?

Experiments have been carried out in order to make comparisons of identification between vowels with two and five formants in Hungarian with the participation of children's and adults' groups.

Method and material

The experimental stimuli were two-formant vowels generated by a parallel-formant speech synthesizer and their five-formant equivalents by means of the cascade mode of the same synthesizer (Klatt 1984). The duration of each vowel was 300 ms. The Hungarian vowel system has both short and long versions of six vowels while three others, /a:/, /ɔ/, and /e/ have only one quantity in the system which is phonologically long for /a:/ and short for /ɔ/ and /e/, but they phonetically tend to be rather long, particularly in # V positions. This means that the generated vowel-like stimuli have objective psychoacoustic relevance for the Hungarian-speaking listeners. The formant bandwidths and formant amplitudes were fixed and equal for both types of synthesized vowels. (The synthesis was made at MIT, in Cambridge, in 1987.) The only difference between the two series of stimuli was the number of formants (cf. Table 8).

Table 8

Formant frequency values of the synthesized vowels

IPA symbol of the vowel	Formant frequency values (Hz) F1	F2	F3	F4	F5
a:	750	1300	2500	3250	3700
ɔ	600	950	2500	3250	3700
o:	440	800	2500	3250	3700
u:	300	620	2500	3250	3700
ø	440	1600	2500	3250	3700
y:	220	1650	2500	3250	3700
e	500	1850	2500	3250	3700
e:	400	2000	2500	3250	3700
i:	220	2500	2700	3250	3700

The chosen values of the first two formants were based on previous perceptual experiments where these frequencies defined the Hungarian vowels concerned in 100% of all responses (Gósy 1989). Two random orders of each stimulus group were tape-recorded and administered to three groups: (i) 16 native adult listeners participated in the first group, (ii) 10 5–6-year-old children in the second, and (iii) 10 3–4-year-olds in the third group. The stimuli were presented to the listeners through headphones at the most comfortable intensity level. Subjects were instructed: to identify each vowel representing one of the Hungarian phonemes. The adults had to write down what they heard, while the children had to repeat loudly what they heard and the examiner wrote down their responses.

Results

(i) Our hypothesis was that the required number of formants for correct identification depends on the vowel quality itself. In addition, feature detectors were assumed to indicate the presence of basic perceptual properties in terms of frequency values. Table 9 contains the main results for both types of synthesized vowel stimuli obtained from **adult listeners**.

Table 9

Correct identificatiбn of the synthesized vowels by adult listeners

IPA symbol of the vowel	Correct identification (%) two-formant vowels	five-formant vowels
a:	95	100
ɔ	100	100
o:	94	75
u:	100	65
ø:	93	100
y:	93	95
e	80	93
e:	62.5	85
i:	100	100
Average	90	94

Our results seem to support Flanagan's (and others') findings (Flanagan 1965) that the first two formants are sufficient for native listeners to identify the vowels correctly. There was no significant difference between the perception of Hungarian vowels with two or five formants. However, more detailed analyses showed a significant difference—as it was expected—in the correct identification between certain types of vowels. Identification of front vowels is better in case of five-formant vowels while the identification of back vowels is significantly better in case of two-formant vowels ($p<0.5$). It should be emphasized that this perceptual difference in the case of /e/ and /e:/ is more significant which can be explained by special characteristics of the Hungarian vowel system and also by the underlying role of F2 for these vowels. A confusion matrix was set up on the basis of the listeners' judgements. This matrix shows the clear operation of the property detectors for each vowel. There are three vowels in the Hungarian system that need 'supplementary' formants beyond the first two in order to be identified correctly. More specifically, Hungarian vowels having their F2s around the 2000 Hz area and their F1s around the 400 Hz area tend to be confused among themselves. The higher-number formants for /e/, /e:/, and /ø:/ do function as property detectors, while they are rather redundant elements for the other Hungarian vowels.

(ii) On the basis of our previous findings concerning the speech perception of **children**, it has been assumed that children need much more acoustic information about a speech signal than adults do. Acoustic cues relevant and sufficient for the identification of speech sounds for adults was supposed to be insufficient for children. The younger the child the more acoustic elements are necessary for recognition, in particular, as it is obvious, when para- and extralinguistic features cannot be used (Gósy 1989). Identifying isolated vowels is not an everyday task for 3–6-year-old children; but repeating nonsense syllables or speech signals is already an expected ability during this stage of language acquisition. Before analyzing the data obtained, two remarks should be made: (i) children repeating the synthesized vowels often tried to imitate the vowels, i.e. they pronounced vowels which are on the boundary of two different phoneme categories of the Hungarian vowel system (e.g. [ɣ] or [o̜]); (ii) the 3–4-year-old children tended to pronounce CV-syllables instead of isolated vowels, often coarticulated with an unvoiced stop consonant (e.g. [pe̜:], [ti:]). The proportion of non-responses was very low in both groups (12% of all responses for 3–4-year-old children and only 2% for 5–6-year-olds). Table 10 shows the experimental results concerning the identification of isolated vowels with two vs. five formants.

Table 10

Identification of synthesized vowel stimuli by children listeners

IPA symbol of the vowel	Correct identification %			
	two-formant vowels		five-formant vowels	
	mean age 3;8	mean age 5;8	mean age 3;8	mean age 5;8
a:	30	85	65	85
ɔ	65	80	65	100
o:	75	95	80	85
u:	20	100	20	85
ø	45	50	55	60
y:	5	55	20	50
e	30	60	40	60
e:	15	30	55	75
i:	55	80	85	80
Average	37.8	75	53.9	70.5

The data clearly show that the children perceived the Hungarian vowels much better when they had more acoustic elements, i.e. the first five formants. Although the data obtained from adults supported the claim that there is no significant difference in identification of two- and five-formant vowels, the children's data seem to support the author's hypothesis about the inability of young children for the correct identification of isolated vowels. Two obvious conclusions can be drawn from these differences: (i) there are feature detectors indicating the necessary presence of basic perceptual properties for children which differ from those of adults'; (ii) the proportion of correct identification of vowels increases with age, and the number of necessary acoustic elements tends to have less importance with increasing age (cf. Table 10). Statistical analyses have been carried out, and a significant difference has been found between the correct identification of two- and five-formant vowels in both children's groups ($p<0.01$) and also between the results of adults' and children's groups ($p<0.01$). However, there was no significant difference between the data obtained from the 5–6-year-old children for the two- and five-formant vowels.

More refined analyses show that there are differences in the misperception of certain vowels between children and adults. For example, illabial /e:/ tends to be confused with labial /ø:/ in adults' perception, but only with illabial /i:/ in children's perception; or: instead of labial /y:/ there are only /i:/ and /ø:/ sounds in adults' data, but a great proportion of other front vowels also appear in children's data. There is only one person in the adults' group who, on one occasion, identified the Hungarian long /a:/ as labial /ɔ/; however, this labial /ɔ/ systematically appears in children's data replacing illabial /a:/ (particularly in the case of two-formant stimuli). As to the confusion matrix of children's data, the perceptual difficulty of front vowels has been confirmed both for 3–4-year-old and 5–6-year-old children. Results of the older children examined show a clear tendency towards correct identification: perception of back /u:/ and front /i:/ are much more often correct for the older than for the younger group. Table 11 shows the numerical data of these examples.

Table 11

Identification of /u:/ and /i:/ by children

Vowels	3–4-year-old children two-formant vowels	five-formant vowels	5–6-year-old children two-formant vowels	five-formant vowels
	vowel identification (%)			
u:	20 u: 30 ø: 30 o: 20 –	20 u: 10 a: 10 e: 20 ɔ 40 o:	100 u:	85 u: 15 o:
i:	55 i: 20 y: 15 ø: 10 –	85 i: 15 e:	80 i: 20 y:	80 i: 20 e:

Similarly to the adults' data, the front vowels /ø:/, /y:/, and /e:/ seem to be ambiguous for both groups of children, and these vowels tend to get confused among themselves and also with the other two front vowels, /i:/ and /e/.

The initial hypothesis that was confirmed by speech production phenomena in the earlier part of this paper was that children prefer back vowels. That hypothesis further entails that there should be some corresponding difference between front and back vowels in perception as well. Table 12 summarizes the data on the correct identification of back vs. front vowels.

Table 12

Identification of back and front vowels

Mean age of children's group		Correct identification in %	
		back vowels	front vowels
3;8	F_1+F_2	47.5	30
	$F_1..F_5$	57.5	51
5;8	F_1+F_2	90	55
	$F_1..F_5$	88.75	65

Identification scores for both two-formant and five-formant vowels reveal a dominance of back vowels: we found a significant difference between the correct identification of back vs. front vowels in both age groups. Although it is almost redundant at this point, we also tabulated the correct identification percentages of vowels appearing in the suffixes discussed above with respect to vowel harmony (cf. Table 13).

Table 13

Identification of [ɔ/o:] and [e/ø:] vowels

Mean age of children's group		Correct identification in %	
		ɔ/o:	e/ø:
3;8	F_1+F_2	70	37.5
	$F_1..F_5$	72.5	47.5
5;8	F_1+F_2	87.5	55
	$F_1..F_5$	92.5	60

The data on the correct identification of ɔ/o: vs. e/ø: also confirm our claim about the perceptual differences between front and back vowels. (As can be seen in adults' data, there is no comparable discrepancy there, cf. Table 9.)

These data, in our view, perfectly support our **hypothesis that back vowels are preferred in language acquisition**. The dominance of back vowels in speech production is based on well-documented characteristics of speech perception, involving a specific contribution made by 'property detectors'.

The appearance and development of the phonotactic regularities of a language in the acquisition process depend on three factors: (i) the phonotactic and phonological rules of the language concerned, (ii) the interrelation between speech perception and the phonological system, and (iii) that between speech production and the phonological system.

Although Jakobson's theory concerning the earliest-appearing vowels in children's speech (cf. his vowel triangle) has already been refuted, a similar tendency in both children's groups could be found from the speech perception point of view. Which vowels are the most correctly identified can be explained as a consequence of the general developmental operation of property detectors: they operate first for a few special sounds depending on the sound system of a given language, then these same property detectors work gradually on all the other sounds. On the basis of our data, the property detectors for vowels focus on /o:/ and /i:/, and later on the very Hungarian-specific /ɔ/. Misidentifications of the front rounded vowels correspond to the articulatory difficulties of these vowels, particularly in the case of 3–4-year-old children. (A more thorough analysis of this problem makes some further investigation necessary.)

Our findings about the perceptual abilities of young children for isolated vowels seem to provide further evidence for an existing speech perception model of children. The description of the interaction between children's phonetic and phonological perception can explain how children assess surface variants of words, resulting from phonological processes, to link their own language with that of adults in order to understand the various word forms. Children's perceptual abilities in the age examined here do not provide sufficient information in every case to detect even the vowels of their mother tongue. Property detectors must operate in a different manner during and after speech acquisition as far as both their qualitative and quantitative characteristics are concerned.

The experimental investigation of vowel harmony continually raises a number of novel problems; to solve these, further experiments have to be carried out. The tendency that emerges from our investigation of the development, between age 5 and adulthood, of the suffixation of a particular set of problematic lexical items, will probably make it possible to formulate a more clear-cut view of the various stages of mother tongue acquisition. That perspective, in its turn, will yield important practical advantages in detecting dyslexia, in determining criteria for delayed speech development, and in a number of other areas within speech pathology and surdopedagogy.

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VOWEL LENGTH ALTERNATIONS IN HUNGARIAN*

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1. Introduction

Autosegmental theory represents long segments as single segments (or melodies) linked to two skeleton slots, as in (1), where X represents a slot not specified as a consonant or vowel (Levin 1985).

```
(1) (a)  X X                     (b)  X X
          \/                           \/
          t   = geminate tt            a   = long a:
```

Such representations are defended in McCarthy (1979) and Leben (1980), and are in fact **forced** if one accepts the Obligatory Contour Principle, which McCarthy (1979, 131) states as (2).

(2) In a given autosegmental tier, adjacent identical segments are prohibited.

Underspecification theory (Archangeli 1984; Archangeli–Pulleyblank 1986) proposes that underlying representations are minimally specified, in that all predictable inforination is suppressed. This implies that the association lines in (1) are not present underlyingly but are supplied by a principle or a rule. We can assume that the Universal Association Convention (UAC) is responsible for this linking. Pulleyblank (1986, 11) states this convention as in (3).

(3) Map a sequence of tones onto a sequence of tone-bearing units,
   (a) from left to right
   (b) in a one-to-one relation.

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Pulleyblank states the convention in terms of tone association, but the same Convention can be applied to the association of melodies to skeleton slots. The important part of this Convention for our purposes is the one-to-one relation between the different autosegmental tiers. We also assume that some associations can be right to left (RL) rather than left to right (LR).

For example, a word like *fekete* 'black' would have no association lines in underlying representation (4a), these being supplied by UAC applying left to right (4b).

```
(4) (a)  X X X X X X        UAC          (b)  X X X X X X
                          ------>             | | | | | |
          f e k e t e       LR                f e k e t e
```

In a language with distinctive long segments, such as Hungarian, the UAC causes problems. For example, what ensures that the UAC gives the representation (5a) for *bál* 'ball (dance)' rather than (5b) with LR association or (5c) with RL association with floating (unassociated) X slots?

```
(5) (a)  X X X X         (b)  X X X X         (c)  X X X X
         | \/  |              | | |                  | | |
         b  á  l             *b a l                 *b a l
```

We could ensure the correct result by prelinking. The representation in (6a) would give *bál*, assuming LR linking by the UAC and the mirror-image Vowel Spread rule in (6c). Alternatively, (6b) would yield *bál*, with RL linking and Vowel Spread (6c).

```
(6) (a)   X X X X      UAC      X X X X      VS       X X X X
             /        ------>   |  /  |    ------>    | `./ |
          b á l        LR       b  á  l     (6c)      b  á  l

    (b)   X X X X      UAC      X X X X      VS       X X X X
            \         ------>   |  \  |    ------>    | \.' |
          b á l        LR       b  á  l     (6c)      b  á  l

    (c)   Vowel Spread (VS)     X   X     (mirror image)
                                 `./
                               [-cons]
```

We would have to select one of (6a) and (6b), since allowing both would lead to contradictory directionality conditions on linking. A second possibility is to mark certain skeleton slots immune to linking, say with a circle: Ⓧ. In this approach, *bál* is underlyingly (7a) or (7b). Either direction of association yields the correct results, assuming a rule that later links a circled X to an adjacent vowel melody (see Section **2**).

(7) (a)	X	Ⓧ	X	X	(b)	X	X	Ⓧ	X
	b	á	l			b	á	l	

At first sight it may seem an **embarras de richesses** to have two possible underlying forms for words with long vowels in the circled X approach, making this less desirable than the prelinking approach. Nevertheless, we will show that we need this ambiguity to analyze vowel length alternations, and that consequently the circled X approach is preferable to prelinking.

2. Morpheme-final low vowels

2.1. The analysis

There are two main environments for vowel-length alternation in Hungarian,[1] one very general, the other specific to a particular irregular noun class. In the general alternation, a morpheme-final low vowel is long before another morpheme,[2] short otherwise. This is commonly known as "Low Vowel Lengthening" after the segmental analysis (e.g. Vago 1980; Jensen 1972). Vago assumes that the final low vowels are underlyingly short, and are lengthened by rule (8).

(8) $$\begin{bmatrix} +\text{syll} \\ +\text{low} \end{bmatrix} \longrightarrow [+\text{long}] \;/\; \underline{\quad} + [+\text{segment}]$$

This rule is intended to account for the data in (9).

(9)	nom.	acc.	pl.	iness.	ill.	poss. 3 sg.	poss. 3 sg. acc.	
(a)	*fa*	*fát*	*fák*	*fában*	*fába*	*fája*	*fáját*	'tree'
(b)	*kefe*	*kefét*	*kefék*	*kefében*	*kefébe*	*keféje*	*keféjét*	'brush'

[1] We are disregarding cases where a short vowel plus *v* alternates with a long vowel, as in *ló* 'horse', plural *lovak*; *lő* 'he shoots', *lövök* 'I shoot'.

[2] There are some derivational suffixes before which a stem-final low vowel is short. We will return to this problem later in this section.

Since we analyze length autosegmentally, as in (1), with no feature [long], Vago's solution is not available to us. Following Hetzron (1972), we propose an analysis involving shortening rather than lengthening. We exploit the possibility of circled X nodes in proposing the underlying representations in (10).

(10) (a)
$$\begin{array}{ccc} X & ⓧ & X \\ & & \\ & f & a \end{array}$$

(b)
$$\begin{array}{ccccc} X & X & X & ⓧ & X \\ & & & & \\ & k & e & f & e \end{array}$$

If nothing else is said, the representations in (10) will produce only the shortened version. As we suggested in Section **1**, we need a rule that links a circled X to an adjacent vowel melody. Because a circled X is immune to the UAC, only a rule that specifically mentions a circled X can effect its linking. We call this rule Floating Vowel Spread (FVS), formalized in (11).

(11) Floating Vowel Spread (FVS)
$$\begin{array}{ccc} ⓧ & & X \\ & \diagdown\!\!\diagup & \\ & [-\text{cons}] & \end{array} \qquad \text{(mirror image)}$$

Rule (11) links a circled X to a vowel melody adjacent to an X linked to that melody on either side. Let us consider the illative form *fába*. It is derived as in (12).

(12) underlying — UAC — FVS
$$\left[\left[\begin{array}{ccc} X & ⓧ & X \\ & & \\ & f & a \end{array}\right] \begin{array}{cc} X & X \\ & \\ b & a \end{array}\right] \xrightarrow{\text{LR}} \left[\begin{array}{ccccc} X & ⓧ & X & X & X \\ | & & | & | & | \\ f & & a & b & a \end{array}\right] \longrightarrow \left[\begin{array}{ccccc} X & X & X & X & X \\ | & \diagdown & \diagup & | & | \\ f & & a & b & a \end{array}\right]$$

=*fába*

We will now turn to the shortened form in the nominative. In order to prevent FVS from applying to this form, we propose a rule that deletes a circled X before a linked [+low] at the end of a word, given in (13).

(13) Shortening I
$$ⓧ \rightarrow \emptyset \; / \; \_\_ \left.\begin{array}{c} X \\ | \\ [+\text{low}] \end{array}\right]$$

Given the initial representation (14a), linking derives (14b) and Shortening I gives (14c).

$$\text{(14) (a)} \quad \begin{bmatrix} X & \textcircled{X} & X \\ & & \\ & f & a \end{bmatrix} \quad \xrightarrow[\text{LR}]{\text{UAC}} \quad \text{(b)} \quad \begin{bmatrix} X & \textcircled{X} & X \\ | & & | \\ f & & a \end{bmatrix} \quad \text{(c)} \quad \rightarrow \begin{bmatrix} X & X \\ | & | \\ f & a \end{bmatrix}$$

The question naturally arises at this point as to why FVS (11) does not apply to nominative *fa*, giving **fá*, and conversely, why Shortening I does not apply to accusative *fát* on the first cycle, giving **fát*. It would of course be easy to stipulate that both rules apply postcyclically with Shortening I ordered before FVS. But in fact both of these statements follow from universal principles and so do not have to be stipulated. The Strict Cycle Condition (SCC) prevents both rules from applying cyclically, and the Elsewhere Condition orders Shortening I before FVS. We state the SCC in (15a) and the Elsewhere Condition in (15c). In (15b) we give the definition of distinctness, which is crucial to the understanding of the SCC and the EC.

(15) (a) Strict Cycle Condition (SCC, Kiparsky 1985, 89)

If W is derived from a lexical item W', where W' is nondistinct from XPAQY and distinct from XPBQY, then a rule A → B / XP __ QY cannot apply to W until the word level.

(b) Distinctness (SPE, 336)

Two units U_1 and U_2 are distinct if and only if there is at least one feature F such that U_1 is specified $[\alpha F]$ and U_2 is specified $[\beta F]$ where α is plus and β is minus... Two strings X and Y are distinct if they are of different lengths, that is, if they differ in the number of units that they contain, or if the ith unit of X is distinct from the ith unit of Y for some i.

(c) Elsewhere Condition (EC, Kiparsky 1982, 137)

Rules A and B in the same component apply disjunctively to a form if and only if

(i) The structural description of A (the special rule) properly includes the structural description of B (the general rule);

(ii) The result of applying A to ϕ is distinct from the result of applying B to ϕ.

In that case A is applied first, and if it takes effect, then B is not applied.

The SCC orders both FVS and Shortening I on the postcyclic level because the inputs and outputs of each rule are distinct in that they contain a different number of units, that is, X slots. The EC orders Shortening I before FVS because Shortening I is more specific, applying only in the context of a linked low vowel, while FVS applies in the context of any vowel. Therefore, no language-specific statements are needed about the ordering of these two rules.

In the derivation of the illative form in (12), Shortening I cannot apply, although there is a linked [+low] at the end of the word, because there is an intervening linked vowel in the stem. Postcyclically, Bracket Erasure has eliminated the] at the end of the stem, so that the stem-final linked [+low] cannot trigger Shortening I at that point. The application of FVS therefore gives the desired outcome, *fába*.

All inflected forms follow this pattern: a stem-final low vowel is long before inflectional suffixes, short word finally. A few derivational suffixes, however, exceptionally cause shortening of stem-final low vowels before them, as in (16).

(16)	(a)	*fekete*	'black'	
		feketében	'in the black one'	
		feketeség	'blackness'	**feketéség*
	(b)	*katona*	'soldier'	
		katonák	'soldiers'	
		katonaság	'soldiery'	**katonáság*
	(c)	*haza*	'native country'	
		hazai	'native, domestic'	**hazái*

The fact that *-ság/-ség* harmonizes in (16a, b) shows that this suffix does not act like a compound element. A compound whose first member ends in a low vowel has this vowel short, as in (17).

(17) *fagáz* 'wood gas' (*fa* 'wood', *gáz* 'gas') **fágáz*

Members of compounds do not harmonize to each other, as shown in (18).

(18) (a) *könyvtár* 'library' (*könyv* 'book', *tár* 'collection')

(b) *háztömb* 'block of houses' (*ház* 'house', *tömb* 'block')

We suggest that Shortening in (16) is due to irregular retention of the bracket before the suffixes *-ság/-ség*, *-i*, and perhaps a few others. Kiparsky (1983) suggests this device for dealing with certain bracketing paradoxes in English phonology.

2.2. Objections answered

Vago (1978) objects to the shortening analysis of Hetzron (1972) on various grounds. To the extent that these criticisms carry over to the present treatment, we give our reactions to his objections. One is his allegation that underlying forms with a long final low vowel are not natural, since the unmarked case is the citation form, which should underly the affixed forms. However, it is impossible to decide a priori which forms are more marked. In a survey of Hungarian noun inflections, Jensen–Stong-Jensen (1988), we concluded that most alternating forms are derived from the oblique stems rather than from the uninflected stems. For example, alternations like *bokor* 'bush', acc. *bokrot* are derived from /bokr/ with epenthesis in both cases, rather than from /bokor/ with deletion in the inflected forms. In fact, Vago (1980) also analyzes the *bokor* class using epenthesis. Therefore, we are justified in choosing the oblique stem to underly length alternation if this yields the optimal analysis. Second, Vago argues from the Conditional suffix *-na/-ne/-ná/-né*, which he claims has an underlying front vowel by virtue of its invariable (irregular) front vowel form in the first person singular of indefinite verb forms, e.g. *hoznék* 'I would bring'. This suffix is otherwise quite regularly harmonic. If the underlying form were /-né/, Vago argues that this would be backed to *-nÁ* following back-vowel verb stems, which would then return to *-né* by the rule of absolute neutralization, giving **hoznėm* from /hoz+né+m/ instead of *hoznám* 'I would bring it'. This argument is not convincing. The alternation between *a* and *e* suggests that this suffix has an underlying low vowel (cf. the harmonic behaviour of *-ság/-ség* discussed above), but does not argue for its underlying length. In Vago's fully specified framework, this suffix could be derived from /-næ:/, with a long low front vowel. In our underspecified framework, it is represented much like *fa* in (10a), with a vowel specified only as [+low]. Vowel harmony and default rules determine the remaining features.[3]

[3] We suggest that invariant *-né-* in the first person singular indefinite has a mid vowel (marked only [−round]); this is a neutral vowel which has no back counterpart. In the definite paradigm, the conditional suffix does not alternate in length, so that the third person singular is *-ná*, *-né* (*hozná* 'he would bring it'). Compare the third person singular indefinite conditional *hozna*. We can represent the definite conditional suffix as prelinked in underlying form, like *csá* (19).

Vago's third objection concerns the existence of exceptional forms that end phonetically in long low vowels. Hetzron (1972) assumed that words with final *á* and *é* have an underlying triple length, and that all word final low vowels are shortened by one mora by a general rule. There is no independent motivation for triple length vowels in Hungarian. However, we do not have to resort to massive exception marking. The forms in final *é* (e.g. *tévé* 'television') can be assumed to have final long mid vowels (not low), which are not subject to shortening. There are only twenty items in final *á*, many of an affective nature or interjections (e.g. *dádá* 'spanking', *csá* 'to the right (for oxen)', *á* 'the letter a' (pronounced [ɒ:]). We can assume that these are represented as prelinked in underlying forms, as in (19). Shortening I is inapplicable, since it deletes only a circled X node.

(19) X X X
cs á

To conclude this section, we have shown that the length alternation in stems ending in a low vowel can be captured in an analysis that exploits the possibility of marking X slots immune to linking in underlying forms. The long variant is derived by spreading the vowel melody to the circled X; the shortened variant is derived by deleting the circled X under appropriate conditions. The ordering of all required rules is determined by universal principles.[4]

3. Length alternations stem internally

About 70 noun stems have a long vowel in the stem when uninflected and in certain inflected forms and a short vowel in other inflected forms. These stems always have a single stem-final consonant after the alternating vowel and always take a low linking vowel. The paradigms of *nyár* 'summer', *tűz* 'fire', *ín* 'tendon', and *úr* 'gentleman' are typical of this class.

[4] Low Vowel Lengthening generalizes without exception to borrowings in Hungarian, e.g. *opera*, *operát* (acc.) 'opera', *forte*, *fortét* (acc.) 'forte'. László Kálmán has suggested to us in discussion that this might argue for a lengthening analysis, with an exceptionless lengthening rule. However, the facts also support our shortening analysis, with the underlying representation given for *fa* (10a) extended to all low-vowel-final stems by means of a general constraint on underlying representations.

(20)

nom.	acc.	pl.	iness.	illative	
nyár	*nyarat*	*nyarak*	*nyárban*	*nyárba*	'summer'
tűz	*tüzet*	*tüzek*	*tűzben*	*tűzbe*	'fire'
ín	*inat*	*inak*	*ínban*	*ínba*	'tendon'
úr	*urat*	*urak*	*úrban*	*úrba*	'gentleman'

This length alternation occurs in some morphemes of this phonological shape but not in others, as shown by the (near) minimal pair provided by *gyár* 'factory,' whose stem vowel is always long, as shown in (21).

(21)

nom.	acc.	pl.	iness.	illative
gyár	*gyárat*	*gyárak*	*gyárban*	*gyárba*
	**gyarat*	**gyarak*		

We suggest that *nyár* and *gyár* differ minimally in their underlying representations. Recall our proposal that long vowels are derived from forms having two X slots, one of which is circled in the underlying representation, representing it immune to the UAC. We suggest that *nyár* and *gyár* differ precisely in where this circled X occurs, as in (22).

(22) (a)   X X X X   (b)   X X X X

gy a r A   ny a r A

The capital A at the end of the forms in (22) represents a floating feature [+low], which appears at the end of all stems that require a low linking vowel before accusative *-t* and plural *-kA*, which itself ends in a floating [+low]. This feature is floating because there is no X slot for it to link to. This is only accidentally related to the fact that both stems in (22) contain a circled X, since stems with short vowels can contain floating features as well, as in *fal* 'wall' and the plural suffix *-k* (23a), whose underlying representations are shown in (23b) and (23c).

(23) (a)

nom.	acc.	pl.	iness.	illative	
fal	*falat*	*falak*	*falban*	*falba*	'wall'

(b) $\begin{array}{cccc} X & X & X & \\ & & & \\ f & a & l & A \end{array}$ (c) $\begin{array}{cc} X & \\ & \\ k & A \end{array}$

'wall' (plural)

Hungarian has a rule of Epenthesis that inserts an X slot before a consonant that cannot otherwise be syllabified. This epenthetic slot is realized as a mid vowel in the absence of any floating feature, as shown by a regular stem like *bál* (7), whose plural is *bálok*.[5] When a floating feature is present, an epenthetic X slot links to it; in fact, this is the only way a floating feature can be realized. This is the case of the accusative of both *nyár* and *gyár*, shown in (24) at an intermediate stage of derivation.

(24) (a)
$$\left[\left[\begin{array}{ccccc} X & \textcircled{X} & X & X & \\ | & & / & | & \\ gy & & a & r & A \end{array}\right] \begin{array}{cc} X & X \\ & | \\ & t \end{array}\right]$$

(b)
$$\left[\left[\begin{array}{ccccc} X & X & \textcircled{X} & X & \\ | & \backslash & & | & \\ ny & & a & r & A \end{array}\right] \begin{array}{cc} X & X \\ & | \\ & t \end{array}\right]$$

The *-t* (accusative) cannot be syllabified, and so an X slot is epenthesized before it. At this stage we must delete the circled X in *nyarat* but not in *gyárat*. Postcyclic Shortening I is inapplicable in both cases. Postcyclically the required bracket is absent due to Bracket Erasure and in neither case is the circled X adjacent to a linked [+low] before a bracket. We need a different rule for these cases, which we give as (25).

(25) Shortening II (cyclic)
$$\textcircled{X} \rightarrow \emptyset \ / \ \_\_\ C \begin{array}{c} X \\ | \\ [+\mathrm{low}] \end{array}$$

We must stipulate that this rule is cyclic, or equivalently, that it turns off at the end of the cyclic component. Shortening II is inapplicable in *gyárat*. The linked [+low] immediately following $\textcircled{X}$ cannot trigger the rule because of the SCC

[5] We have not yet resolved the ambiguity in the underlying representation of *bál*, which could be either (7a) or (7b), since neither of our Shortening rules can apply to it, because its linking vowel is mid and both Shortening rules require a linked feature [+low]. We take the underlying form of *bál* to be (7a) on the analogy of *gyár*.

and the linked [+low] preceding accusative *-t* cannot trigger the rule because the statement of the rule does not allow an intervening vowel. Therefore, FVS applies to derive *gyárat*. In (24b), on the other hand, Shortening II can apply, producing *nyarat*. Now consider the illative forms, which appear to present a problem in that the suffix ends in a low vowel. At the relevant stage of the derivation, we find the forms in (26).

(26) (a)
$$\left[\left[\begin{array}{ccccc} X & X & X & X & \\ | & & | & | & \\ gy & & a & r & A \end{array}\right] \begin{array}{cc} X & X \\ | & | \\ b & a \end{array}\right]$$

(b)
$$\left[\left[\begin{array}{ccccc} X & X & X & X & \\ | & | & & | & \\ ny & a & & r & A \end{array}\right]' \begin{array}{cc} X & X \\ | & | \\ b & a \end{array}\right]$$

Because the suffix *-ba* itself forms a syllable, there is no Epenthesis, and consequently the floating [+low] is not realized. The unlinked [+low] cannot trigger Shortening II, but it prevents shortening being triggered by the final linked [+low] of *-ba* because the rule permits an intervening consonant only. Consequently, FVS correctly derives *gyárba* and *nyárba*. Likewise, in the nominative, the floating [+low] cannot trigger shortening, and we derive *gyár* and *nyár*.

4. Conclusion

We have analyzed two cases of vowel length alternation in Hungarian in terms of an autosegmental theory that allows certain skeletal slots to be designated as floating (circled). We require two Shortening rules that delete circled X slots under certain conditions. The floating X is otherwise joined to an adjacent vowel melody linked to an X, producing a long vowel. The interest in this analysis lies in the fact that it links the length alternation in words like *nyár* to the fact that all these words take low linking vowels, which previous analyses were unable to do. In our analysis the low linking vowel is represented as a stem-final floating feature [+low], which is realized only if a skeletal slot is inserted to support it. Given underspecification, a mid linking vowel has no underlying representation. If there is no floating feature present, an inserted X slot is realized as a mid vowel, whose other features (specifically backness and roundness) are determined by Vowel Harmony. The features of a mid vowel ([–high, –low]) are inserted by redundancy rules only very late in the phonology. It follows that there could not be a Shortening rule conditioned by a linked mid vowel. Thus we explain the limitation of this alternation to stems that require low linking vowels. No such explanation is available in linear analyses. Vago (1980), for example, analyzes the vowel length alternation in the *nyár* class by means of a inor rule that lengthens vowel in the context $\_\_\ \mathrm{(C)\ C} + \left\{ \begin{matrix} \# \\ \mathrm{C} \end{matrix} \right\}$. To capture the limitation to stems that take low linking vowels, Vago assumes "that stems which participate in the vocalic length alternation are marked as [+MIN–LOW]" (p. 122). Minor Lowering (MIN-LOW) is Vago's rule that lowers the epenthetic mid vowel following stems requiring a low linking vowel. This can presumably be done by a redundancy rule that says that any stem that is marked plus for Minor Lengthening is also marked plus for Minor Lowering. But this does not constitute an explanation. The grammar would be more highly valued if the redundancy rule did not exist, predicting the possibility of length alternations in stems that take mid linking vowels. Our analysis, on the other hand, correctly predicts that such stems do not exist.

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MONOTONICITY IN PHONOLOGY

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0. Introduction

In this paper I shall present, argue for, and draw some conclusions from the principle of **monotonicity** as applied to phonology. The principle of **derivational monotonicity** states that rules can only add information to their input. As we shall see, this principle only makes sense in conjunction with the principle of **interpretational monotonicity**, which states that increasing the information content of a representation must lead to non-increasing classes of the objects represented. Although these principles belong to the core of several existing grammatical theories (cf. Sanders 1971; Anderson–Ewen 1987; Kaye *et al.* 1985; Pereira–Shieber 1984 etc.), the considerations discussed in this paper will be independent from the details of those theories.

In Section **1**, I define the concepts of derivational and interpretational monotonicity and I mention some of the ideas that may have led people to adopt them. In Section **2**, I examine a phenomenon related to vowel harmony and 'transparent' vowels. Vowel harmony is usually treated in derivationally monotonic ways, i.e., by feature-specifying rather than feature-changing rules. There is, however, a notorious counter-example, namely, Montañés Spanish height harmony, which is usually considered to involve a feature-changing rule. I shall re-examine this rule and propose a derivationally monotonic solution. Finally, in Section **3**, I shall argue that a wide range of phenomena, exemplified by fast-speech rules, which apparently violate the principle of derivational monotonicity because of their inherently 'destructive' character, actually provide excellent evidence in favour of, rather than against, derivationally monotonic grammars.

1. Monotonicity principles

In what follows, I shall state two principles of monotonicity. These principles, if one adopts them, constrain the range of possible grammars to a considerable extent. Given their essentially restrictive character and the vastness of the

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literature supporting them, the burden of argument is on their opponents. Therefore, the present paper does not go into the details of why just these monotonicity principles should be imposed on grammars of human languages.

The principle of **derivational monotonicity** states that rules can only add information to their input:

(1) A grammar is **derivationally monotonic** iff for any pair r_1, r_2 of representations such that r_2 can be derived from r_1 by some rule of the grammar, the information content of r_2 includes the information content of r_1.

Note that this formulation is independent of what the interpretation of a rule of the grammar is. That is, derivational monotonicity can be implemented irrespective of whether we conceive of rules as generative rules, rules of inference, processes, etc. It can be shown easily that the principle of derivational monotonicity would be completely vacuous if we did not adopt another monotonicity principle, namely, that of **interpretational monotonicity:**

(2) A system is **interpretationally monotonic** iff for any pair r_1, r_2 of representations in the system such that the information content of r_2 includes the information content of r_1, the class of objects represented by r_1 includes the class of objects represented by r_2.

To our knowledge, interpretational monotonicity is a requirement that any sound system relying on representations has to meet. Intuitively, this principle rules out systems in which, say, the class of objects represented by the term 'democrats' can be a proper subset of the class of objects represented by the term 'blue-eyed democrats'. In model theoretic semantics, if r_2 is a set of first-order formulae that includes another set r_1 of first-order formulae, then the class of possible worlds represented by r_2 must be included in the class of possible worlds represented by r_1. For an example in phonology, the class of objects represented by the description [VOICED OBSTRUENT] must be a subset of the class of objects represented as [VOICED].

In what follows, I shall briefly review two types of motivation for adopting the principle of derivational monotonicity in addition to the principle of interpretational monotonicity.

The first type of motivation comes from the so-called **abstractness controversy** (cf., e.g., Kiparsky 1985). The problem of abstractness is, roughly, the following: Are there reasonable principles determining what the relationship of an underlying representation to the set of surface realisations of the same item can be? May it contain 'abstract' segments that can be mapped to an arbitrary set of surface segments? What counts as arbitrary from this point of view? What are the criteria to decide whether a segment or configuration is 'abstract'? Obviously, the principle of derivational monotonicity in (1) directly answers these questions. In the literature of phonology, Anderson–Ewen 1987, among others, suggest the same answer. In terms of Anderson 1986, they claim that the only kind of abstract representation that is desirable in phonology is one that differs from the corresponding surface or near-surface representation in only lacking some information furnished by the subsequent derivation. That is, abstractness is essentially equivalent to underspecification. They state that, in a derivation, rules effecting 'addition, increase of specification', are to be preferred to 'mutative' rules.

If we compare the solution of the abstractness problem offered by derivational monotonicity with the solution of Kiparsky's (1985) theory called Lexical Phonology, we observe that the latter is less restrictive in terms of what phonological rules can do. Moreover, the constraints on abstractness inherent in Kiparsky's model, which could follow from a stronger, derivationally monotonic, model, are due to a conspiracy of several unrelated principles and assumptions on the overall structure of phonological theory (e.g., Strict Cycle Condition, Structure Preservation and Elsewhere Condition; the Strict Cycle Condition may follow from the Elsewhere Condition and the concept of lexical identity rules).

The other type of motivation can be found in Sanders (1971). He stipulates that, in derivations involving productive rules, the representation must monotonously grow into a fully specified phonetic representation (when generating) or into a fully specified semantic representation (when parsing). At the same time, semantic information must diminish in a monotonous manner during generation, whereas phonetic material must vanish in a monotonous manner during parsing. That is, strictly speaking, Sanders' theory is not derivationally monotonic. But the leading idea can also be used to motivate derivationally monotonic systems. This idea is that derivations must lead from underlying to surface forms in the straightest possible way. That is, an entirely unknown system with rules that mediate between two known levels of representation (e.g., between meaning and form in either direction) can be reconstructed in the simplest way (when acquiring or describing the rule system) if we assume that each rule actually gets us closer to the aim of the derivation (e.g., to a semantic or a phonetic representation, depending on the direction chosen) by making one step in the desired direction.

Let me mention two more facts about derivationally monotonic theories here. First, although most principal features of Lexical Phonology which I mentioned earlier follow from the principle of derivational monotonicity, some version of Kiparsky's (1982). Elsewhere Condition (cf. also Sanders 1971, Kiparsky 1973, Koutsoudas *et al.* 1974) is to be assumed in derivationally monotonic theories as well. The Elsewhere Condition states that special rules override general rules if their outputs would conflict. That is, if rule R_g applies to a class of representations C_g and rule R_s applies to a smaller set of representations $C_s \subset C_g$ then in each case when the result of applying R_g to a representation $r \in C_s$ would conflict with the result of applying R_s, to r, then R_s, rather than R_g is to be applied. As far as I know, this principle does not follow from the monotonicity principles. Second, there can be no rule ordering in a derivationally monotonic system. Since adding pieces of information to a representation is a commutative and associative operation, rule ordering will always be vacuous if the grammar is derivationally monotonic.

2. Pasiego Montañés vowel harmony

Harmony phenomena are usually described using feature-specifying (spreading) rules. That is, harmonising segments are represented as unspecified for the agent of harmony, which is a segment specified for that feature. The height harmony of the Pasiego dialect of Montañés (Santander) Spanish, as described in McCarthy (1984), is an apparent counter-example in that it seems to involve a feature-changing rule. In this section, I shall briefly review the critical data of Pasiego and McCarthy's analysis. I shall examine the reanalysis of Spencer (1986), which seems to have considerable advantages over McCarthy's, but still relies on a feature-changing height harmony rule. Spencer's solution, however, allows for a re-reanalysis in terms of derivationally monotonic rules.

The Pasiego vowel system consists of nine vowels. Among the five tense vowels /a, e, i, o, u/, four have [–tense] counterparts, namely, /A, I, O, U/. Pasiego exhibits a height harmony phenomenon: the vowels of a phonological word (except final unstressed vowels) agree in height with the stressed vowel:

/beb+ís/	[bibís]	'drink 2Pl'
/sint+émus/	[sentémus]	'feel 1Pl'

The fact that the underlying stems of the above forms are indeed /beb, sint/ can be shown easily, since /a, A/ do not trigger height harmony:

/beb+ámus/	[bebámus]	'drink 1Pl'
/sint+áis/	[sintáis]	'feel 2Pl'

/a, A/ do not undergo height harmony, either:

/sal+ís/	[salís]	'leave 2Pl'
/sal+émus/	[salémus]	'leave 1Pl'

As in many other cases when a vowel neither triggers nor undergoes harmony, /a, A/ are 'transparent' for height harmony in Pasiego:

/po la káλe/	[po la káλe]	'down the street'
/po l kamínU/	[pU l kAmInU]	'along the path'

The last example also shows that another harmony process, lax harmony, operates in Pasiego. Lax harmony laxes all vowels in a phonological word containing a lax vowel (in the above example, underlying lax /U/ is due to a morphological rule affecting singular count nouns), but /e/ does not undergo or block this:

/ermánU/	[ermÁnU]	'brother'
/komfesonárjU/	[kOmfesOnÁrjU)]	'confessional'

Finally, stressed mid vowels are raised in lax words in Pasiego. This is shown by pairs like *flóxu* 'limp (mass)' vs. *flÚxU* 'limp (count)' or *konéxus* 'rabbits' vs. *kUnÍxU* 'rabbit (count)'.

There are two main problems inherent in the above data. First, height harmony seems feature changing, for it both raises /beb/ 'drink' to [bib] and lowers /sint/ 'feel' to [sent]. That is, a height harmony rule like McCarthy's (1984) is simply unavailable in a derivationally monotonic theory:

(3) [high] Harmony (McCarthy)

$$\text{[high]} \longrightarrow \phi \ \% \quad \underset{\text{[-str]}}{\underset{|}{\_\_}} \quad \underset{\text{[+str]}}{\underset{|}{\text{[high]}}}$$

This rule destroys the height specification of the unstressed vowels; the only remaining height value, i.e. the one that belongs to the stressed vowel, will automatically spread in due course.

Second, although lax harmony appears to be perfectly monotonic in that it specifies as [–tense] those segments which lack this information, the spreading of [–tense] (which is taken to be automatic by McCarthy) seems to somehow 'skip' /e/, while the raising rule can still tell an /e/ which is in a lax word from those which are not. McCarthy solves this problem by assuming that /e/ is actually laxed by lax harmony, and then it is re-tensed after the intervening raising rule. Height harmony must be ordered after raising, since an underlying /e/ that gets raised in a lax word triggers high harmony (cf. *kUnÍxU*, not **kOnÍxU*). In sum, the relevant part of McCarthy's rule system is the following (the rules are to be applied in this order):

(4) Raising (McCarthy)

$$\begin{array}{lcl} [\text{high}] & \longrightarrow & [+\text{high}] \\ \mid & & \\ [+\text{str}] & & \\ \mid & & \\ [-\text{tns}] & & \end{array}$$

(3) [high] Harmony (McCarthy)

$$\begin{array}{lllcc} [\text{high}] & \longrightarrow & \phi\ \% & \underline{\quad} & [\text{high}] \\ & & & \mid & \mid \\ & & & [-\text{str}] & [+\text{str}] \end{array}$$

(5) *e*-Fisson (McCarthy)

$$\begin{array}{l} [-\text{tns}] \\ \ddagger \\ [-\text{back}] \\ \mid \\ [-\text{high}] \end{array}$$

(6) Default (McCarthy)

$$\begin{array}{llcc} \phi \longrightarrow & [+\text{T}] & / & \underline{\quad} \\ & & & \text{x} \\ & & & \text{V} \end{array}$$

e-Fission delinks the specification [–tns] from the intermediate lax /e/, and Default assigns the value [+tns] to it as to those vowels which have not undergone lax harmony at all.

Spencer (1986) modifies McCarthy's rules using a theory of autosegmental phonology that allows to treat vowel harmony rules as assigning a feature value to an entire tier within a given domain. All P-bearing units within such a domain share the value specified on the tier in vowel harmony (although, in principle, different segments can be linked to different autosegments on the same tier in other cases). For example, the Pasiego height harmony rule that he posits assigns the segmental height value of the stressed vowel to the entire height tier within the phonological word domain, which means that all the vowels within that domain will agree with the stressed vowel in their autosegmental height value. As is clear from (7) below, this rule is feature-changing, i.e. it is not available in a derivationally monotonic theory:

(7) [high] Harmony (Spencer)

$$[[_{\beta H}\ ]] \longrightarrow [[_{\alpha H}\ ]] \quad / \quad \begin{array}{c} [\alpha H] \\ | \\ [+\mathrm{str}] \end{array}$$

Here the double brackets enclose an autosegmental tier associated with a domain. The rule expresses that the domain of the autosegmental tier of height which belongs to a word with some segmental specification [αH] will be marked as αH.

In Spencer's analysis, /a, A/ are specified as [–high] on the segmental tier and therefore cannot be linked to the height tier at which height harmony takes place. That is, the fact that /a, A/ are non-P-bearers for height harmony is expressed by their not being linked to the autosegmental height tier. Similarly, /e/ is segmentally [+tense]. Therefore, it cannot be linked to the autosegmental tenseness tier, and is immune to tense harmony (cf. (8) below) for that matter:

(8) Tense Harmony (Spencer)

$$[[_{o T}\ ]] \longrightarrow [[_{-T}\ ]] \quad / \quad \begin{array}{c} [-T] \\ | \\ [+u\#] \end{array}$$

Although Spencer's machinery is not derivationally monotonic, it deserves our attention for several reasons. First, his rules need not be ordered except that raising may have to apply twice if it is not extrinsically ordered before height harmony, which it feeds:

(9) Raising (Spencer)

$$\begin{array}{ccccc}
[[_{\text{H}}\ ]] & \longrightarrow & [[_{\text{H}}\ +\ ]] & / & __ \\
| & & | & & | \\
\text{V} & & \text{V} & & [+\text{str}] \\
 & & & & | \\
 & & & & [[\ _{-\text{T}}\ ]]
\end{array}$$

(Since Raising is not a vowel harmony process, it is irrelevant whether the $[[_{\text{H}}\ ]]$ domain has an overall value specification. This is why the vowel on the right-hand side is allowed to be assigned a + value irrespective of the other segments in the domain.)

If the stressed vowel is mid, then the structural description of the height harmony rule is met, and all P-bearers will become mid before the application of raising, but all those mid vowels are to be raised further after the stressed vowel becomes high by the raising rule. Spencer (1986) suggests that height harmony should be prevented from applying twice either by extrinsic rule ordering or by some general principle that intrinsically orders certain types of rules. In a derivationally monotonic theory, neither possibility is available. On the other hand, for the very same reason, i.e., because of the absence of the concept of rule application order, the problem of 'double application' is non-existent in a derivationally monotonic theory.

Note that (9) (Spencer's (22), p. 15) is probably misprinted, since it requires that the stressed vowel be linked to a [−T] domain, though /e/, which it should apply to, is not. Under standard assumptions on rule notation, the association line in question should be marked as optional. This complication suggests that the distinction between segments falling within an autosegmental domain and segments linked to an autosegmental tier may be dispensed with. In fact, these two binary choices together with the possibility of the segment's being specified for the feature that characterises the tier in question should yield eight possible cases, four of which are actually impossible. (Among the eight possible choices, two are excluded because a segment cannot be linked to a tier if it does not fall within its domain. Two more cases can be eliminated under the assumption that a segment that falls within a certain domain is linked to that tier if and only if it is not specified for the feature represented by the tier.) The same four different cases can be expressed if we discard the opposition between linked and unlinked segments within autosegmental domains.

If we allow for segments that are segmentally specified for certain features but may be linked to autosegmental tiers specifying a conflicting value of the same feature, then we have to rely on phonetic implementation rules which will interpret the output of phonological derivations correctly. In particular, the phonetic implementation module of Pasiego has to decide that a segment which is segmentally [+tense] is to be interpreted as [+tense] irrespective of the tenseness of the word domain in which it occurs. Similarly, /a,A/ are segmentally [-high] and are to be implemented as low vowels irrespective of the height domain in which they occur.

Interestingly enough, the approach proposed above offers a way to state Spencer's rules in a derivationally monotonic format. Notice that the assumption that segments are linked to an autosegmental tier if and only if they are not specified for the feature that characterises the tier would correspond to the assumption that, during phonetic implementation, segmental specifications always override autosegmental ones. I propose to drop this assumption. Instead, let me assume that the language specific phonetic implementation module of Pasiego contains rules to interpret complex configurations such as tense /e/ falling within a lax autosegmental domain or low /a,A/ occurring in a mid or high domain:

(10) Phonetic Implementation of Tenseness

(i) Interpret *e* as tense; (ii) otherwise, interpret α as lax iff it falls within a lax autosegmental domain.

(11) Phonetic Implementation of Height

(i) Interpret segmentally low vowels as low; (ii) otherwise, if α falls within an autosegmental domain of height, interpret it in terms of that domain; (iii) otherwise, interpret α in terms of its segmental height specification.

There are three kinds of argument that can be made in favour of the above proposal. First, there may be particular cases in which the segmental specification of a segment for a certain feature does not override its autosegmental specification in phonetic implementation. For example, a notorious issue in Hungarian FRONT/BACK harmony may be due to such an effect. As is well-known, most Hungarian suffixes which have FRONT and BACK alternants (e.g., *-nak/-nek* 'dative') occur as independent roots. In those cases, they seem to be underlyingly specified for FRONT/BACK, for they trigger either FRONT or BACK harmony (for example, the dative suffix is front when used as a root: *nekem* 'to me', not **nakam*). That is, the segmental specification of the suffix vowel FRONT in the case of *-nak/-nek*) can be overridden by the autosegmental specification determined by the root.

Second, the need for a phonetic implementation module, in general, and rules to phonetically interpret complex phonological configurations, in particular, seem to be necessary for independent reasons (cf. also Liberman–Pierrehumbert 1984; Clements 1981). One of the most convincing examples is the rule that interprets a floating low tone as a downstep in certain tone languages.

Third, the assumption that phonetic implementation modules are language specific offers a definitive solution to the problem of default rules without any stipulation imposed on their ordering. Note that this is absolutely necessary in a derivationally monotonic theory because of the impossibility of ordering. Under this hypothesis, phonetic implementation modules are free to assign default values to unspecified features that are crucial for the phonetic realisation of a 'surface phonological' representation in the same way as they assign phonologically non-distinctive features if so needed.

Let me now state the three rules of a derivationally monotonic description of Pasiego:

(12) Lax Harmony

$$\phi \longrightarrow [[_{[\text{LAX}]}\ ]]_{\text{word}} \quad / \quad \underset{[\text{LAX}]}{\text{V}}$$

Lax Harmony creates a $[[_{[\text{LAX}]}\ ]]$ autosegmental domain over a (phonological) word if there is a segmentally [LAX] vowel within the word.

(13) Height Harmony

$$\phi \longrightarrow [[_{[\text{MID }\alpha]}\ ]]_{\text{word}} \quad / \quad \underset{[\text{MID }\alpha]}{\overset{\overset{[\text{stress}]}{|}}{\text{V}}}$$

Here α can stand for HIGH or nothing; I use the simplex-feature notation of Sanders (1971) or Pereira and Shieber (1984). The fact that 'high' can be derived from 'mid' by adding a piece of information (namely, HIGH) follows from the existence of a Raising rule in Pasiego (see below) and the principle of derivational monotonicity. The Height Harmony rule says, 'if the stressed vowel is not low, then create a height domain which agrees with the segmental height specification of the stressed vowel'.

(14) Raising

$$\phi \longrightarrow [\textsc{high}] \;/\; [[_{[\textsc{lax}]} \quad \begin{array}{c} [\text{stress}] \\ | \\ \\ | \\ \text{V} \\ [\textsc{mid}\ \_\_] \end{array} \quad]]$$

The examples listed in the beginning of this section can be derived as follows.

	beb+ís		sint+émus		beb+ámus		sint+áis	
LH,HH,R	[[[MID HIGH]	]]	[[[MID]	]]				
PIT (i)	e			é	e			
(ii)		í	i	u		á u	i	ái
PIH (i)						á		á
(ii)	i	í	e	é				
(iii)				u	e	u	i	i
Output	bib	ís	sent	émus	beb	ámus	sint	áis

	sal +ís		sal + émus	
LH,HH,R	[[[MID HIGH]	]]	[[[MID]	]]
PIT (i)				é
(ii)	a	í	a	u
PIH (i)	a		a	
(ii)		í		é
(iii)				u
Output	sal	ís	sal	émus

	po	la	káλe		po	l	kamínU
LH,HH,R				[[[LAX]] [[[MID HIGH]]			í]]]
PIT (i)			e				
(ii)	o	a	á		O		A Í U
PIH (i)		a	á				A
(ii)					U		Í
(iii)	o		e				
Output	po	la	káλe		pU	l	kAmÍnU

	ermán +U	komfe so nárj +U
LH,HH,R	[[[LAX]]]	[[[LAX]]]
PIT (i)	e	e
(ii)	Á U	O O Á U
PIH (i)	Á	Á
(ii)		
(iii)	e U	O e O U
Output	ermÁn U	kOmfesOnÁrj U

	flóx+U	konéx+U
LH,HH,R	[[[LAX] [[[MID HIGH] ú]]]]	[[[LAX] [[[MID HIGH] í]]]]
PIT (i)		
(ii)	Ú U	O Í U
PIH (i)		
(ii)	Ú	U Í
(iii)	U	U
Output	flÚx U	kUnÍx U

3. Fast-speech deletion and derivational monotonicity

In this section I shall present two alternative approaches to fast-speech deletion rules. The first approach relies on feature-changing rules, so it must be discarded in terms of the derivational monotonicity principle. The second approach calls for two independent mechanisms, namely, a set of structure-building rules and a set of phonetic implementation rules. That is, the analysis that is in conformity with derivational monotonicity is more cumbersome. Nevertheless, I shall argue that the more complex analysis is to be preferred independently of the issue of derivational monotonicity.

Let me take as an example a fast-speech process of Hungarian. In frequent phrases like *Kossuth Lajos utca* 'K.L. Street', *Felszabadulás tér* 'F. Square' and *szakszervezet* 'trade union', the intervocalic voiced oral consonants and consonant clusters can disappear in fast speech (at least in my dialect):

Kossuth Lajos utca	/košut lajoš ut^s:a/	[košutɑšut^s:ɑ]
Felszabadulás tér	/felsabadula:š te:r/	[fɛ:sa:šte:r]
szakszervezet	/sakservezet/	[sɑksɛ:t]

There are many interesting processes at the level of fast (routine) speech in which the above forms appear, but most of them are irrelevant from the point of view of the present discussion. For example, weird things may happen to vowels, nasals and complex clusters. The forms quoted above are relatively pure examples of the single rule that I shall consider in the following. (With one exception, namely, the the first /l/ of *Felszabadulás tér* is often dropped (/fel/⟶[fɛ:-]) even in much more careful speech.)

In a derivationally non-monotonic framework, the rule accounting for the forms under scrutiny would be simple indeed: Delete intervocalic voiced oral consonants in fast speech. The rule system should guarantee that the output is resyllabified and assigned a novel metrical structure. The problem with this analysis is that it is somehow upside down: intuitively, speed directly affects the metrical built-up of utterances, and 'deletion' is a consequence of the coalescence of segmental material in certain syllable structures. As a matter of course, a rule system that builds metrical structure first and deletes segments afterwards would also be possible to fabricate in a theory that does not rely on derivational monotonicity. Moreover, under a derivationally non-monotonic approach, there is no independent formal reason why one should prefer the latter analysis, even though it seems intuitively more appealing than the former.

The Hungarian fast-speech phenomena mentioned earlier in this section provide strong evidence against the derivationally non-monotonic analysis. If Hungarian fast-speech deletion was a truly phonological process, then we would not expect the 'deleted' segments to influence the phonetic shape of the surrounding sounds in any way. In fact, all the participants of the phonology project at the Budapest Institute of Linguistics (whom I wish to thank for their comments on an earlier version of this paper) tell me that the actual speech sounds which appear in my examples (cf. the underlined symbols in [košutɑšut^{s}:ɑ], [fɛ:sa:šte:r] and [sɑksɛ:t]) are very peculiar and probably do not appear under any other circumstances.

Derivationally monotonic theories are clearly superior in that they both offer a unique way of approaching the fast-speech deletion problem and explain why the 'deleted' segments have certain phonetic effects. First, rules deleting segmental material cannot be formulated in a derivationally monotonic way, since deletion cannot be conceived of as adding information. Consequently, the only possible explanation of why certain segments are missing on the surface is that those segments are phonologically present, but the phonetic implementation module fails to interpret them. In the case of fast-speech deletion, this must be due to the metrical configurations in which those segments occur but which do not license them. The fact that certain phonological segments or features do not correspond to their usual counterparts in phonetic form does not contradict the derivational monotonicity principle, because what phonetic implementation does is to build a new level of representation in a derivationally monotonic way, by adding pieces of information to it.

As for the phonetic effects, a 'deletion' rule may consist in simply not interpreting certain segments, in which case, the information content of the phonetic representation will not increase, but this is not illicit. The actual rules involved in Hungarian fast-speech deletion (the details of which are of minor importance in this argument) are probably more complex than that. As far as the data are clear, part of the rule says that syllable domains are to be created from one voiceless consonant to the next. After properly assigning onset and coda functions, all the intervening material is relegated to nucleus domains. Phonetic interpretation must, then, ignore or 'vocalise' consonants which occur in the middle of a nucleus, since such a position does not license a normal consonant. In this process, the coalescence of vowels and vocalised consonants may give rise to extraordinary phonetic segments and sequences.

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PROSODIC PHONOLOGY IN HUNGARIAN*

ISTVÁN KENESEI–IRENE VOGEL

1. Introduction

As recent work in phonology has shown, in order to account for phonological rules that involve more than one word, it is necessary to have a theory of the interface between phonology and syntax. Simply stating that a particular rule applies across words does not work since the rule may apply across some words but not others. It is thus necessary to specify the domains within which specific rules may and may not apply. That these domains do not necessarily coincide with syntactic constituents has been amply demonstrated in such works as Clements (1978), Napoli–Nespor (1979), Rotenberg (1978), Selkirk (1978, 1984), Nespor–Vogel (1982, 1986) and Kaisse (1985). Instead, what is needed is a somewhat more complex theory of the interaction between the syntactic and phonological components of a grammar. Several such theories have been proposed in the last few years, in particular those advanced by Selkirk (1984), Kaisse (1985) and Nespor–Vogel (1986).

In this paper, we will examine two phonological phenomena of Hungarian that operate above the word level, a stress rule and a palatalization rule. Hungarian is particularly interesting in relation to the problem of the syntax-phonology interface since the proposals about this interface advanced thus far have all dealt primarily with configurational languages, while Hungarian, according to most accounts, is a nonconfigurational language. We will consider the two phonological rules in relation to three current analyses of Hungarian syntax, those of Horvath (1981, 1986), É. Kiss (1981, 1987a) and Kenesei (1984, 1986)/Marácz (1986), and demonstrate that none of the analyses provides appropriate constituents for delimiting the domains of application

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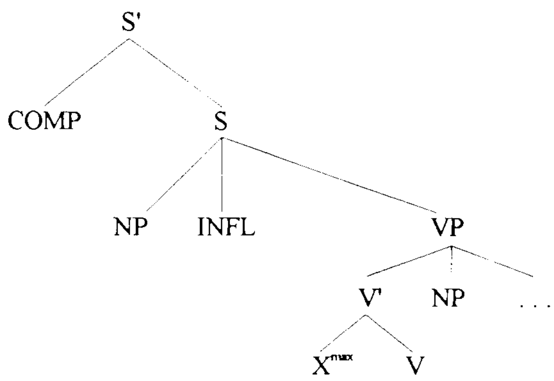
of the rules, a result that is not particularly surprising. We will then examine the rules in light of the three proposals for more complex interactions between syntax and phonology and show, perhaps more surprisingly, that as they stand, none of these works either. What we will propose, instead, is an even more complex type of interaction, one that not only involves syntax and phonology, but also directly includes semantics, in particular, certain aspects of logical form. Our analysis will, furthermore, lend support to the treatment of Hungarian as a nonconfigurational language.

2. Hungarian and the configurationality issue

Before we begin to investigate the interaction between phonology and syntax in Hungarian, we will outline the relevant aspects of the three competing proposals for the analysis of Hungarian syntax that will be considered below.

In the recent literature on Hungarian syntax, we find proposals both to the effect that Hungarian is a configurational language and to the effect that it is nonconfigurational. On the side of configurationality, we find Horvath's (1981, 1986) treatment. Concentrating on a single aspect of word order, focus phenomena, Horvath posits the following tree structure for Hungarian sentences:

(1)



In this structure, all complements, including the preverbal ones, are optional; X^{max} is a node that dominates a verbal prefix or some other preverbal complement, which may be 'locally postposed' freely. If another constituent is moved into the position vacated by a postposed verbal complement, it will receive focus interpretation. Thus, the neutral sentence in (2) can have the focused forms given in (3), where *le* is moved and its position is filled by another constituent.

(2) $[_S[_{NP}$ Mari$]$ $[_{VP}[_{V'}[_{PP}$ le$]$ $[_V$ tette$]]$ $[_{NP}$ az edényeket$]]]$
Mary down put the dishes-acc.
'Mary put the dishes down.'

(3) (a) $[_S[_{NP}\ e_i]$ $[_{VP}[_{V'}[_{V'}[_{NP_i}$ Mari$]$ $[_V$ tette$]]$ $[_{PP}$le$]]$ $[_{NP}$ az edényeket$]]]$
'It was Mary that put the dishes down.'

(b) $[_S[_{NP}$Mari$]$ $[_{VP}[_{V'}[_{V'}[_{NP_i}$ az edényeket$]$ $[_V$tette$]]$ $[_{PP}$ le$]]$ $[_{NP}\ e_i]]]$
'It was the dishes that Mary put down.'

In Horvath's model, focus status is optionally assigned in the preverbal position at S-structure, and the constituent involved is moved into the peripheral COMP position at Logical Form (LF), the result being that it will c-command its trace at the relevant level.[1]

Counter to Horvath's proposal, if we consider any of the grammatical properties that have been proposed for distinguishing between configurational languages (CLs) and nonconfigurational languages (NCLs), it turns out that Hungarian displays all of the characteristics associated with NCLs. Thus, for example, Hungarian, like Walpiri, Navaho, etc. has the following set of superficial properties discussed by Hale (1981, 1983, 1985): free word order, syntactically discontinuous expressions, extensive use of null anaphora (or pro-drop), lack of pleonastic elements, a rich case system and complex verb-words.

It has also been proposed that CLs differ from NCLs in relation to a parametrized form of the Projection Principle (cf. (4)), formulated by Hale as in (5).

(4) Projection Principle
Representations at each syntactic level (i.e., LF, D- and S-structure) are projected from the lexicon, in that they observe the subcategorization properties of lexical items. (Chomsky 1981, 29)

[1] Focus interpretation at LF is carried out by a rule of the following form:
(i) Given a representation of the form:
α $[_S \ldots x \ldots]$
[FOCUS]
where x is in the position of the FOCUS-marked constituent, and α stands for an arbitrary category, rewrite it as: $\alpha =$ the x such that $[_S \ldots x \ldots]$.
For a discussion of Horvath's movement rules and a proposal in the framework of GPSG, see Farkas (1986).

(5) Configurationality Parameter

(a) In configurational languages, the projection principle holds of the pair (LS, PS).

(b) In nonconfigurational languages, the projection principle holds of LS alone. (Hale 1983, 26)

Note that in (5) LS stands for lexical structure ("essentially an amalgam of the 'virtual structure' of Vergnaud–Zubizarreta (1982) and the 'logico-semantic structure' of Marantz (1981)", Hale 1983, 11); PS stands for phrase structure.

In a different approach, Jelinek (1984) claims that at least in some NCLs elements in the inflectional morphology (verbal affixes or AUX clitics) are in fact clausal arguments and are coindexed with freely occurring nominals for coreference. To account for this, Jelinek (1986) proposes a different typological parameter:

(6) Argument Type Parameter (ATP)

(a) In Pronominal Argument languages, only pronominal (and anaphoric) clitics and affixes are arguments.

(b) In Lexical Argument languages, lexical items serve as arguments.

The ATP, while providing for free constituent order, can rescue the projection principle in its original form.

The best known nonconfigurational proposal for Hungarian syntax is that advanced by É. Kiss (1981, 1987a) who offers the following set of rules, where 'X^{n^*}' stands for any number of maximal major categories:

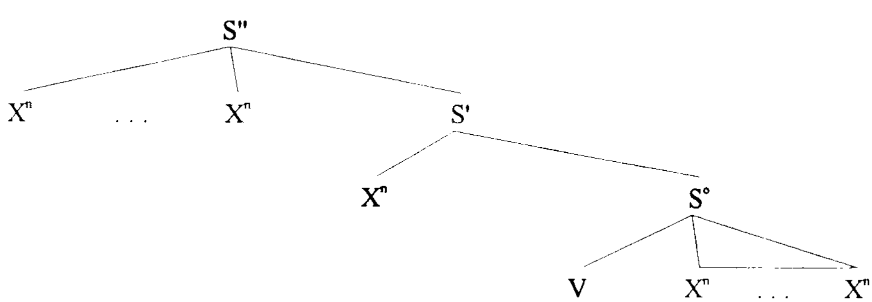
(7) (a) $S'' \longrightarrow X^{n^*}\ S'$

(b) $S' \longrightarrow X^{n}\ S^{o}$

(c) $S^{o} \longrightarrow V\ X^{n^*}$

The resulting trees, which have the form in (8), are subject to the operation of rules of the move-α type, which in effect move constituents from S^{o} into positions in S' (focus) and S" (topic).

(8)



By virtue of an obligatory rule, the X^n immediately dominated by S' (i.e. focus) will receive primary stress.

The sentences in (2) and (3) will thus, according to É. Kiss, be derived from (9a) by the optional application of the rules of Focusing and Topicalization, yielding (9b, c, d).

(9) (a) $[_{S''}$ *e*$[_{S'}$ *e*$[_{S^o}$ tette le Mari az edényeket]]]
put down Mary the dishes-acc.

(b) $[_{S''}$ Mari$_i[_{S'}$ le$_j[_{S^o}$ tette e_j e_i az edényeket]]]
'Mary put down the dishes.'

(c) $[_{S''}$ *e*$[_{S'}$ Mari$_i[_{S^o}$ tette le e_i az edényeket]]]
'It was Mary that put down the dishes.'

(d) $[_{S''}$ Mari$_i[_{S'}$ az edényeket$_j[_{S^o}$ tette le e_i e_j]]]
'It was the dishes that Mary put down.'

By implication, focus interpretation is carried out at LF, since any constituent under the preverbal S' position is assigned focus status.

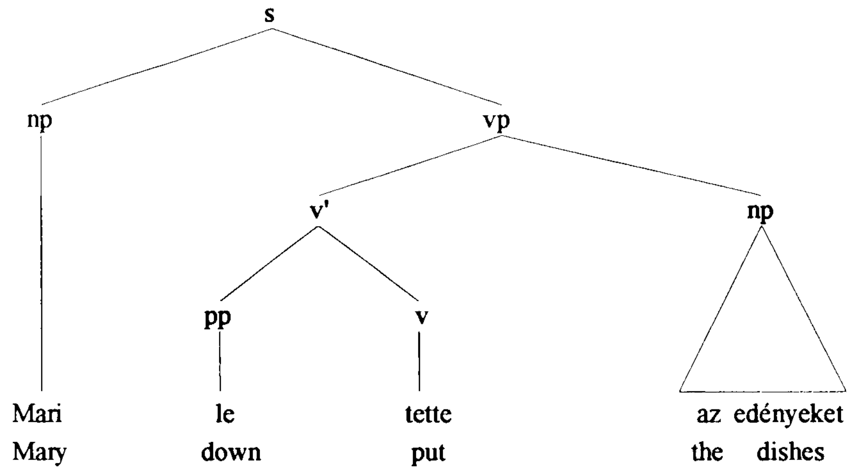
The third analysis we will consider, based on work mainly by Marácz and Kenesei, arose out of the need to account for both subject-object asymmetries, such as are found in reflexive binding, and the arguments for a VP-less S-structure, e.g. those stemming from pronominal non-coreference, the lack of rules involving VP and of ECP effects in subject position (cf. É. Kiss 1987b; Kenesei 1984, 1986; Marácz 1986).

The Kenesei/Marácz proposal can be accommodated in various analyses proposed for non-configurational languages. For example, Hale argues that "argument positions in LS are fully identified [...] and suffice to discharge the theta roles associated with the verb as required by the projection principle" (Hale 1985, 5). It may then be the case that the NPs at the PS level are not arguments, i.e., the PS of NCLs contains only non-A positions which are related to LS A-positions by some device. If, in a NCL, a module of grammar makes reference to argument positions it will have to look at LS, and if it refers to non-A positions, it will have PS as its domain. The data from Hungarian also support Mohanan's (1983, 113) conclusion (wherever applicable) that "reflexive binding, disjoint reference, control, case-assignment and NP-movement belong to Lexical structure, while pronominal non-coreference, wh-movement and quantifier scope belong to Configurational structure [Hale's phrase structure]."[2]

[2] The condition on applicability concerns, for example, NP-movement, a nonexistent operation in Hungarian.

The examples used above to illustrate Horvath's and É. Kiss's proposals would have the LS and PS representations in (10) and (11a–c), respectively, according to the Kenesei/Marácz analysis.

(10)



(11) (a) [$_{S}$[$_{NP}$ Mari] [$_{V'}$[$_{PP}$ le] [$_{V}$ tette]] [$_{NP}$ az edényeket]]
'Mary put the dishes down.'

(b) [$_{S}$[$_{NP}$ Mari] [$_{V'}$[$_{V}$ tette]] [$_{PP}$ le] [$_{NP}$az edényeket]]
'It was Mary that put the dishes down.'

(c) [$_{S}$[$_{NP}$ Mari] [$_{NP}$az edényeket] [$_{V'}$[$_{V}$ tette]] [$_{PP}$ le]]
'It was the dishes that Mary put down.'

One way to assign focus in the Kenesei/Marácz system would be to assume that in the derivation of S-structure some rule like Culicover–Rochemont's (1983) Strong Assignment optionally marks the constituent in front of the verb for primary stress, which will be interpreted for focus function at LF. Alternatively, as we will suggest below, LF can be allowed to interpret the structures for operator status and scope and feed this information into the Phonetic Form (PF) component for stress assignment and other phonological rules.

3. The data: stress and *l*-palatalization

Now that we have examined the basic syntactic structure of Hungarian sentences, we will proceed in this section to provide the phonological facts that are relevant for the specific proposal we will advance regarding the syntax-phonology interface in Hungarian, and perhaps in nonconfigurational languages in general. We will first examine the phenomenon of stress, and in particular a rule of Stress Reduction (SR), sometimes referred to as a stress eradication rule. This is the only phonological rule of Hungarian operating above the word that has received significant attention in the Hungarian linguistic literature. The second rule we will examine is *l*-palatalization (LP), a rule that is typically mentioned in traditional discussions of Hungarian in relation to its application within words. Sometimes it is mentioned that the rule may apply across words as well (cf. among others, Vago 1980), but this phenomenon has not previously been examined systematically. Our discussion of these rules is based on their application in standard Budapest Hungarian as spoken by educated speakers. They are both observed in colloquial speech produced at a tempo that is neither particularly slow nor particularly fast, it should be noted, however, that SR applies independently of style and rate of speech.

3.1. Stress

As is well known, Hungarian has word and phrase initial stress. This can be seen in the following minimal pair from Hetzron (1980), where 'M' and 'L' indicate mid and low degrees of stress, respectively.

(12) (a) ^{M}Chomsky ^{M}professzor
'Chomsky is a professor.'

(b) ^{M}Chomsky ^{L}professzor
'Professor Chomsky'

As far as stress in sentences is concerned, some linguists (e.g. Varga 1983) claim that, at the phonetic level, there are three degrees: primary ('), secondary (ˌ), and non-stress (unmarked). Others (e.g. Kálmán 1985) believe that there are only two: presence (') and absence of stress (unmarked), and moreover, the perception of primary stress does not necessarily mean that the syllable in question has received more stress. It may gain its relative prominence as a result of the loss of stress on the following phonological word, defined as the entire string following the stress up to, but not including, the point at which there is another strong stress, or the end of the sentence.

Thus, a neutral sentence will have identical stress patterns in Varga's and Kálmán's analyses.

(13) 'Tegnap 'Pál 'játszott a 'kertben.
yesterday Paul played the garden-in
'Yesterday Paul played in the garden.'

In nonneutral sentences, however, the two approaches differ. For Varga, a focused phrase must have primary stress and postverbal ones secondary stress (14a), while for Kálmán the latter are unstressed (14b).

(14) (a) 'Tegnap 'Pál játszott a ˌkertben.
(b) 'Tegnap 'Pál játszott a kertben.
'It was Paul that played in the garden yesterday.'

It should be noted that according to both Varga and Kálmán (cf. also Kálmán–Kornai 1988) the finite verb has to be destressed following a focused constituent.[3] As far as postverbal constituents are concerned, however, it is Varga's proposal we will adopt here, that is, that words following the verb retain some degree of phonetic prominence. This position is supported by a minimal pair (cf. Varga 1983) which shows that if postverbal stresses were all decreased to the zero level, the sentences in (15a) and (15b) could not be distinguished, though in fact they have distinct pronunciations.

(15) (a) Csak 'most jöttek a ˌrabok.
only now came the prisoners
'The prisoners have just come.'
(b) Csak 'most jöttek ˌarabok.
Arabs
'Arabs have just come.'

Since these examples show that the stress on postverbal constituents is not totally eliminated (or eradicated) as it is on the verb in sentences with a focused element, we will use the term Stress Reduction (SR) here to refer to the general phenomenon by which stress is reduced following a focused constituent. The fact that the phonetic realization of this process is somewhat different on the verb itself and on the postverbal constituents is not relevant here.

3.2. *l*-palatalization

A number of the dental consonants of Hungarian become palatal in the environment of a palatal segment. We will be concerned here, however, only with

[3] Kálmán–Kornai's formulation of the destressing rule is as follows, where 'S' stands for syllable, 'S_0' for (more than) null syllable, '$(...)_1$' for one or more of the item(s) in parentheses, '*' for accent, 'f' for a focused constituent and '#' for sentence boundary:

$$\text{(i)}\ [_f\ S_0\ \overset{*}{S}\ S_0\ ]\ (\ [\ S_0\ \overset{*}{S}\ S_0\ ]\ )_1 \longrightarrow [_f\ S_0\ \overset{*}{S}\ S_0\ (S_0\ S\ S_0)_1\ ]\ /\ \_\_ \left\{ \begin{matrix} f \\ \# \end{matrix} \right.$$

the palatalization of *l*, which follows a pattern slightly different from the others. When *l*-palatalization (LP) applies, essentially what happens is that an /l/ followed by /j/ becomes [j], resulting in the sequence [jj], as shown:

(16) *l*-palatalization
$\mathrm{l} \longrightarrow \mathrm{j} \ / \ \_\_ \ \mathrm{j}$

Considering the question of where LP applies in a broader sense, that is, to morphemes and words, let us begin by examining those structures in which the rule may and may not apply.[4] As the examples in (17) show, the rule applies within a word between a base and suffix.

(17)	tol – ja	to[jj]a	'he pushes it'
	cél – juk	cé[jj]uk	'their aim'
	fél – jen	fé[jj]en	'let him fear'

LP also applies across the two members of a compound, as illustrated in (18).

(18)	fél – jegy	fé[jj]egy	'half price'
	fal – járó	fa[jj]áró	'wall walker (one who walks through walls)'
	szél – jegyzet	szé[jj]egyzet	'margin note'
	el – jönni	e[jj]önni	'to come away'
	fel – jönni	fe[jj]önni	'to come up'

If we look now at sequences of words, we find that LP may apply in different positions within a phrasal constituent. The length of the constituents appears not to be crucial, as the examples below show. The *l*s that may undergo palatalization are in italics.

(19) (a) [az ango*l* játék]$_{\mathrm{NP}}$
the English toy

(b) [ez a nagyon szép ango*l* játék]$_{\mathrm{NP}}$
this very beautiful English toy

(c) [az a nagyon jó*l* játszott meccs]$_{\mathrm{NP}}$
that very well played match

[4] It should be noted that the application of LP is not obligatory. To some extent whether or not LP applies between words seems to depend on the style of speech, more extensive application being associated with less formal registers, though by no means can LP be considered what has sometimes been called a "sloppy speech rule". Rate of speech seems to have little or no effect on the extent of LP application. A systematic study of the various factors would be needed, however, to determine more precisely how they affect LP.

(d) [jó*l* jár]$_{V'}$
well walks 'he fares well' (lit. 'he walks well')

(e) [Pá*l* javára]$_{PP}$
Paul for-the benefit-of 'for Paul's benefit'

(f) [tú*l* jeges]$_{AP}$
too icy

LP can also apply across phrasal constituents in many instances, as illustrated by the following examples, where phrasal constituents are labelled only as XP or V (or V'); further distinctions are not necessary here.[5]

(20) (a) [csak]$_{XP}$ [Pá*l*]$_{XP}$ [jár]$_{V}$
only Paul walks
'Only Paul walks.'

(b) [Pál]$_{XP}$ [botta*l*]$_{XP}$ [jár]$_{V}$ [be]$_{XP}$ [az iskolába]$_{XP}$
Paul stick-with walks in the school-into
'Paul walks with a stick into the school.'

(c) [a legkisebb ango*l*]$_{XP}$ [jött]$_{V}$ [be]$_{XP}$ [a szobába]$_{XP}$
the smallest Englishman came in the room-into
'The smallest Englishman came into the room.'

(d) [minden nyú*l*]$_{XP}$ [Jánost]$_{XP}$ [szereti]$_{V}$ [a legjobban]$_{XP}$
every rabbit John-acc. loves the best
'Every rabbit loves John the best.'

(e) [nem]$_{PRT}$ [olvaso*l*]$_{V}$ [jó szé*l*jegyzetet]$_{XP}$
not read good margin note-acc.
'You don't read good margin notes.'

(f) [tegnap]$_{XP}$ [beszélgetett]$_{V}$ [Pá*l*]$_{XP}$ [Jánossal]$_{XP}$
yesterday spoke Paul John-with
'Yesterday Paul spoke with John.'

(g) [Mari]$_{XP}$ [a kastélyban]$_{XP}$ [beszélgetett]$_{V}$ [olaszu*l*]$_{XP}$
Mary the castle-in spoke Italian
[Jánossal]$_{XP}$
John-with
'In the castle Mary spoke Italian with John.'

[5] Although some of the sentences in (20)–(22) are ambiguous without stress indications, we will postpone the discussion of stress until the next section.

It should be noted that LP may also apply across words where a (putative) trace intervenes, as in (21).[6]

(21) [*e*] $[\text{csak}]_{XP_i}$ $[\text{Pál}]_{XP}$ $[\text{fé}l]_V$ $[e_i]$ $[\text{Jánostól}]_{XP}$
only Paul fears John-from
'Only Paul is afraid of John.'

Although LP may apply in many positions within a sentence, it is not the case that it may apply across all sequences of two words, given the correct segmental context. Examples of positions in which LP is typically blocked are given in (22), where the relevant *l*s are in boldface.

(22) (a) $[\text{Pál}]_{XP}$ $[\text{Jánost}]_{XP}$ $[\text{látta}]_V$
Paul John-acc. saw
'Paul saw John.'

(b) $[\text{Pál}]_{XP}$ $[\text{jól}]_{XP}$ $[\text{gondolta}]_V$ $[\text{a dolgot}]_{XP}$
Paul well thought the matter-acc.
'Paul was right about it.'

(c) $[\text{a nyúl}]_{XP}$ $[\text{Jánost}]_{XP}$ $[\text{szereti}]_V$
the rabbit John-acc. loves
'The rabbit loves John.'

(d) $[\text{Pál}]_{XP}$ $[\text{jól tudod}]_S$ $[\text{beteg}]_{XP}$
Paul well you-know sick
'Paul, as you know, is sick.'

(e) $[\text{ha iszol}]_S$ $[\text{János}]_{XP}$ $[\text{haragudni fog}]_{V'}$
if you drink John be angry will
'If you drink, John will be angry.'

(f) $[\text{minden nyúl}]_{XP}$ $[\text{Jánost}]_{XP}$ $[\text{sem}]_{PRT}$ $[\text{szereti}]_V$
every rabbit John-acc. not-even loves
'Not even John is loved by every rabbit.'

(g) $[\text{Mari}]_{XP}$ $[\text{visszaél}]_V$ $[\text{János}]_{XP}$ $[\text{türelmével}]_{XP}$
Mary abuses John's patience-with
'Mary takes advantage of John's patience.'

(h) $[\text{Mari}]_{XP}$ $[\text{beszélgetett}]_V$ $[\text{olaszul}]_{XP}$ $[\text{Jánossal}]_{XP}$
Mary spoke Italian-in John-with
'Mary spoke in Italian with John.'

[6] This is one possible constituent analysis according to É. Kiss.

(i) $[\text{Pál}]_{XP}$ $[\text{fél}]_{V}$ $[\text{Jánostól}]_{XP}$
Paul fears John-from
'Paul is afraid of John.'

The data considered in this section reveal a complex pattern of LP application and lack of application. While it is clear that LP may always apply within words, including compounds, and within phrasal constituents, it is much less clear where its application across phrasal constituents is permitted and where it is prohibited. Particularly surprising are pairs of sentences such as (20g) and (22h), or (21) and (22i). While the two sentences in each pair are quite similar, LP may apply in the first but not the second one. If we look closely at the sentences, however, we see that there is an important difference between the first and second one in each pair. The first one contains a focused element (i.e. *a kastélyban* and *Pál*), while the second one is a neutral sentence in both cases and thus does not contain a focused element. Since focus was also seen to be relevant for the stress reduction phenomena, a reasonable question to raise at this point is whether there is any overlap between the contexts of SR and LP.[7]

[7] Since native speakers' intuitions about LP are often unclear, 22 native speakers of standard Budapest Hungarian were tape recorded in November and December, 1987, to provide more reliable data. The subjects a) read 29 sentences with sequences of /l + j/ and b) performed a sentence completion task involving the same sentences. Of these, 4 items were omitted from our analysis because they were interpreted and stressed in more than one (acceptable) way by our subjects. Of the 12 secondary school students and 10 teachers recorded, 5 subjects were eliminated from consideration: 3 because their speech was excessively deliberate and unnatural, and 2 because, throughout the sample, they applied another rule, *l*-deletion, which made it impossible to determine whether it was this rule or LP that was being applied. This left 17 subjects and 24 test sentences in two conditions, a total of 816 items: 7 where no LP is predicted, 7 where it is predicted within words, and 10 where it is predicted across words. In a few instances, the responses were unintelligible, so the final total is 809. The results are given below (see footnote 27 for a discussion of pauses).

Table 1

	LP predicted						No LP predicted	
	within words		across words		total			
	N	%	N	%	N	%	N	%
LP	160	67%	182	54%	342	59%	28	12%
No LP	78	33%	140	41%	218	38%	167	72%
Pause	0	0%	16	5%	16	3%	38	16%
Total	238		338		576		233	

3.3. Relation between stress and LP

In order to best see the relation between stress and LP, let us review the examples of LP application vs. nonapplication just seen in light of the observations made about stress above in **3.1**. The cases of LP within a single word are straightforward. There is one stress per word, on the first syllable, so we find that LP applies to a string in which there is only one stress, and this falls on a syllable to the left of the one containing the relevant /j/. The same is true for compounds, in which the first member is the one that bears the stress; the stress of the second member is lost. The items seen above in (17) and (18) are repeated in (23), where stress indications have been added.

(23)	(a)	'tolja	(b)	'féljegy	'eljönni
		'céljuk		'faljáró	'feljönni
		'féljen		'széljegyzet	

Let us now compare the stress patterns of those cases in which LP applies across constituents with those in which it does not.[8] We will return to the cases of LP within constituents below. The sentences where LP applies (cf. (20) and (21)) and does not apply (cf. (22)) are repeated with stress indications in (24) and (25). Word stress is indicated by a double (") or single (') stress mark, the latter indicating a reduced word stress; unstressed items bear no special markings.[9] The word that initiates Stress Reduction is in italics.

(24) (a) Csak "*Pál* jár.
(b) "Pál "*bottal* jár 'be az 'iskolába.
(c) A "*legkisebb* 'angol jött 'be a 'szobába.
(d) "*Minden nyúl* 'Jánost szereti a legjobban.
(e) "*Nem* olvasol 'jó 'széljegyzetet.

[8] The results of the experiment on LP given in footnote 7 show 12% of cases where LP was found in contexts in which no LP is predicted. Aside from some small percentage of these cases which could be normally expected statistically, there appear to be two other sources for these responses: a) possible restructuring of the intonational phrase, creating additional environments for LP (cf. (59) in **5.2**) and b) the application of another rule, *l*-deletion, which would produce a result similar to that of LP. Although these are also interesting phenomena, to examine them further would be beyond the scope of the present paper. We will thus consider the relevant contexts from the point of view of the lack of LP application.

[9] Recall that the verb following a focused element is destressed by SR, while any subsequent constituents retain a level of word stress lower than that of the item that is the source of the application of SR. For a discussion of how focus is determined, see **5.1**.

(f) "*Tegnap* beszélgetett 'Pál 'Jánossal.
(g) "Mari a "*kastélyban* beszélgetett 'olaszul 'Jánossal.
(h) Csak "*Pál* fél 'Jánostól.

(25) (a) "Pál "*Jánost* látta.
(b) "Pál "*jól* gondolta a 'dolgot.
(c) A "nyúl "*Jánost* szereti.
(d) "Pál, "jól tudod, "beteg.
(e) Ha "iszol, "János "haragudni fog.
(f) "Minden nyúl "*Jánost* sem szereti.
(g) "Mari "visszaél "János "türelmével.
(h) "Mari "beszélgetett "olaszul "Jánossal.
(i) "Pál "fél "Jánostól.

While the generalization found in relation to stress and LP within words does not hold for LP across constituents, where the syllable with the /j/ may bear stress, there is nevertheless another generalization that holds for both cases. That is, LP may apply any time there is a syllable to the left of the one containing the /j/ that has a stronger stress than the one with the /j/. This same generalization also holds for the cases seen above of LP applying within a phrasal constituent, where stress is always on the leftmost element that may bear stress in phrases in Hungarian (cf. **3.1**). There is thus clearly a link between stress and LP, though it is not possible to state the environment of LP in straightforward terms directly in relation to stress since local stress relations are not adequate for predicting whether or not the rule may apply. If we consider the relative stress of two adjacent syllables (a and b), within or across words, there are three logical possibilities: $a > b$, $a = b$, $a < b$. As Table 1 shows, the only relation which allows us to distinguish between the application of LP and its absence is $a > b$. The other two stress patterns permit LP to apply in some cases, but not in others.

Table 2
Stress relations

	+LP	-LP
a) a > b	e.g. (24a, e)	———
b) a = b	e.g. (24c, f)	(25a, b)
c) a < b	e.g. (24d, h)	(25e, f)

As far as the application of SR and LP is concerned, there is one more observation that should be made. The only place in which we find LP operating across words is within a single constituent and across constituents in sentences in which SR also applies, but only to the right of the first syllable of the word which initiates Stress Reduction. Thus, at least in part, the domains of SR and LP overlap. In the remaining sections, we will address the problem of accounting for these domains.

4. Syntax and the domain of SR and LP

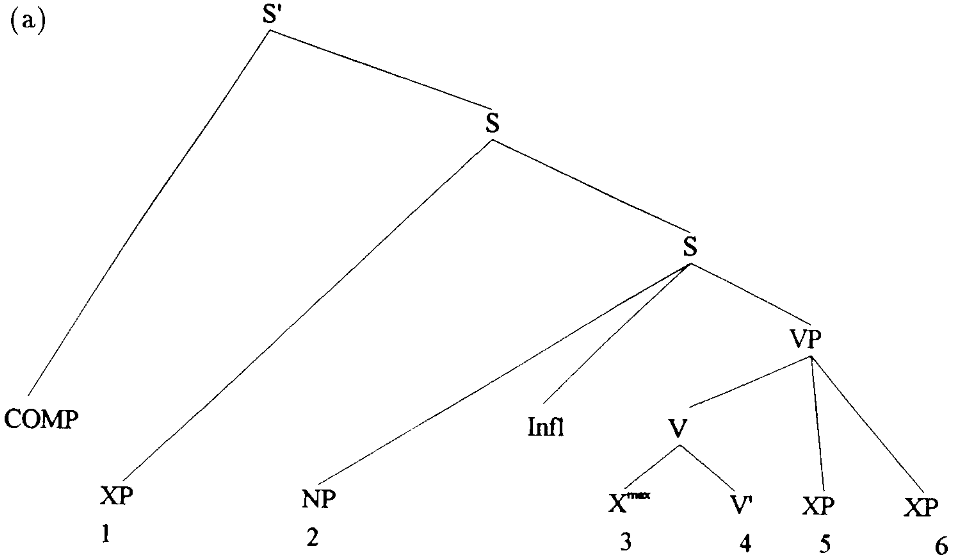
Since SR and LP apply across words, but not just any sequence of words, any account of their domains will have to involve syntax in order to specify precisely under what conditions the rules may and may not apply. We will first examine the possibility of accounting for SR and LP in terms of syntactic constituents, and then proceed to a consideration of more complex types of relations between syntax and the two rules in question.

4.1. Syntactic constituents

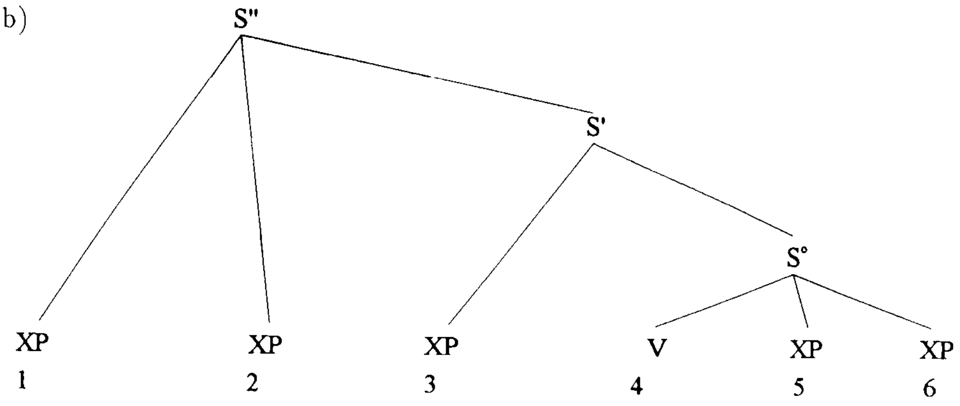
The simplest type of interaction between phonology and syntax is one in which the constituents of syntactic structure are coextensive with the strings within which phonological rules apply. Although, as was mentioned above, it has been demonstrated elsewhere that such a simple relation is not tenable, we will nevertheless go through the demonstration that it cannot account for the Hungarian data since it is still currently assumed that SR can be predicted solely on the basis of syntactic tree structures (cf. among others Horvath 1981, 1986; É. Kiss 1981, 1987a). Let us consider the three structures in (26a–c), corresponding to a sentence consisting of one verb preceded by three and followed by two constituents, as it would be represented in the syntax of Horvath, É. Kiss and Kenesei/Marácz (cf. 2 above).[10]

[10] Note that in (26a), Horvath's type of analysis, the constituent in position 1 is attached to S by Chomsky Adjunction. This is a topic constituent, and since Horvath mentions preposing only in passing and in relation to nonadjuncts, it is not clear how other topics should be incorporated into the tree.

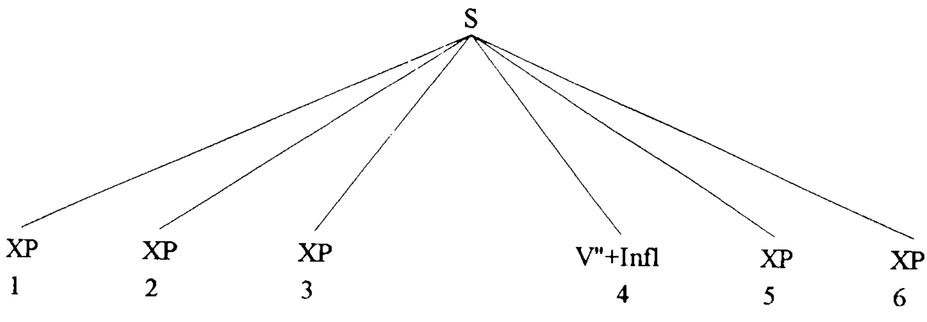
(26) (a)


S'
S
S
VP
COMP
Infl
V
XP
1
NP
2
X^{max}
3
V'
4
XP
5
XP
6

(b)


S"
S'
S°
XP
1
XP
2
XP
3
V
4
XP
5
XP
6

(c)


S
XP
1
XP
2
XP
3
V"+Infl
4
XP
5
XP
6

The examples in (27) are sentences with all six positions filled. The readings of these sentences are intended to have focus on the constituent immediately preceding the verb.

(27)

(a)

1	2	3	4	5	6
[tegnap]	[Péter]	[a parkban]	[kérdezte]	[az angol játékról]	[Jánost]
yesterday	Peter	the park-in	asked	the English toy-about	John-acc.

'Yesterday Peter asked John about the English toy in the park.'

(b)

1	2	3	4	5	6
[Jánossal]	[Júlia]	[a parkban]	[játszott]	[tegnap]	[egy meccset]
John-with	Julia	the park-in	played	yesterday	a match-acc.

'Julia played a match with John in the park yesterday.'

(c)

1	2	3	4	5	6
[a parkban]	[Pál]	[játékból]	[verte]	[nyakon]	[Pétert]
the park-in	Paul	playfully	hit	neck-on	Peter-acc.

'Paul playfully hit Peter on the neck in the park.'

Since we are assuming a focus reading of the items in (27), the only way these sentences can be pronounced as far as stress is concerned is with the usual stress on positions 1 and 2 and with SR applying to positions 3–6, as indicated in (28).

(28) (a) "Tegnap "Péter a "parkban kérdezte az 'angol 'játékról 'Jánost.

(b) "Jánossal "Júlia a "parkban játszott 'tegnap egy 'meccset.

(c) A "parkban "Pál "játékból verte 'nyakon 'Pétert.

As far as LP is concerned, it should be noted that it may apply between words that are part of the string to which SR has applied, i.e. 3–6. Specifically, it may apply within position 5 in (27a) and between 5 and 6 in the same sentence. It does not apply between 1 and 2 in (27b) and between 2 and 3 in (27c).

The syntactic structures proposed by Horvath (26a), and by É. Kiss (26b), include a constituent that is coextensive with positions 3-6, VP and S', respectively, Thus far, it seems that the syntactic structure in (26c) cannot account for the rules under investigation. Both (26a) and (26b), on the other hand, do provide constituents that can account for the application of the rules. Let us now examine two more sentences to see whether the structures in (26a) and (26b) still hold up.

(29)
1 2 3 4
(a) [tegnap] [Péter] [a parkban] [beszélgetett]
yesterday Peter the park-in spoke
5 6
[mindenkivel] [még az angol játékról is]
everyone-with even the English toy-about also
'Yesterday in the park Peter spoke with everyone even about the English toy.'

1 2 3 4
(b) [tegnap] [Péter] [a parkban] [beszélgetett]
yesterday Peter the park-in spoke
5 6
[mindenkivel] [Jánosról]
everyone-with John-about
'Yesterday in the park Peter spoke with everyone about John.'

On the basis of the relation between constituent structure and SR, we would expect the sentences in (29) to have the same stress patterns as those in (27). They do not, however, and instead may have the fairly different ones seen in (30).

(30) (a) •Tegnap •Péter a "parkban beszélgetett •mindenkivel még az •angol 'játékról is.

(b) •Tegnap •Péter a "parkban beszélgetett •mindenkivel 'Jánosról.

If, as was seen above, VP and S' are the constituents within which SR applies in the Horvath and É. Kiss models, then there is no way to account for the unreduced stress in positions 5 and 6 in (30a) and SR and LP in positions 5 and 6 in (30b).

Finally, it should be recalled that in neutral sentences there is no SR. Consequently, the only place LP may apply is within a word or across words in a single constituent. In such cases, all of the models exemplified in (26) would need a special stipulation to the effect that only the terminal nodes of the syntactic trees illustrated are relevant in determining the application of the rules in question.

The conclusion we must draw at this point is that none of the three types of syntactic analyses of Hungarian examined here provides constituents that correctly delimit the strings within which SR and LP apply. These rules of Hungarian are thus no exception to what has been found on the basis of other languages, namely that syntactic constituent structure alone cannot predict where phonological rules which operate above the word level may apply.

4.2. More complex relations between syntax and phonology

Since the application of SR and LP cannot be accounted for solely on the basis of syntactic constituents, we will now examine these rules in light of several recent proposals for more complex types of interactions between syntax and phonology. Specifically, we will consider three such approaches, which we will refer to as the c-command, the metrical grid and the prosodic constituent approaches. Before analyzing the Hungarian data, though, we will first outline those aspects of each proposal that are relevant to our analysis. It should be noted that all three proposals share the assumption that the only syntactic information that may be involved in the syntax-phonology interaction is that which is found in surface syntactic structure, though the specific type of information and the nature of the interaction vary from one approach to another.

According to the c-command approach, proposed by Kaisse (1985), phonological rules that apply in larger domains than the word may be of one of two types: fast speech rules or external sandhi rules.[11] It is proposed that the former are the purely phonological rules of a language in that they only make reference to phonological information. The latter, on the other hand, require reference not only to phonological information, but also to syntactic or morphological information. Since we are concerned here precisely with the interaction between syntax and phonology, we will limit our discussion to the second category of rules.

According to Kaisse's proposal, only two syntactic notions may play a role in the syntax-phonology interface. These two notions form the basis of the following two parameters:

[11] These are distinct from still another category of rules, those that involve cliticization and are, according to Kaisse, handled by the syntactic or morphological component of the grammar.

(31) (a) C-command Condition: one of the words must c-command the other.[12]

(b) Edge Condition: the sandhi pair (i.e. the words participating in the phonological rule) must be on the edge of the constituent that contains them. (Kaisse 1985, 186)

When values are supplied for each of these parameters, the result is the specification of the environment of the sandi rule in question.

Thus, what the c-command approach predicts is that any phonological rule that is sensitive to syntactic information may apply only to a sequence of two words at a time, and only if the words are in the required syntactic relation to each other. There is no notion of domain in the sense of a string of potentially varying length extending from one point to another, nor consequently, as Selkirk (1986) points out, of the limit (i.e. beginning or end) of such a string.

The metrical grid approach, a proposal advanced by Selkirk (1984), attributes the fundamental role in determining where a given (external) sandhi rule will apply to the rhythmic structure of the sentence, as expressed in terms of the metrical grid.[13] Since grid structure is built on the basis of syntactic structure, it is precisely in the area of grid construction that we find an interaction between syntax and phonology. Another area of interaction involves the assignment of intonational structure to the surface syntactic structure of a sentence.

The aspect of grid construction that explicitly brings syntax and phonology above the word into contact is the assignment of silent demibeats, or positions in the representation of a sentence that do not correspond to phonetic material. This is achieved by the rule in (32).

(32) Silent Demibeat Addition

Add a silent demibeat at the end (right extreme) of the metrical grid aligned with

[12] It should be noted that the definition of c-command used by Kaisse (p. 159) is that of domain c-command, according to which "in the structure $[_{X^{max}} \ldots \alpha \ldots]$, X^{max} is defined as the domain of α. Then α c-commands any β in its domain".

[13] Note that Selkirk's use of the term "sandhi" is not the same as that of Kaisse. While for Kaisse sandhi rules are precisely those that are not affected by rate of speech, for Selkirk sandhi rules are those that *are* affected by rate of speech.

(a) a word,
(b) a word that is the head of a nonadjunct constituent,
(c) a phrase,[14]
(d) a daughter phrase of S. (Selkirk, p. 314)

Since, according to Selkirk, whether or not a given external sandhi rule applies depends on the amount of time (in relation to the silent demibeats) intervening between two segments, the more quickly a sentence is uttered, the less time there will be between the segments in question, and consequently, the more environments there may be for the application of the rule.

The other aspect of the syntax-phonology interface in Selkirk's approach is not directly related to grid structure. Here, instead, intonational phrasing is assigned freely to the surface syntactic structure of a sentence. Thus, although syntactic structure and phonological (i.e. intonational) structure are related to each other by such a mapping, it is not the case that the syntactic structure of a sentence **determines** its intonational phrasing. While the structures created by Silent Demibeat Addition serve in the determination of the application of external sandhi rules, according to Selkirk, intonational phrases do not.

Finally, it should be noted that although the metrical grid approach and the c-command approach account for the application of phonological rules above the word level in very different ways, the two approaches have in common the fact that neither one makes use of the notion of domain, a string throughout which a rule applies.

The third approach we will consider is the prosodic constituent approach, as proposed in Nespor–Vogel (1986). Though the prosodic theory of the interface between syntax and phonology actually dates back to earlier works such as Selkirk (1978, 1980), and Nespor–Vogel (1982), we will not consider these further here since they differ in a number of crucial ways from Nespor and Vogel (1986). According to the prosodic constituent approach, phonological structure is organized into a set of hierarchically arranged n-ary branching constituents ranging from the syllable to the phonological utterance. The various phonological constituents are defined on the basis of (morpho-)syntactic structure, though the phonological constituents are not necessarily isomorphic to any constituents found elsewhere in the grammar. It is thus the rules that map (morpho-)syntactic structure onto prosodic structure that define the nature of the relation between syntax and phonology in the prosodic constituent approach.

[14] Note that Selkirk (p. 315) stipulates that (32c) must be restricted by a constraint such that when a phrase consists only of one word, the structure does not receive a second demibeat (i.e. in addition to the one assigned by (32a)).

It should be noted that in addition to the interaction between syntax and phonology in the prosodic constituent approach, there is also an interaction between semantics and phonology, at least at the two highest levels of the phonological hierarchy, the intonational phrase (IP) and the phonological utterance (U). The notion of focus and certain abstract semantic relations such as those expressed in English by *and*, *therefore* and *because* are needed in assigning stress, and accounting for restructuring in IP and U, respectively.

The prosodic constituent approach differs from the other two with respect to the treatment of external sandhi rules.[15] Since the various prosodic constituents delimit strings of different lengths, it is possible according to Nespor and Vogel's proposal to make reference to domains of application of rules corresponding to the prosodic constituents. Specifically, it is claimed that external sandhi rules apply only in relation to strings that can be defined in terms of these domains. That is, they may apply throughout such a domain, at its beginning or end, or at the juncture of two domains.

Before concluding this section on prosodic constituents, it should be pointed out that Selkirk (1986) has taken a position in favor of a prosodic domain approach more along the lines of her earlier work and the proposal discussed here, thus moving away from the position taken in the metrical grid approach. The rules Selkirk uses to construct the prosodic constituents, however, differ from those found in Nespor–Vogel (1986). We will not go into them in detail here; it is sufficient to observe that the way constituents are created in Selkirk's new system is by marking the ends of certain types of syntactic constituents. The string between the end of one such constituent and the end of the next constituent is then a prosodic constituent.

In the following sections, we will examine the SR and LP data in light of the three approaches to the syntax-phonology interface just described. In order not to bias our evaluation of these proposals in relation to SR and LP by our choice of the syntactic model of Hungarian, we will consider each one in terms of all three of the models discussed above.

[15] It should be noted that the definition of sandhi rule used in the prosodic constituent approach, as in Selkirk's (1984), includes only those rules that may be formulated uniquely in terms of phonological structure, following the syntax-to-phonology mapping, though no reference is made to rate of speech. They are thus opposed to those that must make direct reference to syntactic information, the sandhi rules in Kaisse's system.

4.2.1. The c-command approach

In relation to the c-command approach, it should be noted first of all that this approach can only be applied to a configurational type of syntactic structure. The notion of c-command thus applies only in a very limited way to the models of É. Kiss and Kenesei/Marácz. Specifically, the definition of domain c-command used by Kaisse will only apply to the elements found within the phrasal nodes that are daughters of some S, though not between such phrases. Thus, of all the cases of LP application seen in **4.1**, the only ones the c-command approach can account for are those between *angol* and *játékról* in (27a) and (29a). It does not even make sense to discuss SR in relation to these words alone since SR applies to much broader contexts. There is more chance the c-command approach can work in relation to Horvath's analysis of Hungarian syntax since it is configurational in nature. In a tree structure such as the one in (26a), the verb in position 4 would c-command positions 3, 5 and 6. Since segmental external sandhi rules such as LP require that the segments involved be adjacent at some level, the relation between 4 and 6 is irrelevant. Assuming there is no additional edge requirement, the c-command approach can predict LP between positions 3 and 4 and between 4 and 5, of which we have no examples in the sentences with 6 positions, though relevant cases were seen above in (24b) and (24e), respectively. Note that it will also work within a single constituent, and thus between *angol* and *játékról* once again. It also correctly predicts the lack of LP between positions 1 and 2 and positions 2 and 3 in the example seen in (27c). It cannot, however, predict LP between 5 and 6, where, in fact, the rule applies, as was seen in (27a) and (29b). It should be recalled, moreover, that the c-command approach only accounts for rules applying to pairs of adjacent words; it does not define longer strings as domains for sandhi rules. It cannot, therefore, account for SR, the environment of which is not defined in relation to two words, but rather precisely to sequences of varying length, depending on the sentence. Even as far as LP is concerned, the fact that the rule must operate on two words at a time means that the instances of LP within words must be treated separately, by lexical phonology, according to Kaisse. The only way to get SR to apply throughout a given string, and to account for word-internal and wordexternal LP with the same rule, would be to consider them both to be fast speech rules. Such a solution is not acceptable, however, since neither of the two rules is associated with a particularly fast tempo, and even more problematically, neither one applies "across the board", without reference to anything but phonological information; as required by Kaisse's definition of fast speech rules. Thus, SR and LP represent a type of phonological rule that is systematically excluded by the c-command approach: one which is sensitive to more than phonological information but which applies throughout strings that may be longer than a sequence of two words and shorter than an entire sentence.

4.2.2. The metrical grid approach

The metrical grid approach can, in principle, apply to nonconfigurational as well as to configurational structures. By way of evaluation of this approach, let us consider the sentences examined above (27a–c), repeated in (33). The way the silent demibeats would be introduced in relation to the six positions in such sentences is given in (34i), (34ii) and (34iii) for the Horvath, É. Kiss and Kenesei/Marácz models, respectively. Lines (a)–(d) correspond to Selkirk's four rules of Silent Demibeat addition (cf. (32) above).[16]

(33)
(a)
1	2	3	4
[tegnap]	[Péter]	[a parkban]	[kérdezte]
yesterday	Peter	the park-in	asked

5	6
[az angol játékról]	[Jánost]
the English toy-about	John-acc.

'Yesterday Peter asked John about the English toy in the park.'

(b)
1	2	3	4	5
[Jánossal]	[Júlia]	[a parkban]	[játszott]	[tegnap]
John-with	Julia	the park-in	played	yesterday

6
[egy meccset]
a match

'Julia played a match with John in the park yesterday.'

[16] The silent demibeats (SD) in line *b* have been placed in parentheses in (i) and (ii) as a result of the ambiguity of applying Selkirk's rule to both Horvath's and É. Kiss's structures since in some cases position 1 contains an argument (e.g. (33b)) and thus requires an SD, while in other cases it contains a free adjunct (e.g. (33a, c)) and thus does not require an SD. Our SD assignment is based on an extrapolation of Selkirk (1984), since she does not specify how non-argument phrases at the level of S are to be treated. In (iii), we have placed parentheses around the x in position 4, following the verb, because it is unclear from Selkirk's proposal how the verb should be treated in Hungarian, where V' differs significantly from VP in configurational structures. The parentheses around the other x's indicate that each position might or might not be filled with a nonadjunct constituent.

The SDs are in parentheses in line *c* because every one of them follows a phrase that may consist of a single word (cf. footnote 12).

The SDs in parentheses in line *d* are those which are daughters of S' or S", positions which are not discussed by Selkirk (1984).

	1	2	3	4	5
(c)	[a parkban]	[Pál]	[játékból]	[verte]	[nyakon]
	the park-in	Paul	playfully	hit	neck-on
	6				
	[Pétert]				
	Peter-acc.				

'Paul playfully hit Peter on the neck in the park.'

(34)		1	2	3	4	5	6
(i)	(a)	x	x	x	x	x	x
	(b)	(x)	x	x	x	(x)	(x)
	(c)	(x)	(x)	(x)	0	(x)	(x)
							x
	(d)	(x)	x	0	0	0	x
							(x)
(ii)	(a)	x	x	x	x	x	x
	(b)	(x)	(x)	(x)	x	(x)	(x)
	(c)	(x)	(x)	(x)	0	(x)	(x)
	(d)	(x)	(x)	(x)	0	x	x
							(x)
							(x)
(iii)	(a)	x	x	x	x	x	x
	(b)	(x)	(x)	(x)	(x)	(x)	(x)
	(c)	(x)	(x)	(x)	(x)	(x)	(x)
	(d)	x	x	x	x	x	x

The fewer silent demibeats there are between two words, the more likely it is that an external sandhi rule will apply in that position. Not one of the representations in (34) comes close to providing the appropriate environments for SR and LP for sentences such as those in (33). We will not list all the difficulties here, but what the reader should note is that in each of the representations there are words between which the rules should be blocked that are rhythmically the same or closer than others between which the rules should apply. Compare, for example, the juncture of 1–2 with that of 5–6.

4.2.3. The prosodic constituent approach

In order to evaluate the prosodic constituent approach, it is necessary to determine whether one of the constituents in the hierarchy corresponds to the domain of application of SR and LP, given any of the three syntactic analyses available. To begin with, we can exclude the phonological utterance (U), since it includes the entire string dominated by the highest node in the syntactic tree. This cannot be the appropriate domain, given that the rules in question are often blocked at specific points within a sentence. The next smaller constituent, the intonational phrase (IP), must also be excluded on the grounds that it often delimits a domain which is too broad. All of the sentences we have been considering in this section, for example, would be analyzed as consisting of a single intonational phrase each, since each one corresponds to a single root sentence in the syntactic tree and does not contain any of the types of constructions that obligatorily form intonational phrases on their own (e.g. parentheticals, vocatives). The constituent below IP, the phonological phrase (φ), is defined by Nespor–Vogel (1986) only for configurational structures. We can thus examine this constituent only in relation to Horvath's analysis of Hungarian, and to those places in the two others where a configurational structure appears. If we take the recursive side in Hungarian to be the left side with respect to a head, the phonological phrase would be defined as consisting of a clitic group (i.e. the next smaller prosodic constituent) containing the head of a phrase, X, plus all the material to its right up to, but not including, the next clitic group containing a head outside of the maximal projection of X. Let us consider this definition in relation to the sentence in (27a), repeated in (35).

(35) 1 2 3 4
[tegnap] [Péter] [a parkban] [kérdezte]
yesterday Peter the park-in asked
5 6
[az angol játékról] [Jánost]
the English toy-about John-acc.
'Yesterday Peter asked John about the English toy in the park.'

According to the above definition, the phonological phrase structure of (35) would be that in (36), as applied to Horvath's model.

(36) $[\text{tegnap}]_\varphi$ $[\text{Péter}]_\varphi$ $[\text{a parkban}]_\varphi$ $[\text{kérdezte az angol játékról Jánost}]_\varphi$

If we were to posit φ as the domain of application of SR and LP, this would account for the observed lack of application of these rules (where the correct segmental context occurs in the case of LP) between positions 1 and 2 and between 2 and 3. It would also account for the application of the rules between 4 and 5, and 5 and 6. It could not, however, account for their application between 3 and 4 in sentences such as those in (27) and (35). It should also be noted that 4–6 would incorrectly form a single φ in a neutral sentence. In É. Kiss's model, where S° is the maximal projection of V, the six positions would be grouped into φs in the same way as in Horvath's analysis. In the Kenesei/Marácz model each of the six positions would correspond to a φ, and thus not predict any of the applications of the rules across constituents. Thus, on the whole, the prosodic constituent approach fails to account for the phonological rules under investigation, as do the other two approaches.

Before concluding this section, for the sake of completeness, we will also briefly examine Selkirk's (1986) phonological constituents. Essentially, they can be identified by placing brackets at the right (or left) end of words and phrases: $]_{\text{word}}$ and $]_{X^{\text{max}}}$. We will not be concerned here with the domain identified as the phonological word since SR and LP must be allowed to apply in a domain consisting of more than one word. The only other possibility is the phonological phrase, determined in relation to the ends of X^{max}.

Let us consider again the sentences seen in (27)/(33). If we assume that the X^{max} brackets are to be placed at the left end of the appropriate syntactic constituents, we end up with five phonological phrases in Horvath's model, where X^{max} and V form a single phrase. The result for the É. Kiss model is the same as that for the Kenesei/Marácz model, and it is incorrect. That is, we would place a bracket at the left of each of the six positions, creating one phonological phrase per position. If we place the X^{max} brackets to the right of the relevant syntactic phrases, we end up with the same results for the Horvath and É. Kiss syntactic structures, but slightly different ones for the Kenesei/Marácz structure, as indicated in (37a) and (37b), respectively.

(37) (a) [1] [2] [3] [4 5] [6] phonological phrases

(b) [1] [2] [3] [4] [5] [6]

At this point, it might seem that there is no hope of accounting for SR and LP in any systematic way. What we believe is that this is true if the only type of nonphonological information considered is syntactic constituent structure. It will be demonstrated in the next section, however, that there is indeed a "system" to the phenomena in question, but it depends crucially on the introduction of semantic information as well.

5. Accounting for SR and LP

It has often been noticed that there is some connection between the stress pattern and the semantics of a sentence in Hungarian, especially such notions as topic and focus (cf. also **3.3** above). As these notions constitute part of the logical form (LF) component of the grammar, we will first briefly outline the relevant principles of LF and how they apply to Hungarian. It will be shown subsequently how scope relations and whether or not an item bears a logical function relate directly to the application of LP and SR. At this point, too, we will be forced to choose among the three models of Hungarian syntax we have been considering all along: only the "flat" structure proposed by Kenesei and Marácz will allow us to account for the phenomena under investigation. Finally, we will propose a way of integrating the appropriate semantic notions with syntactic and phonological structure to provide a simple and straightforward account of LP and SR. Specifically, we will propose that the domain of these rules is the prosodic constituent IP (i.e. intonational phrase), and that the mapping rules that construct this phonological constituent must take not only syntactic, but also semantic, information into consideration.

5.1. The contribution of logical form

The surface order of the constituents of a Hungarian sentence does not depend on their grammatical functions. Instead, in general, it is determined by their logical functions, or rather, in terms of current grammatical theory, the other way around: the linear order of maximal projections determines the logical form of the sentence. By way of illustration, consider the following examples, in which the sentences of each pair differ as far as the order of constituents, in terms of their grammatical functions, is concerned, but not as far as their scope relations and stress patterns are concerned:

(38) (a) "Mindenki 'Pétert kérdezte 'meg.
everyone-nom. Peter-acc. asked perf.
'For every person x, it was Peter x asked.'

(b) "Mindenkit 'Péter kérdezett 'meg.
everyone-acc. Peter-nom. asked perf.
'For every person x, it was Peter that asked x.'

(39) (a) "Péter kérdezett 'meg 'mindenkit.
'It was Peter that asked everyone.'
(b) "Pétert kérdezte 'meg 'mindenki.
'It was Peter that everyone asked.'

(40) (a) Nem "Péter kérdezett 'meg 'mindenkit.
not
'It wasn't Peter that asked everyone.'
(b) Nem "Pétert kérdezte 'meg 'mindenki.
'It wasn't Peter that everyone asked.'

(41) (a) "Péter nem kérdezett 'meg 'mindenkit.
'It was Peter that didn't ask everyone.'
(b) "Pétert nem kérdezte 'meg 'mindenki.
'It was Peter that not everyone asked.'

(42) (a) Nem "Péter nem kérdezett 'meg 'mindenkit.
'It wasn't Peter that didn't ask everyone.'
(b) Nem "Pétert nem kérdezte 'meg 'mindenki.
'It wasn't Peter that not everyone asked.'

In each of these examples, the linear order of focus, negation and the universal quantifier fully determines the relative scopes of these elements. In descriptive terms, we can say that the various constituents of Hungarian sentences, with or without a logical reading, line up as shown in Fig. 1, where 'Q' = quantifier, 'XP' = any maximal projection without a lexically specified logical function, and commas signify arbitrary order. Except for the verb, all constituents are optional. (Recall that Hungarian is a pro-drop language, so it can have sentences that consist solely of a finite verb.)

<table>
<tr><td>Initial Field</td><td colspan="5">Quantifier Field</td><td>Verb</td><td>Postverbal Field</td></tr>
<tr><td rowspan="2">XPs ("topics"), Existential Qs, Downgraded universal Qs</td><td>Even-phrase No-phrases</td><td>Neg</td><td>Universal Qs</td><td>only</td><td>XP (focus)</td><td rowspan="2">Neg+V</td><td rowspan="2">XPs, Even-phrase, No-phrases, Existential Qs, Universal Qs</td></tr>
<tr><td colspan="4"></td><td>wh-phrases</td></tr>
</table>

Fig. 1. Fields in Hungarian sentences

Within the Quantifier Field (QF), the elements are strictly ordered, and any constituent in QF takes scope over any other one to its right, whether it is in QF too, or not. Observe that QF only contains expressions that carry a logical function, which we will call operators here; no nonoperator may occur in QF.[17]

Since operator status and scope relations are crucial to the question of word order in Hungarian, we will briefly consider how they are determined. As is well known, LF is responsible for attributing to the various operators their logical readings and assigning them scopes. The latter is achieved by the LF version of move-α : quantifier raising (QR). A quantifier can have scope over some expression if and only if the quantifier c-commands it. Thus QR moves constituents from A-positions to non-A-positions by Chomsky-adjoining them to phrasal nodes including S (cf. May 1985). QR accounts for scope asymmetries in subject and object positions.[18] Now, if phrase structure (PS) is flat in Hungarian as suggested by independent considerations, all the operators c-command one another and their relative scopes are not determined by their grammatical functions, as they (in effect) are in configurational languages. We may suppose that LF assigns operator status to the appropriate categories in familiar ways on the basis of lexical specifications of their content. The only

[17] There are also co-occurrence restrictions between operators that are due to constraints on relative scopes such as prohibitions against any operator appearing to the left of a wh-phrase (cf. (i)–(ii)), or against a wide-scope universal quantifier followed by negation (cf. (iii)–(iv)). It is possible, however, to have a downgraded universal quantifier followed by negation, as in (v).

(i) *Még Pál is kit kérdezett meg?
even Paul-nom. prt. who-acc. asked perf.

(ii) Kit kérdezett meg még Pál is?
'Who did even Paul ask?'

(iii) *ˈPál ˈmindenkit nem kérdezett 'meg.
everyone-acc. not

(iv) Pál nem kérdezett meg mindenkit.
'Paul didn't ask everyone.'

(v) ˈPál ˈmindenkit ˈnem kérdezett 'meg.
'idem'

We will not go into the co-occurrence restrictions within QF further here, however, since this is beyond the scope of the present paper.

[18] Compare (i) and (ii):

(i) (a) What did everyone buy for Max?
(b) $[_{S'}$ what$_i$ $[_{S}$ everyone$_j$ $[_{S}$ e$_j$ buy e$_i$ for Max$]]]$

(ii) (a) Who bought everything for Max?
(b) $[_{S'}$ who$_i$ $[_{S}$ e$_i$ $[_{VP}$ everything$_j$ $[_{VP}$ bought e$_j$ for Max$]]]]$

In (ib) either quantifier can have scope over the other since both are immediately dominated by the same maximal projection, S', thus they c-command one another. In (iib), however, *everything* does not c-command who, therefore it has narrow scope.

exception is the constituent that is to be assigned focus function. Focus is assigned simply by (optionally) ascribing it to the category node immediately preceding the (finite) verb.[19] We will assume that all operators are marked by a diacritic [+OS] and no nonoperator is so marked.

Next let us consider scope assignment. Ignoring the various language specific restrictions on scope relations for the time being, it is always the leftmost operator that has the widest scope. Let LF, then, mark this constituent by the diacritic [+SC]. All the other operators will be ordered with respect to scope in relation to the constituent bearing the feature [+SC].[20] Note that the diacritic [+SC] or an equivalent device to determine which quantifier has the largest scope, which is independently needed for LF interpretation, in effect draws the boundary between the Initial Field and the Quantifier Field in Fig. 1.

We will not go into further detail about the proposals concerning the rules and principles within LF here; however, see Kenesei (1986, 1989) for a discussion of some of these. Though we believe our approach is correct, it should be noted that the question of the existence of QR is not crucial; even if QR must be an integral part of LF, it will in any case, yield the appropriate scope relations, and that is all that must be taken into account here. The issue of whether the logical form of sentences is hierarchical is immaterial. Finally, we will make use of the features introduced here for ease of exposition, leaving open the possibility that they may represent completely different mechanisms of derivation.

Let us now consider some of the examples of LP contexts and stress patterns seen above, supplemented with the features that the relevant rules of LF contribute to their structures.[21] Only features with positive values are

[19] Or more precisely, it is assigned to the one before (Verb +) Tense, since verbs can also carry focus function. For more details, see Kenesei (1986).

Note also that if Culicover–Rochemont's (1983) proposal for Strong Assignment in syntax is not followed, focus assignment will also have to be part of the LF component in configurational languages. In this case, some device is needed by which LF and the phonological component are associated, for example, the mapping rules that build (prosodic) phonological structure on the basis of various types of nonphonological information.

[20] This may perhaps be regarded as comparable to Chomsky's (1981) "Assume a GF", proposed to account for the freedom of NP ordering with respect to grammatical function in Japanese.

[21] Note that the contexts for LP are rather restricted in the Quantifier Field since, proceeding from left to right in Fig. 1, *even-* and *no-*phrases are accompanied by particles ending in /ʃ/, /ɛ/ or /m/; the negative can end in either /m/ or /ɛ/; and the word for 'only' ends in /k/. That leaves only universal quantifiers and focus to be examined for LP in QF.

indicated; [+SC] implies [+OS]. The ls that undergo LP are in italics, while those that do not are in boldface.

(43) (a) [[ˈTegnap]$_{PP}$ [beszélt]$_V$ [ˈPá*l*]$_{NP}$ [ˈJánossal]$_{NP}$]$_S$
[+SC]
yesterday spoke Paul-nom. John-with
'It was yesterday that Paul spoke with John.'

(b) [[ˈPál]$_{NP}$ [ˈJánossal]$_{NP}$ [ˈtegnap]$_{PP}$ [beszélt]$_V$]$_S$
[+SC]
'idem'

(44) [[ˈMinden ango*l*]$_{NP}$ [ˈJánossal]$_{NP}$ [beszélt]$_V$ [ˈelőször]$_{PP}$]$_S$
[+SC] [+OS]
every Englishman John-with spoke first-for
'For every Englishman x, it was John that x first spoke with.'

(45) [[ˈPál]$_{NP}$ [ˈJánossal]$_{NP}$ [beszélt]$_V$ [ˈelőször]]$_{PP}$]$_S$
[+SC]
'It was John that Paul spoke with first.'

(46) [[ˈPál]$_{NP}$ [ˈbotta*l*]$_{NP}$ [jár]$_V$ [ˈbe]$_{PP}$ [az ˈiskolába]$_{NP}$]$_S$
[+SC]
Paul-nom. stick-with walks in the school-to
'It is a stick that Paul walks into the school with.'

(47) [[ˈPál]$_{NP}$ [ˈjátékból] [ˈJánosra]$_{NP}$ [ütött]$_V$]$_S$
[+SC]
Paul-nom. play-from John-on patted
'It was John that Paul playfully patted.'

(48) [[ˈMinden nyúl]$_{NP}$ [ˈJánost]$_{NP}$ sem [szereti]$_V$]$_S$
[+OS] [+SC]
every rabbit John-acc not-even loves
'Not even John is loved by every rabbit.'[22]

[22] This sentence contains a downgraded universal quantifier.

(49) (a) [[ˈPál]$_{NP}$ [ˈfél]$_{V}$ [ˈJánostól]$_{NP}$]$_{S}$
Paul-nom. fears John-from
'Paul is afraid of John.'

(b) [[ˈPál] [fél]$_{V}$ [ˈJánostól]$_{NP}$]$_{S}$
[+SC]
'It is Paul that is afraid of John.'

What these examples show is that LP is possible across constituents whenever the appropriate segmental context occurs to the right of the operator that has the widest scope, i.e. the one marked [+SC]; it is blocked, however, between constituents to the left of [+SC]. In other words, scope relations, which are computed for totally independent reasons, play a crucial role in the application of LP.

Scope relations also play a role in determining the stress pattern of a sentence. Specifically, those words that bear [+SC] or [+OS] (as well as certain words to the left of [+SC]) are assigned the type of stress we have been marking with a double stroke (i.e. ˈ), though, as we discuss below, minor readjustments may take place under certain circumstances. The relationship between SR and LP can thus be seen in the asymmetry both display in relation to the positions to the left and right of [+SC]. That is, both may apply only to the right of the word bearing [+SC]; if no word bears [+SC], as in (49a), neither rule may apply (across constituents).

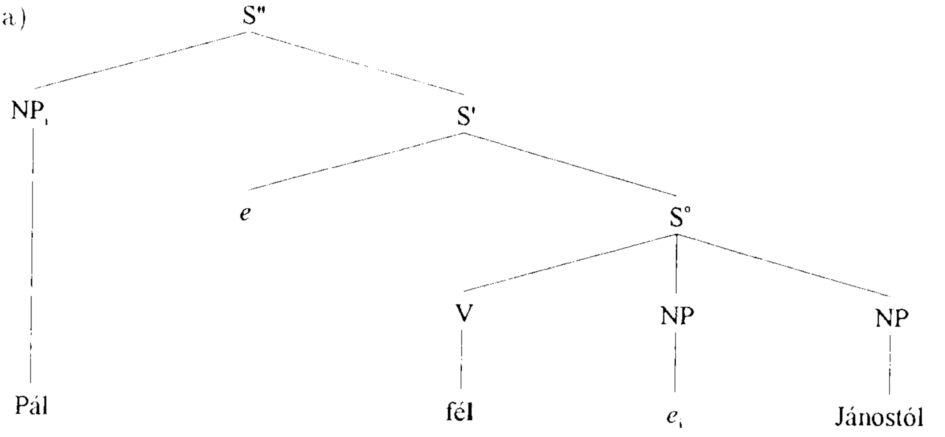
As far as LP within constituents is concerned, it should be noted that the rule may apply regardless of the presence or absence of [+SC]. Thus, LP applies within a constituent to angol but not across constituents to *játékról* in (50), a neutral sentence where no item bears the feature [+SC].

(50) [[ˈPéter]$_{NP}$ [ˈbeszélgetett]$_{V}$ [az ˈangol ˈjátékról]$_{NP}$] [ˈJánossal]$_{NP}$]$_{S}$

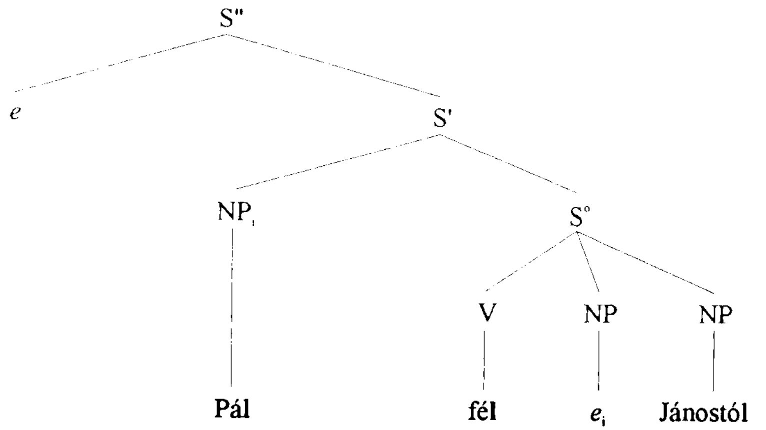
In such cases, the domains for SR and LP do not coincide. Logical function is also irrelevant for LP application within words, including compounds, and thus in these cases, too, the contexts for SR and LP are different.

Thus far we have only examined the possibility of combining LF information with the flat syntactic structures proposed by Kenesei and Marácz. In fact, if we make use of either of the "hierarchical" models proposed for Hungarian, it turns out that the difficulties in accounting for LP and SR become insurmountable. Consider, for example, the structures assigned by É. Kiss to (49a, b), given in (51a, b).

(51) (a)



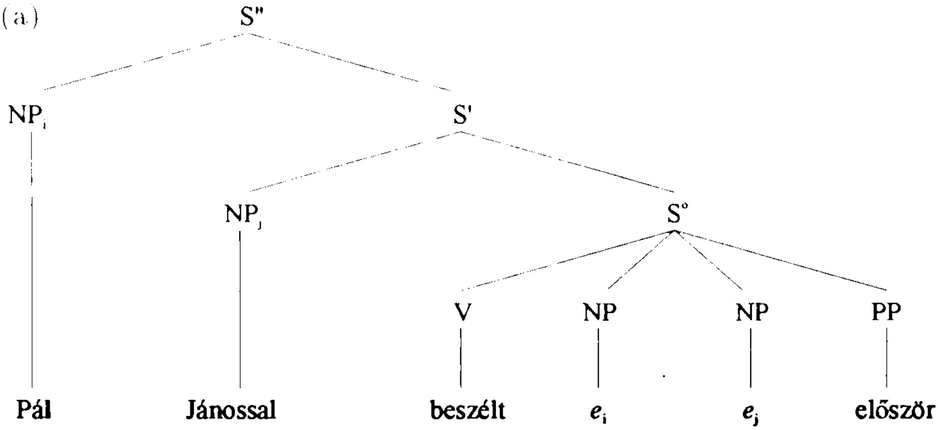
(b)



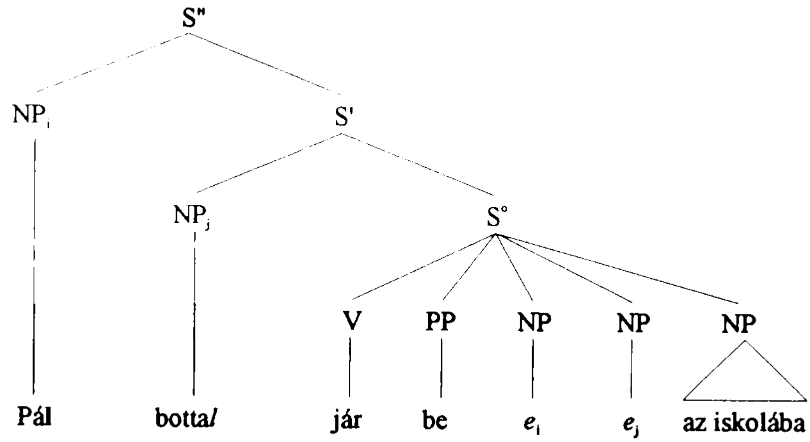
Since the two structures are identical in S_0, we would have to claim that a topic trace blocks LP (cf. (51a)), while a focus trace does not (cf. (51b)). There is, however, no principled way to distinguish between these two cases.

In addition, there is hardly any structural difference between (45) and (46), which would have the structures (52a) and (52b), respectively.

(52) (a)



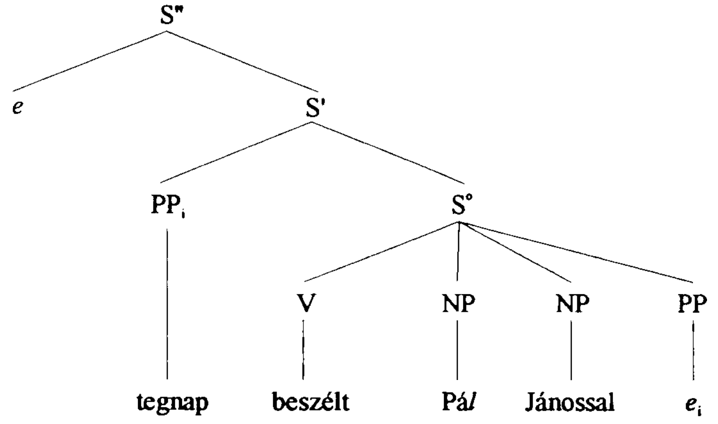
(b)



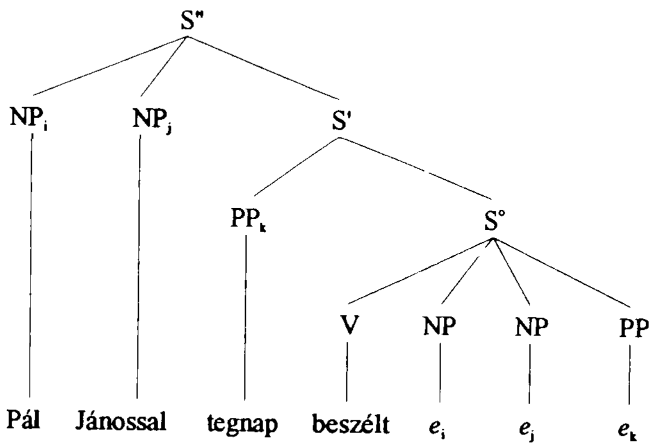
That is, LP should be constrained as inapplicable between a constituent under S" (topic) and another under S' (focus) as in (52), but not between a focus and the verb under S°.

Again, (43a) and (43b) exhibit identical configurations at the relevant points, as illustrated in (53a) and (53b), respectively, although LP is possible only in the former case.

(53) (a)

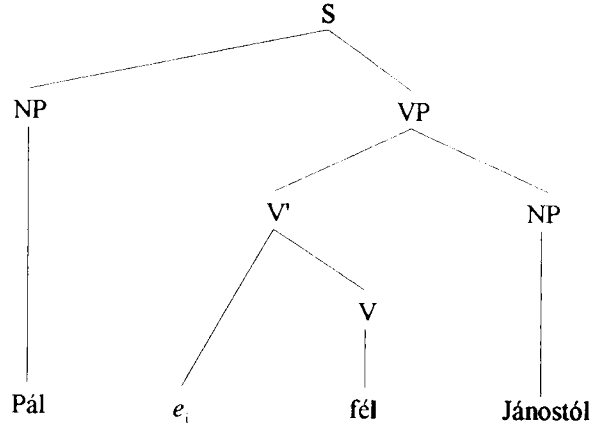


(b)

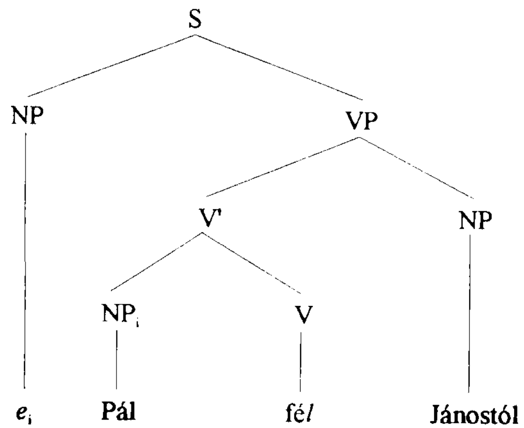


The analyses that would be given within Horvath's framework fare no better in this respect. For example, (49a) and (49b) would have to be analyzed as in (54a) and (54b), respectively, while (45) and (44) would have the S-structures seen in (55a) and (55b), respectively.

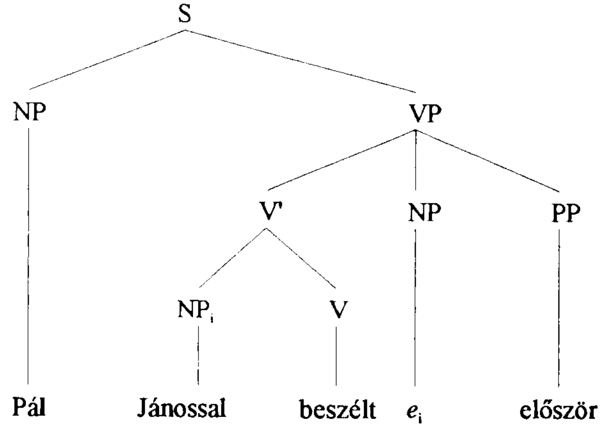
(54) (a)


S
NP
VP
V'
NP
V
Pál
e_i
fél
Jánostól

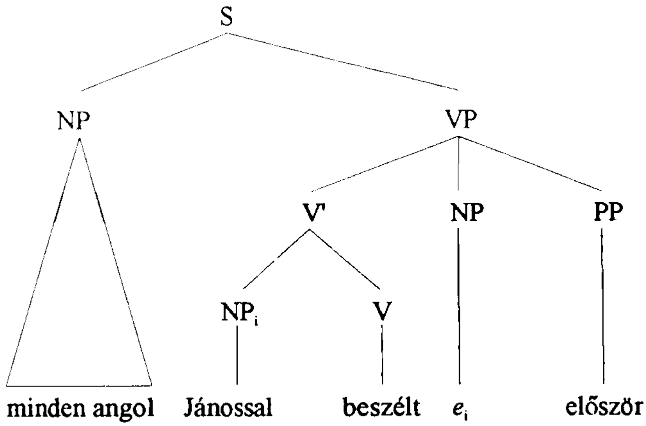
(b)


S
NP
VP
V'
NP
NP_i
V
e_i
Pál
fél
Jánostól

(55) (a)



(b)



In both pairs of sentences, the structures are identical, though LP may apply in (54b) and (55b), but not in (54a) and (55a). The structures provided by Horvath's model do not allow us to predict this difference in the application of LP.

In general, then, what we have seen is that the only model of Hungarian syntax that provides structures that allow us to correctly predict where LP (and SR) may apply is the "flat" one proposed by Kenesei and Marácz. The hierarchical S-structures proposed by É. Kiss and Horvath both fail to make correct predictions about the environments of the phonological rules under examination here, though both are explicitly intended to account for stress patterns, including SR.

5.2. The intonational phrase

What is needed now is a way to integrate the phonological facts of SR and LP with the flat syntactic structure analysis of Hungarian and scope relations shown by means of the features [+SC] and [+OS] assigned by LF. As a basis for this interaction, we must exclude Kaisse's c-command approach since, as we have shown above, it cannot by definition handle phonological phenomena that apply throughout strings of more than two words but which are, at the same time, sensitive to syntactic information. There is, furthermore, little role for semantics in Kaisse's model.

In Selkirk's metrical grid approach, a role is given to semantics in relation to the intonational phrase (IPh)[23], in the form of the Sense Unit Condition which states that "the immediate constituents of an intonational phrase must together form a sense unit" (p. 286). The intonational phrase is, moreover, the only unit corresponding to a given span within a sentence (i.e. that over which an intonation contour spreads) in Selkirk's framework, since as was seen above, grid construction does not create phonological units, but instead only introduces time intervals at certain points within a sentence. Recall, however, that Selkirk claims that the IPh does not serve as the domain of application of sandhi rules. Any rules that have in the past been considered to apply within the intonational phrase are, according to Selkirk, most likely additional instances of juncture-sensitive rules, to be handled in terms of the metrical grid as well. That is, their application, like that of other external sandhi rules, depends on the amount of time intervening between the relevant segments. The only difference, then, between what were thought to be intonational phrase domain rules and other sandhi rules would be that the former may apply across more silent demibeats than the latter. They are only blocked by substantial pauses since a relatively large number of silent demibeats will usually be assigned at such points. This account of SR and LP will not work, however, since the strings over which intonation contours spread in Hungarian are not necessarily bounded by pauses. As Varga (1985) points out, in a sentence such as the one in (56), where there are three intonation units ('tone groups' in Varga's terms) indicated orthographically by the commas, a pause may occur between 1 and 2, but it would be highly unlikely between 2 and 3 (cf. Varga, p. 211).[24]

[23] Selkirk uses the symbol 'IPh'. Since Selkirk's definition of the intonational phrase differs from the one proposed by Nespor–Vogel (1986), abbreviated as 'IP' here, we will maintain the different symbols to distinguish between the two proposals.

[24] See Varga (1983, 1985) for a systematic analysis of intonation contours in Hungarian.

(56) 1 2 3
Ha készen vagy, amikor megjövök, fizetek.
'If you are ready (now), when I get back, I'll pay you.'

Despite the lack of a pause between 2 and 3, according to Varga, other "juncture" phenomena may occur at this point, such as the lack of assimilation when the segmental environment would otherwise permit it.

Even if we reversed Selkirk's position and did allow the IPh to be the domain of application of sandhi rules, the metrical grid approach would still fail to account for the Hungarian rules under investigation. Specifically, this approach would run into difficulty in the way in which it divides a sentence into IPhs. Essentially, surface structure is partitioned freely into IPhs, regardless of the syntactic structure of the sentence in question. This generates a large number of possibilities, many of which will be ruled out in LF by the Sense Unit Condition, a sense unit being defined as a constituent, the immediate constituents of which "must bear either a head-argument relation or a head-(restrictive) modifier relation to each other" (Selkirk 1984, 28). This condition, however, will incorrectly rule out certain structures in Hungarian that must form a single intonational phrase, despite the fact that their immediate constituents do not bear the necessary relations to each other. In particular, this type of problem will arise in the case of discontinuous head and argument constituents, as seen above in (27b), where the verb *játszott* 'played', the head of the phrase, is separated from its object argument *egy meccset* 'a match-acc.' by the free adjunct *tegnap* 'yesterday'. It will also arise when a head is separated from its modifier as in *"Almát ettem 'kettőt* 'It is apples that I ate two of' (lit.: 'apple-acc. I-ate two-acc.'), where the head *almát* is separated from its modifier *kettőt* by the verb. This leaves the prosodic constituent approach, which also allows for the introduction of semantic information in addition to syntactic and phonological information in the creation of phonological structure. Specifically, the notion of focus is needed in assigning relative prominence within the intonational phrase once it has been constructed. As we have seen above, however, none of the prosodic constituents as defined by Nespor–Vogel (1986) provides the appropriate domains of application for SR and LP. What we would like to suggest here is that there is indeed a constituent of the prosodic hierarchy that delimits the correct domains, the intonational phrase, but this constituent must be defined in a different way for Hungarian, and perhaps more generally. That is, instead of bringing LF into

See also Kálmán Kornai (1988) for a treatment of Hungarian intonation patterns within the autosegmental framework.

play only after IP has been constructed, it must come into play earlier, as part of the mapping rules that construct IP. Specifically, we propose to formulate the rule for IP construction as in (57). This rule will apply in relation to flat syntactic structures to which [+SC] and [+OS] have been assigned in LF by the principles seen above.[25] The prosodic constituents (PCs) that are grouped into IPs are coextensive with the daughters of S in the syntactic tree.

(57) (a) IP Construction:
   i. Group the PC containing an element marked [+SC] with all PCs to its right until either another constituent with a logical function (marked [+OS]), or the end of the sentence, is reached; each remaining PC forms an IP on its own.
   ii. If no PC is marked [+SC], each PC forms an IP on its own.
(b) IP Relative Prominence:
   s/w* (w* = any number of weak PCs).

Given this definition of IP, we can now account for SR and LP. They are both span rules that operate throughout the intonational phrase. Stress is automatically reduced on all of the PCs following the one marked [+SC] by the relative prominence rule. Additional phonetic interpretation rules will be needed to account for the total destressing of the PC following a focused element (i.e. the verb) and the less extreme stress reduction on PCs farther to the right in IP. As far as LP is concerned, this rule may apply whenever its segmental context is present within IP, as stated in the following rule:[26]

(58) $\mathrm{l} \longrightarrow \mathrm{j} \;/\; [_{\mathrm{IP}} \ldots \underline{\quad} \mathrm{j} \ldots]_{\mathrm{IP}}$

It should be noted that this formulation of LP not only accounts for the rule's application across (syntactic) constituents, but for its application within constituents and within words as well. That is, since the smallest possible IP must contain one entire syntactic constituent (= one PC), the segmental context for LP across words within a constituent will automatically also fall within a single IP. Similarly, any segmental context for LP within a word will also automatically be within an IP. The rule in (58) also accounts for why LP does not apply across constituent strings involving topic position or across

[25] Note that it is the standard T-model that we have followed and proposed to modify here so that an interface could be set up between LF and the prosodic mapping rules. For alternative proposals, of which van Riemsdijk–Williams (1981) and Williams (1986, 1988) appear to be most promising, see Vogel–Kenesei (forthcoming).

[26] This may be subject to additional stylistic considerations, as was mentioned above, but due to the absence of information about this matter, we will not go into the problem further here.

constituents in a neutral sentence. LP is blocked in the former case because any PCs to the left of [+SC], and thus topics, form IPs on their own. Since LP does not apply across IP boundaries, it will not apply across the constituents that compose the separate IPs. By the same token, since each daughter of S in a neutral sentence corresponds to its own IP, we would not expect LP to apply across such constituents either.[27]

It has been pointed out (cf. among others, Selkirk 1984; Nespor–Vogel 1986) that the intonational phrase is a fairly flexible constituent. The IP in Hungarian is no exception, and as the basic IPs in Nespor–Vogel's system may under certain circumstances undergo restructuring, so may those created by the basic IP construction rule in (57). Once again, however, the present proposal differs from that in Nespor–Vogel in that, at least for Hungarian, the restructuring rule too makes reference to semantic information, specifically to whether or not an item bears [+OS], as seen in the rule in (59).

(59) IP Restructuring:
Short IPs to the right of a constituent marked [+SC] may optionally be joined into one larger IP (possibly including the IP with [+SC]).

This rule is subject to a general constraint. That is, it is not possible for an inflected verb marked [+OS] to participate in restructuring, as illustrated by the comparison of (60) and (61).

(60) (a) [Péter fél]$_{\mathrm{IP}}$ [Jánostól is]$_{\mathrm{IP}}$
[+SC] [+OS]
Peter fears John-from even
'It is Peter that is afraid even of John.'

(b) [Péter *fél* Jánostól is]$_{\mathrm{IP}}$
[+SC] [+OS]

(61) (a) [ˈNem minden nyúl]$_{\mathrm{IP}}$ [ˈjátszik ˈMarival]$_{\mathrm{IP}}$
[+SC] [+OS]
not every rabbit plays Mary-with
'Not every rabbit plays with Mary.'

(b) *[ˈNem minden nyúl ˈjátszik ˈMarival]$_{\mathrm{IP}}$[28]
[+SC] [+OS]

[27] IP boundaries also predict where pauses may be inserted in a sentence. This accounts for the relatively high percentage of pauses in our data in those contexts where no LP was predicted (cf. footnote 7).

[28] Note that (61b) would be a possible Hungarian sentence if the verb *játszik* did not bear [+OS] and thus did not have a contrastive meaning.

Thus, the sentence in (60a) may be restructured as in (60b), while the one in (61a) may not be restructured as in (61b), as demonstrated by the possibility of LP applying to the *l* in italics in (60b) but not to the one in (61b).

6. Conclusions

In trying to account for two phonological rules of Hungarian, Stress Reduction and *l*-Palatalization, both of which apply above the word level, we found that a combination of only syntactic and phonological information was not sufficient to define their domains of application. Specifically, three current proposals for complex interactions between syntax and phonology were examined and all were found to be inadequate, as was a more simple type of interaction in which syntactic constituents themselves define the contexts for phonological rules. Since it was clear that the rules had to make reference in some way to syntax because they apply above the word level but not always throughout an entire sentence, it was also necessary to decide what model of syntax should be used for Hungarian. Three proposals were considered, and on the basis of the phonological rules under investigation, it was shown that only a "flat", nonhierarchical, type of structure was tenable. Finally, it was demonstrated that the clue to the analysis of SR and LP lay in the introduction of semantic information in the determination of their domains of application. It was argued, specifically, that the domain of both rules is the intonational phrase, a (prosodic) phonological constituent that in this case must be defined in relation to the semantic notions of scope relations and the operator status of specific words, assigned in LF to a flat S-structure. The interface between syntax and phonology must thus be enriched to include an interface with semantics as well. The question that arises at this point is how general such a situation is. In the area of focus, relevant in our analysis, too, it has been suggested on different occasions that semantics must be allowed to interact with phonology. What the Hungarian phenomena show, however, is that semantics may play an even more specific role. One possibility is that the additional semantic notions needed in order to account for Hungarian may in fact be fundamental in accounting for nonconfigurational languages in general, where the syntactic structure provides less information. It might also be the case, however, that the type of interaction between semantics and the other components of the grammar seen in Hungarian will turn out to be relevant for configurational languages as well, and provide insight into some of the problems that have not yet been resolved in such languages. Hopefully, future research will provide more information about the role of semantics in the syntax-phonology interface.

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CONSONANT LENGTH IN RECENT BORROWINGS INTO HUNGARIAN

ÁDÁM NÁDASDY

0. Overview of the article

This article examines a marginal but interesting phonological phenomenon of Hungarian: the length of consonants in recent borrowings whose source language form has a short consonant, e.g. H. *tipp*, *vicc*, *szvetter* from E. *tip* (G. *Tipp*), G. *Witz*, E. *sweater*. I call this phenomenon Borrowed Consonant Lengthening (BCL). Its challenge derives from the fact that Hungarian systematically distinguishes short and long consonants, and there is nothing in the phonology that would require such a lengthening. I will show that the spelling of these words in the source language, which often has a double consonant-letter in the relevant position, does not provide a satisfactory explanation for the data. The distribution of these "borrowed long consonants" will also be examined: it will appear that there are many counterexamples and that we may have to speak of a tendency rather than a rule. My treatment is data-centered and pre-theoretical, trying to provide material (often underivable from Hungarian spelling) for further research and theoretical speculation. I assume that a [+Foreign]—or, arguably, [+German]—feature is assigned to these words at the lexical level, much like a [+Latinate] feature to certain English words in Mohanan's (1986) approach.[1]

1. "Recent" borrowings

We shall consider Hungarian words that have been borrowed into the language recently, that is, since about 1750. These words usually retain a connotation of foreignness, at least stylistically. Many of them are only current in familiar usage (for example, H. *vekker* 'alarm clock' (< G. *Wecker*) is replaced in formal usage by *ébresztőóra*), but this need not disturb us here. All words cited are

[1] My thanks are due to colleagues, especially L.T. András, Tamás Szende and Irene Vogel for criticism on an earlier version of this paper.

current in the speech of educated Hungarians. We shall also cite some widely used proper names as examples.

More specifically, we will examine the fact that many of these "recent" loanwords are pronounced (and usually spelt) with a long medial or final consonant in Hungarian, whereas the source languages—German, French, English—do not have long consonants. I call this phenomenon "Borrowed Consonant Lengthening" (BCL), and illustrate it in (1). (Hungarian double consonant-letters normally indicate length. When disambiguation is necessary, length will be shown by doubled phonetic symbols; e.g. /tt/, /čč/.)

(1)	WORD	GLOSS	SOURCE
	tipp	'idea, tip'	G. *Tipp* <E. *tip*
	sokk	'shock'	Fr. *choc*, G. *Schock*
	stramm	'brave'	G. *stramm*
	blöff	'bluff'	E. *bluff*
	szvetter	'sweater'	E. *sweater*
	dollár	'dollar'	E. *dollar*
	galopp	'gallop'	G. *Galopp* < E. *gallop*

Such lengthening can also be found in some earlier borrowings, as shown in (2). The year is that in which the double-consonant spelling first appears in Hungarian written records. (All historical data are from TESz.)

(2)	*friss*	1585	'fresh'	G. *frisch*
	sakk	1584	'chess'	G. *Schach*
	sallang	1662	'flourish'	G. *schlank*
	szappan	1416	'soap'	It. *sapon(e)*
	juss	1560	'inheritance'	L. *jus* 'right'

However, the incidence of BCL really begins to increase after 1750 with the ever larger influx of Western words, and continues to the present day.

2. A Hungarian phonological rule?

Let us look briefly at the distribution of long consonants in Hungarian in general, to see if BCL is motivated by some rule of Hungarian phonology. As is well known, in intervocalic and final-postvocalic position both short and long consonants may occur in Hungarian. All types under (3) are well-formed and well-attested, and minimal pairs are easy to find.

(3)	*beteg*	/t/	'ill'	–	*retteg*	/tt/	'he fears'
	kosz	/s/	'dirt'	–	*rossz*	/ss/	'bad'
	vice	/t^s/	'janitor'	–	*vicce*	/t^st^s/	'joke+his'

There is one restriction: after a long vowel a long consonant may only appear as a result of the concatenation of formatives. This means that sequences of a long vowel plus a long consonant, /V:C:/, are not allowed intramorphemically. Compare the pairs in (4):

(4)	*ráz*	/z/	'he shakes'	–	*rázz*	/zz/	'shake+imp'
	métely	/t/	'corruption'	–	*héttől*	/tt/	'seven+from'
	szűcs	/č/	'furrier'	–	*fűts*	/čč/	'heat+imp'

An apparent exception is the rhyme *-áll*, but in present-day normal pronunciation this is simplified to /-a:l/, so that e.g. *száll* 'he flies' and *szál* 'thread' are homophones, both being /sa:l/. The suffixed form *szállal* 'thread+with' is of course /sa:llɔl/.

If we look at the loanwords in (1), we see that their long consonant always stands after a short vowel: they obey the morpheme structure condition described above. On the other hand, there is no rule requiring the consonant to be long after a short vowel, since intramorphemic /VC/, /VC:/, /V:C/ all freely occur, with no phonological rule to choose between hem. (It seems that in this respect further research may discover surprising things; see Törkenczy in this volume.)

It must be mentioned that there are sporadic cases of consonant lenghening after a short vowel in "inherited" (i.e. Finno-Ugrian or ancient borrowed) words, especially monosyllables. In some of these the spelling preserves the older /-VC/ form, but modern pronunciation has /-VC:/.

(5)	*lesz*	/ss/	'will be'
	egy	/d'd'/	'one'
	csat	/tt/	'buckle'
	új	/ujj/	'new'
	kisebb	/šš/	'smaller'

Note also the name of the letters *F* /ɛff/, *L* /ɛll/, *S* /ɛšš/, etc. In a few words an intervocalic consonant vacillates between short and long, with the long pronunciation considered more vulgar, probably because the spelling codifies the short pronunciation:

(6)	*eső*	/š/~/šš/	'rain'
	köpeny	/p/~/pp/	'gown'
	*szal*ag	/l/~/ll/	'ribbon'
	szőlő	/ö:l/~/öll/	'grapes'
	bakancs	/k/~/kk/	'heavy shoes'

Some Hungarian dialects have a stronger tendency for postvocalic consonant lengthening, and a few such forms have become the exclusive norm, e.g. *teljes* /jj/ 'complete' < *tellyes* < *telles* < *teles* (Bárczi 1967, 132–4). Onomatopoeic stems double their final consonant before the 'instantaneous" suffix *-An*, e.g. *koppan* 'give a knock'.

But all these are isolated and unpredictable cases. We must conclude that a preceding short vowel is a necessary, but not a sufficient condition for the lengthening shown in (1).

3. The influence of spelling?

Since the source languages of the words we are considering—mostly German, French, or English—usually have a double consonant-letter in the relevant place, and since double consonant-letters regularly correspond to long consonants in Hungarian, one might suggest that BCL is siply due to the interference of spelling, especially if we take "double consonant-letter" to include complex graphemes like *ck* or *tch*. This is true for *tipp*, *sokk*, *stramm*, *blöff*, *dollár*, *galopp* among the examples cited so far; further examples appear in (7).

(7)	*hall*	'hall'	
	giccs	'kitsch'	
	vicc	'joke'	G. *Witz*
	*massz*ör	'masseur'	
	roller	'roller'	
	hobby	'hobby'	
	vekker	'alarm clock'	G. *Wecker*
	szonett	'sonnet'	G. *Sonett* < Fr. *sonnet*

As can be seen from *galopp*, *szonett*, it is the German spelling (and stressing) that seems to matter, even if the word is of English or French origin.

This "orthographical approach", however, oversimplifies things and leaves a lot unexplained. In the next sections we shall point out its weaknesses.

a) In order to posit an influence of the spelling, one has to presume that the borrowers first met the word in written form. This may well be true for some of the loanwords—namely "learned" or "bookish"—borrowings like *sokk* 'shock', *esszé* 'essay', *gleccser* 'glacier'—but not for others. Many loanwords from (or via) German must have been borrowed through the ear, as it were, or introduced by bilinguals into their Hungarian speech. Many of these words still carry an air of low-colloquial familiarity, e.g.:

(8)	*sitt*	'debris'	< G. *Schütt*
	pakk	'parcel'	< G. *packen* 'to pack'
	kuss	'shut up'	< Fr. *couche* 'lie down'
	*koff*er	'suitcase'	< G.*Koffer* < *coffre*
	pakker	'rug beater'	< G. ?*prachern*

It would be weird to suppose that the borrowers or introducers had the orthographic German form in mind when adopting the word into Hungarian. At the same time, let us stress again that there is (or was) no phonological reason in Hungarian for choosing the long consonant: the forms **sit*, **pak*, **kus*, **kofer*, **praker* would have been equally well formed, as proved by existing words like *süt* 'he fries', *csak* 'only', *kas* 'basket', *kofa* 'market-woman', *krapek* 'guy'.

b) If we took spelling influence seriously, then it would be quite puzzling why it is just this spelling feature of foreign languages, i.e. double consonant-letters, that Hungarians feel obliged to follow, when otherwise they seem to know quite well the reading rules of the major Western languages. For example, the letter *s* is regularly pronounced /š/ in Hungarian, yet for centuries foreign words with an *s* in them have been borrowed with /s/—and often respelt, accordingly, with *sz*, e.g. *szonáta*, 'sonata' *notesz* 'notebook' (E./Fr. *notes*). Many Hungarian families have names spelt in a foreign, especially German, fashion, yet people automatically read these according to non-Hungarian reading rules. For example, nobody reads *Beck* as */bɛt^{s}k/, *Glaser* as */glɔšɛr/, or *Feuer* as */fɛuɛr/; these names are pronounced as /bɛkk/, /gla:zɛr/ and—interestingly enough—/fɔjjɛr/. At the same time, there are Hungarian names which end in a double consonant-letter, yetare pronounced with a short consonant: *Papp* /pɔp/ (=*pap* 'priest'), *Kiss* /kiš/ (=*kis* 'little'), etc. We must therefore conclude that in borrowings double consonants are treated differently from other spelling features: they are pronounced long by dint of some convention which overrides the (otherwise well informed) knowledge of Western reading rules.

c) BCL also appears in a number of words whose source is spelt with a single consonant-letter. These can in no way be accounted for by the "orthographical approach". For example:

(9)	*dzsemm~jam*	/ǰɛmm/	'jam'
	szett~szet		'set, knitted costume'
	sztepp		'step-dance'
	chip	/čipp/	'electronic chip'
	asz	/ass/	'A-flat' < G. *As*
	szvetter		'sweater'
	dopping		'doping'
	Feuer	/fɔjjɛr/	'G. proper name'

As can be seen in (9), Hungarian spelling usually codifies the long pronunciation by doubling the letter. This is an ongoing process as fresh borrowings become established. Consider the following quotations from newspapers published in 1986–88:

(10)	*különböző duty free shoppok*	'various duty free shops'
	a szupermarketteket	'the supermarkets + Acc'
	kitteket szállít	'delivers kits'

A further example was observed in a 1989 television programme presenting the exhibition of an artist who had the unusual name *Szkok Iván*. He was regularly referred to, and addressed as /skokkiva:n/. His surname was treated as a freshly borrowed word.

We have examined some possible motivations for the length of consonants in recent borrowings, but found none satisfactory. First, Hungarian has no preference for heavy rhymes or closed syllables (or just traces of such a preference, cf. (5)–(6)); second, the double-consonant spelling in the source language is a sufficient, but not a necessary condition for BCL.

4. The rule

The data suggest that there is a rule at work here, which can informally be worded as in (11).

(11) Borrowed Consonant Lengthening (BCL)
In words marked as [+Foreign], a consonant must be long after a short vowel.

(Technically, (11) affects consonants in clusters as well, but those are shortened anyway by an independently motivated rule of Hungarian, cf. *sokkszerű* /šoksɛrü/ 'shock-like'.) Rule (11) should ideally be fully productive, applying to all forms that are input to it, i.e. all words that carry a [+Foreign] feature and have a VCV or VC# string. We shall see, however, that there are many exceptions in which the consonant is not lengthened even though the word is obviously a recent borrowing. This puts a serious limitation on the validity of my whole hypothesis: either I have to accept that we should speak of "tendency" instead of "rule", which does not sound very satisfying, or I have to say that the assignment of the [+Foreign] feature is arbitrary and does not directly depend on whether a word is actually a fresh borrowing or not. That the latter is not completely unscientific can be supported from Mohanan (1986, 8–9), who suggests a [+Latinate] feature for English words whose behaviour would otherwise be unpredictable (for Velar Softening, etc.). My [+Foreign] feature might be something analogous, though not with effects in cyclic rule application (since the words marked with it do not behave unusually from a Hungarian point of view, see Section **2** above) but with the effect that they conform to a stricter syllable structure template—i.e. Rule (11)—than Hungarian words in general. But even if my hypothesis is indefensible, I think that the phenomenon deserves description and comment.

5. German re-examined

The language which occupies a key position in this process is German. Let us re-examine the status of long consonans there: it will turn out that they are not wholly absent. Rather than taking present-day Standard German as basis, let us consider the pronunciation of German as it was current in the towns of Hungary and its neighbours up to the middle of this century, spoken by a significant minority as their mother tongue. I will call this "South-Eastern Urban German" (SEUG), to distinguish it from the rural German dialects of ethnic

German peasant colonists in Hungary (Schwaben, etc.). SEUG was spoken by the middle classes in the towns of Austria–Hungary, in Prague, Budapest, or Cluj-Kolozsvár-Klausenburg. It was based on the Bavarian-Austrian dialect of German.

While long consonants had got shortened by the sixteenth century in central High German dialects (**Binnenhochdeutsch**, the basis of today's Standard German), they remained long in most of the Bavarian-Austrian area. "Long" here stands for various phonetic features like length or tenseness or fortis ("sharp") articulation, any of which would strike the Hungarian ear as consonant length. Thus while /VC:/ became /VC/ in Standard German, it remained in Bavarian-Austrian, and consequently in SEUG. For exaple, MHG *sunne* /nn/ 'sun' > NHG *Sonne* /n/ but SEUG /nn/. Moreover, this syllable type was generalized in stressed syllables, so that any consonant (except in clusters) came to be pronounced "long" after a short stressed vowel. That is, /'VC/ became /'VC:/, e.g. MHG *gotes* /t/ 'God's' > NHG *Gottes* /t/ but SEUG /tt/.

The data for SEUG basically come from my own experience, as I grew up among such speakers. This type of German pronunciation is sparsely documented because it was not "dialectal" enough to interest dialectologists. By now it has practically become extinct as a vernacular. The literature, however, does give indirect support to my observations. "Mittelbayrisch: für das schriftdeutsche *t* steht ... das stimmlose *d*, jedoch nur nach langem Vokal, während nach kurzem Vokal der scharfe Laut eingetreten ist" (Reis 1912, 130). "Especially before the final syllables *-er* and *-el* former /m/ would appear to have become /mm/, e.g. MHG *hamer* > NHG *Hammer*" (Keller 1978, 404). "[Generally we find the lenition of all fortis (including geminate) consonants] but Bavarian ... former intervocalic geminates (*-pp-*, *-tt-*, *-kk-*, *-ff-*, *-ss-*, *-zz-*) ... remained fortis" (Keller 1978, 277).

In the SEUG variety of German a conspiracy works to ensure that any stressed syllable is "heavy", i.e. its rhyme is either made heavy by a long vowel (or a diphthong) or by a long consonant (or a cluster). This may be called Heavy Stressed Syllable Requirement, or "Heaviness Requirement" for short. Thus in a stressed syllable either the nucleus (the vowel) or the coda (the conaonant/s) must consist of two segments, i.e. we must have either /VVC/ (which may mean /V:C/) or /VCC/ (which may mean /VC:/). Putting it very simply, either the vowel or the following consonant has to be long in a stressed syllable. Standard Italian also fulfils this requirement (cf. *fāto* 'fate' with /V:C/, but *fătto* 'fact' with /VC:/); Hungarian, you will recall, does not. However, the pronunciation of Latin traditionally used in Hungary is subject to the Heaviness Requirement, because the two languages which transmitted Latin learning to Hungary, namely Italian and German (=SEUG), also are. Observe the Hungarian words in (12), which are all "learned" borrowings from Latin.

(12)	/V:C/			/VC:/	
	Vénusz	'Venus'	–	*penna*	'pen'
	fáma	'gossip'	–	*anno*	'way back'
	kázus	'fuss'	–	*passzus*	'passage'

Note that /z/ and /ss/ behave like a short-long pair, as shown also by *Jézus* 'Jesus' and its facetious derivative *jesszus* 'gee!'. The words in (12) obviously carry the [+Foreign] feature—many of them also defy vowel harmony—and this reinforces the domain of operation of Rule (11) which requires any [+Foreign] word to meet the Heaviness Requirement.

The rule does not hold for all syllables, but only for the one that carried the stress in the source language. Thus the second syllables of *Vénusz*, *passzus* do not show BCL. Conversely, *fatális*, *relatív* have the long vowel where the Latin words have the stress. It should be noted that with Latin borrowings, the Heaviness Requirement does not apply (i.e. /VC/ is permitted) if the syllable is the antepenultimate, even if it is the stressed one in the source language: *medikus*, *agonizál*, not **médikus*, **agónizál*. (This of course stems from the same tradition as English Trisyllabic Laxing, but we will not go into details of Latin borrowing here.)

Speakers of SEUG, including Hungarians who lived in towns or learnt German at school, saw their Heavy Stressed Syllable mechanism actually "justified" by the orthography of Standard German, which had come to spell a double consonant-letter after any short stressed vowel, merely to indicate the shortness of this vowel (Behaghel 1958, 35). It must have seemed proper, even in the eyes of the educated who otherwise strove to imitate Standard German, to pronounce a long (tense, etc.) consonant when the spelling had one. Thus they did not "correct" their SEUG pronunciation of, say, *Gottes* /tt/ to conform with Standard German /t/. It must have seemed equally proper to borrow such words into Hungarian with a long consonant, since Hungarian had long consonants anyway. Thus the notion took root in Hungary that German has a long consonant after any short stressed vowel—normally the first or only vowel of the word. Names like *Beck*, *Schmidt*, *Mann*, *Rippel*, *Koller*, *Presser* /ss/, *Eppich*, *Wittinger*, etc. are common in Hungary and are invariably pronounced with a long consonant, for local tradition says that this is the way a German word has to be pronounced.

The phenomenon is analogous to the way many other communities have a respectable local tradition of pronouncing some foreign language, especially a culturally superior one. Latin, Greek, Arabic, all have local pronunciations, as does English in India. Hungarian radio announcers regularly say *Honegger*, *Britten*, *Schiller* with the long consonant: it would sound uncouth or ridiculous to pronounce a short consonant in these.

6. Other languages in German garb

Since most loanwords have come from German, this pronunciation is extended to words that come from French or English. To illustrate this with an example from the vowels, E. *nylon* is /nɛjlon/ in Hungarian, not */najlon/ (which would be an equally possible string), in accordance with South-Eastern German /ɛj/ for Standard G. /aj/. Only very lately has this mechanism started to break up and give way to a more direct imitation of English originals, e.g. *file*, *byte* have /aj/, not /ɛj/.

English or American names, if they have some German resemblance, are pronounced in the SEUG manner in Hungarian even by people who are otherwise proficient speakers of English. *Arthur Miller* is /artu:r millɛr/ and *Leonard Bernstein* is /lɛonard bɛrnštɛjn/. In a recent Hungarian film for children, the hero was a fox called *Vuk*. This arbitrary coinage was pronounced /vukk/ by young and old, as if it were a German word: **Wuck*. The word *stressz* 'psychological stress' was borrowed from English in the 1960s, but was naturally adopted with initial /š/+consonant, as well as long /ss/ after a short vowel, to comply with SEUG phonology.

The word *sztyeppe* 'steppe' aptly illustrates the special status of BCL. The Russian original is *step'*, with a short /p/. The Western languages adopted the word with a double *p* in spelling to indicate the shortness of the vowel: Fr./E. *steppe*, G. *Steppe*. This latter was borrowed into Hungarian in the last century, regularly as /štɛppɛ/. After 1945, when Russian became well known in Hungary, the initial cluster was adjusted to resemble Russian, hence the present-day form *sztyeppe* /st'ɛppɛ/. Purists even drop the final *-e* as unjustified, thus *sztyepp*—but nobody thinks of shortening the /pp/, since the word is [+Foreign] and has a short vowel.

Non-Roman-alphabet names with intervocalic /s/ are spelt in German with *-ss-* to express the voicelessness of the fricative: *Nasser*, *Hussein*, because a single intervocalic *-s-* would be read as /z/. In Standard German this solution produces the required /s/, since there are no long consonants anyway; but in Hungarian such forms are pronounced (and re-spelt) with the long consonant, e.g. *Nasszer*, *Husszein*. This is a clear example of the influence of spelling and indeed such words do reach Hungary via the written media, but this influence is only able to override other factors because there is a tradition of "real German" (i.e. SEUG) syllable structure supporting it.

All this suggests that we may have to speak of a [+German] rather than a [+Foreign] feature. We shall come back to this in a later section.

7. BCL according to consonant type

The following examples are arranged according to consonant type. Some of the words vacillate between a long-consonant and a short-consonant pronunciation: this is indicated by %. No gloss is given for words cited so far, or where the meaning is obvious to the English reader.

A) Obstruents

BCL most frequently applies to voiceless obstruents. This follows from the phonology of German, where only voiceless obstruents could be "long" (or fortis, or "sharp", etc.).

Voiced stops appear long in a number of borrowed words, which fact shows the productive nature of the rule for Hungarian. The length of /ǰ/, however, is neutral in this respect. Voiced fricatives are excluded from BCL.

a) Voiceless noncontinuants: /p, t, k, t^s, č/. These undergo BCL very regularly in stressed syllables, and occasionally in final position.

/pp/ *tipp*, *sztepp*, *chip*, *galopp*, *sztyeppe*, *dopping*, as above; *drapp* 'drab', *stopp* 'hitch-hike', *klip* /pp/ 'video clip', *hippi* 'hippie', *stopper* 'stop-watch', *shoppingol* 'go shopping', % *floppy*, etc.

/tt/ *sitt*, *szet(t)*, *szonett*, *szvetter*, as above; *matt* 'checkmate', *gitt* 'putty', *szvit* /tt/ 'suite', % *brit* 'British', *petting*, *Betty* /tti/, % *mutter* 'mum', *Gutenberg* /gutt ~ gu:t/, *cutter* /köttɛr/ (a film-makers' term, now obsolete), etc.

/kk/ *sokk*, *pakk*, *vekker*, *prakker*, as above; *blokk* 'block', *pikk* 'spades', *rock* /kk/ 'rock music', *sikk* 'chic', *Jacques* /žakk/, *smakkol* 'go down well', *víkend* /vikk-/ 'weekend', *Black and Decker* /Blɛkkɛndɛkkɛr/, *McEnroe* /mɛkkɛnro:/, etc.

$/t^st^s/$ *vicc*, as above; *skicc* 'sketch', *necc* 'net', *procc* 'upstart', *hecc* 'riotous fun', *ziccer* 'easy catch', etc.

/čč/ *giccs*, *gleccser*, as above; *puccs* 'putsch', *meccs* 'match', *taccs* 'touch (in football)', etc.

b) Voiceless continuants: /f, s, š, x/.—Very regular in monosyllables, somewhat less regular in penultimate syllables. Long /xx/ is noteworthy since it hardly ever occurs in traditional Hungarian words; it probably belongs to the /h/-phoneme.

/ff/ *blöff*, *koffer*, as above; *muff* 'muff', *treff* 'clubs', *paff* 'flabbergasted', *maffia* 'mafia', etc.

/ss/ *stressz*, *asz* (so all names of modified musical tones, which end in *-sz*), *masszőr*, *esszé*, *jesszus*, as above; *slussz* 'the end', *plusz* /ss/ 'plus', *snassz* 'mean', *klassz* 'fine', *dzsessz* 'jazz', *bessz* 'baisse', *desszert* 'dessert', *smasszer* 'detective', *Debussy* /döbüssi/, *asszó* 'assaut', etc.

/šš/ *kuss*, as above; *plüss* 'plush', *tus* /šš/ 'China ink', *tus* /šš/ 'musical flourish', *Bush* /šš/, etc. Does not seem to undergo BCL in polysyllables: *Fischer* /š/, etc.

/xx/ *fach* /xx/ 'shelf', *krach* /xx/ 'collapse', *Bach* /xx/, % *shah*, *pech* /xx/ (after front vowels /x/ is more or less palatalised, i.e. [x'], or even [ç]) 'bad luck', *stich* /xx/ 'something fishy', *Bächer* /bɛxxɛr/, etc.

c) Voiced noncontinuants: /b, d, g, d^z, ǰ/.—There are few examples with voiced obstruents on the whole: the data mostly shows voiced stops in intervocalic position. However, there are not many counterexamples either, since the voiced obstruents are hardly ever found after a short vowel in recent borrowings.

/bb/ Hardly any monosyllables: % *klub* 'club', *DAB* 'beer brand', % *bob* 'bobsleigh'. Disyllables: *hobbi* 'hobby', *rabbi*, *Abba* 'pop group', % *tübing* 'tubing, iron lining' (note the /ü/).

/dd/ No monosyllables. Disyllables: *jiddis* 'Yiddish'.

/gg/ Hardly any monosyllables: % *szmog* 'smog', % *dán dog* 'Great Dane'. Others: *Heidegger* /hɛjdɛggɛr/, etc.

/$d^z d^z$/ Does not occur as BCL, though cf. *pizza* /$d^z d^z$/. *AIDS* is /e:$t^s t^s$/ or /e:ts/. The second is more in harmony with morpheme structure conditions, namely */V:C:/.

/ǰǰ/ An independent rule of Hungarian phonology requires postvocalic /ǰ/ to be long, therefore BCL applies to it vacuously, e.g. *bridzs* /ǰǰ/ 'bridge', *dodzsem* 'dodgems'. Very recent English loanwords begin to defy this rule and permit intervocalic /ǰ/, e.g. % *menedzser* /ǰǰ~ǰ/, *Roger* (always /ǰ/).

d) Voiced continuants: /v, z, ž/.—These never occur long in recent borrowings, i.e. they show no effect of BCL—but no counterexamples either, where they would be preceded by a short vowel. Syllables that end in a voiced continuant obstruent comply with the Heaviness Requirement by having a long vowel: *naív* 'naive', *gáz*, *rúzs* 'rouge', *blues* /blu:z/, *blúz* 'blouse', etc. In the name *Oz* (the Wizard), the /z/ is retained and the vowel lengthened, thus /o:z/ (usually spelt *Óz*). In the very recent borrowing *juice* 'fruit juice' the long vowel is retained and the fricative changed to voiced: /ǰu:z/. The same applies to the somewhat older *szervíz* 'service' (G. /zɛr'vi:s/). In *dzsessz* ~ *jazz*, the short vowel is retained and the fricative undergoes BCL, which automatically means a change to /ss/, since /zz/ is not permitted, thus /ǰɛss/ (cf. *Jézus* - *jesszus* above).

B) Sonorants

a) /m, n, l/ undergo BCL quite regularly.

/mm/ *stramm*, *dzsem* ~ *jam*, as above; *gramm*, *stimm* 'musical part', *szlem(m)* 'slam (in bridge)', *shimmy* /šimmi/ 'dance', *Stühmer* /štümmɛr/ 'chocolate brand', etc.

/nn/ *dzsinn* 'jinn', *finn* 'Finnish', *Wren* /rɛnn/ ⟨architect⟩, *Mann* /mɔnn/ ⟨writer⟩, etc.

/ll/ *hall*, *dollár*, *roller*, as above; *brill* 'diamond', *tüll* 'tulle', *kollázs* 'collage', etc.

b) /j/ undergoes BCL intervocalically, providing some of the most striking examples of the working of our rule. In final position /j/ does not seem to occur in recent borrowings, therefore there are no examples but no counterexamples either. The examples for intervocalic /jj/ come from German diphthongs (spelt *ei*, *ey*, *ay*, *eu*, *au*) whose glide element is reanalysed as a consonant in Hungarian; thus the diphthong is treated as a VC sequence, which is now input to the BCL rule. The few examples are mostly names.

> /jj/ *speyeri gyűlés* /-ɛjjɛ-/ 'Diet of Speyer', *Feuer* /fɔjjɛr/, *Mayer* /mɔjjɛr/ or /ma:jɛr/, *Peyer* /pɛjjɛr/, *dauer* /dɔuɛr/, vulgar /dɔjjɛr/ 'perm'.

Evidence for the long consonant in *Peyer* is provided by a widely-known song of the working class movement, in which three labour leaders are mentioned in a derogatory context, their names appearing in the plural: *Bücherek*, *Propperek*, *Peyerek*. The rhythm is the same for all three ("dum-de-dum"), thus /büxxɛrɛk proppɛrɛk pɛjjɛrɛk/.

c) /r/ is not subject to BCL in any position. Like /v, z, ž/, it is usually preceded by a long vowel, thus the syllable satisfies the Heaviness Requirement. For example: *kőr* 'hearts', *sir* /sö:r/, *bár*, *snúr* 'a game'. Interestingly, an *e* before *r* does not always lengthen to /e:/ as would follow from short-long vowel relationships in the language, but to /ɛ:/, which is otherwise rare, e.g. *Khmer* /kmɛ:r/, *Hair* /hɛ:r/, *Kner* /knɛ:r/ 'a famous printing house'; but cf. *primér* 'primary'. Intervocalic /rr/ is possible after short /ɔ/ (=spelling *a*): *Harry* /hɔrri/, *Harrer*, at least according to some informants.

8. BCL according to position in the word

The larger environment within the word also correlates with the incidence of BCL. We will touch upon the most important of these correlations.

A) Monosyllables

BCL is almost entirely predictable in monosyllables. Counterexamples are: % *pop*, *sznob* 'snob', *Fred* (and other English names in *-d*), *rum*, *gin* /ǰin/. All these, however, are heard with a long consonant, with somewhat vulgar stylistic overtones. The only hard counterexample is *busz* 'bus' which is always /bus/.

B) **Polysyllables**

a) Final long consonants.—BCL sometimes applies to the final consonant of words of more than one syllable, thus at the end of a syllable which is—a fortiori—unstressed in Hungarian, e.g. *szonett.* Often the words in question are end-stressed in German, which in turn takes them from French or Italian. It is characteristic of these words in Hungarian that the first (now stressed) syllable does not have BCL, therefore we get exactly the opposite of what the Heaviness Requirement prescribes—unless we apply it to the final (=originally stressed) syllable.

The voiceless stops and /l/ are found long in tis position, most typically in the endings *-ett* and *-ell.*

/pp/ *galopp* (< G. *Galopp* /ga'lɔp/)

/tt/ *szonett* (< G. *Sonett*, *krikett* 'cricket', *balett* 'ballet', *toalett*, 'toilet', *kvintett* 'quintet', % *klozet(t)* 'toilet' (< G. *Klosett* < E. *closet*), % *Hamlet*, % *sólet* 'baked beans' (note the heavy first syllable), *kokott* 'cocotte', *Edit* 'Edith', *kajüt* /tt/ 'cabin', etc.

/kk/ *barakk* 'barrack', *tarokk* 'tarot', *barokk* 'baroque'.

/ll/ *modell* 'modell', *kartell* 'cartel', etc.

Counterexamples: *küret(t)* /t/ 'abortion', *panel*, *hotel*, *fotel* 'armchair'.

b) Consonants before a long vowel.—BCL fails to apply to a consonant if the next vowel is long. This is analogous to the phenomenon mentioned in the previous paragraph; the source language form usually has the stress on the syllable which has the long vowel in Hungarian. Again, the Heaviness Requirement is fulfilled for the second of the two syllables, and we have an iambic configuration in many cases (e.g. *zakó*). For example: *japán* 'japanese' (in vulgar speech also /pp/), *frottír* /t/ 'terry cloth', *zakó* 'jacket', *plakát* 'poster', *brigád* 'brigade', *büfé* 'canteen', *sofőr* 'driver', *passzíroz* /s/ 'sift', *masszíroz* /s/ 'to massage', *hasé* 'hash', *blamázs* 'blunder', *primér* 'primary', *porcelán* 'porcelain', *roló* 'blinds', *kiló*, etc.

Counterexamples: *kollázs*, *passzázs* 'shopping arcade', *masszázs*, % *masz-szőr*, *esszé*, *asszó* (and some others—all are apparently from French).

c) Consonants before a short vowel.—It is in this position—that is, when both preceded and followed by a short vowel—that consonants behave the least predictably from the point of view of BCL. Besides the expected /VCCV/, which makes the first of the two syllables heavy, we often find /VCV/ in violation of the Heaviness Requirement. Still, it is worth outlining a few characteristic patterns.

Lengthening is very regular when the next syllable has *-er*, e.g. *vekker*, *ziccer*, *Stühmer* /mm/, *szvetter*, etc. etc.

BCL is normally absent before the ending *-i* (also *y*), especially in its function of diminutive, or playful abbreviation. There is a Hungarian formative in this function which of course does not cause lengthening, e.g. *Jani* from *János* 'John', *Kati* from *Katalin* 'Catherine', *isi* from *iskola* 'school'. Most borrowings in *-i*, *-y* (usually from English) also defy lengthening, e.g. *Johnny* /ǰoni/, *Billy* /bili/, *troli* 'trolley-bus', *hoki* 'hockey', *hifi*, *strici* 'pimp'. Compare *rock* /kk/, *rock and roll* /rokkɛndroll/ with its derivative *roki* /k/ and the verb *rokizik* 'to dance r.'. Compare *Lionel Ritchie* /riči/ with *Nina Ricci* /ričči/. Note also *bugi* 'boogie', *sztori* 'story', *frutti* /t/ 'toffee brand', *tutti-frutti* /t, t/ 'mixed ice cream'. Counterexamples are *hippi*, *hobbi*, % *floppy*, *Betty*, *Lassie* /lɛssi/ 'dog breed', % *Jimmy* /ǰim(m)i/.

Before other word-endings BCL is frequent (e.g. *dresszing* 'salad dressing', but many words have an unexplainable short consonant (e.g. *tenisz* 'tennis'. The spread of English will probably bring about the triumph of short consonants in fresh borrowings, and the BCL rule will cease to be active, at least for polysyllables. This process has begun: *Lennon* is /lɛnon/, not /-nn-/, *Thatcher* is /sɛčɛr/, not /-čč-/. We should therefore speak not of a [+Foreign] feature but of a [+German] feature, remembering that "German" here differs from standard German at some important points and is based on SEUG. Some English words, like *szvetter* and *dopping*, and all monosyllables, like *meccs*, *shop*, *szlem(m)* will have been marked with the [+German] feature in Hungarian, i.e. they will continue to comply wih the Heaviness Requirement.

It is not only fresh English borrowing that defy BCL and display a /VCV/ string: there is another group of words that is characterized by this. These words belong to very informal low-colloquial style or downright slang, and mostly derive from Slavonic, Gipsy or Yiddish, the languages traditionally supplying cant and jargon words (German *Rotwelsch*) in German-speaking places—which included, as we have seen, the towns of historical Hungary. When such words are used in Hungarian, it is the short vowel plus short consonant sequence—the nonapplication of the Heaviness Requirement in their stressed syllable—that marks them off phonologically as being not "German proper" (=SEUG) but low-colloquial or substandard foreignisms. (There are often other phonological markers, especially the nonapplication of Vowel Harmony, both in stems, e.g. *hekus*, and in suffixation, e.g. *gönnol* 'to wish good'.) Examples appear in (13):

(13) *duma* 'talk', *hekus* 'cop', *halef* 'knife', *manusz* 'guy', *krapek* 'guy', *pajesz* 'earlock', *balek* 'sucker', *kolesz* 'dormitory' (from *kollégium*), *samesz* 'assistant', *haver* 'pal', *fater* 'dad', % *mut(t)er* 'mum', *maszek* 'small dealer'.

The words *fater*, *mutter* do derive from German, yet belong to the low-colloquial (almost rude) stylistic layer: their sound shape classes them with the non-lengthening, i.e. [-German], words of (13).

We conclude that the lexical feature requiring a heavy stressed (originally stressed?) syllable, and therefore triggering BCL if the preceding vowel is short, is not exactly [+Foreign], since the words in (13), as well as the fresh English borrowings mentioned above, are (and are felt to be) foreign as well, but [+German].

In this sense *fater* and *mut(t)er* are [-German], while *dzsem*, *sztepp*, *szvetter*, *dopping* or *rabbi* are [+German], whatever their etymological source or borrowing history may be.

To conclude this section, let us list some counter-examples that have a short conaonant before a short vovel (other than final *-i*); our analysis is unable to account for these, unless we accept that they are arbitrarily assigned the [-German] feature.

(14) *liter* 'litre' (cf. *méter* 'metre'), *szuper* 'super', *Roger* /ǰ/, *fuser* 'bungler', *Ascher* /š/ ⟨name⟩ (maybe all words with intervocalic /-š-/?), *notesz* 'notebook', *tenisz*, *mammut* /m/ 'mammoth', *strapa* 'drudgery', *Opel* 'car brand', *pucol* 'clean' (cf. *puccos* 'dressed up'), *puding* 'custard' (E. *pudding*), *defekt* 'breakdown', *kredenc* 'cupboard', *modern* (in the last three German has end-stress).

d) Earlier syllables.—Syllables earlier than the last two are much less ready to undergo BCL than others. The Heaviness Requirement does not really apply to such syllables, since their lightness is counterbalanced by the two or more unstressed syllables following them. The word consists of enough moras even if the stressed syllable is light. (This is traditionally called "moraballancing", or *Morenausgleich* in German, and is relevant for English and medieval Latin as well.) Without attempting to order the data into patterns, let us list words where the antepenultimate syllable does undergo BCL (15) and others where it does not (16).

(15) *hollender* 'flare nut', *Offenbach*, *Rotterdam* /tt, mm/, *Wassermann* /vɔssɛrmɔnn/, *Gutenberg* /gu:t ~ gutt/, *Chatterley* /čɛttɛrli/, *Meyerbeer* /jj/.

(16) *hokedli* 'stool', *puszedli* 'tart', *tediber* 'type of velvet' (*Teddy Bear*), *hepiend* 'happy end(ing)', *pikoló* 'small glass beer', *terrier* /tɛriɛr/, *Challenger* /čɛlɛnjɛr/, *neszes(s)zer* 'toilet-case', *Jolly Joker* /jolijo:kɛr/.

9. Conclusion

We have seen that words borrowed from Western languages in the last two hundred years have generally satisfied the Heavy Stressed Syllable Requirement even after their adoption into Hungarian, or actually made to conform to it (*szvetter*). One way of achieving this is Borrowed Consonant Lengthening, that is, making (or keeping) the consonant long after a short stressed (or originally stressed) vowel. In this Hungarian follows the now extinct local "respectable" variety of German, "South-Eastern Urban German", which also obeyed the Heaviness Requirement, unlike Standard German, which only appears to do so by graphically doubling consonants after short stressed vowels, but pronouncing them short.

BCL is extended to words from other languages, especially monosyllables, and disyllables ending in *-er* (but not disyllables ending in *-i/-y*). Such words, whatever their actual etymology, can be said to carry a [+German] feature. This is a lexical feature, and its role is to place the template of Heavy Stressed Syllable on the word. Sometimes the heaviness is realized in the last (now unstressed) syllable of the word; this is related to its being end-stressed in German, but must probably be regarded as an irregularity in Hungarian. Consonants before a short vowel (other than *-er* or *-i*) are the most unpredictable. Within this environment, fresh English borrowings (*Lennon*) do not comply with the Heaviness Requirement: they are no longer borrowed as [+German]. Nor do low-colloquial or slang words, even if etymologically from German (*fater*; *samesz*) comply with it: they are also [–German]. It seems to be a marker of their substandard or "low" nature not to follow the requirements of educated borrowing via Urban German.

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ON FAST SPEECH

PÉTER SIPTÁR

The term 'fast speech' is often used rather vaguely, with no exact definition or interpretation in mind. Of course, we all think of roughly the same types of things when we encounter this label: fusions and assimilations, the dropping of vowels or consonants or even whole syllables, the appearance of special allophones, etc. But is it really the speed of speaking that underlies and induces such processes? For example, the utterance appearing in (1) is a typical example of (extremely) fast speech:

(1) [ɔsmˈɛ:knɛmatˢɛmɛnıˌsj̃ãzbɔ]

At the other end of the scale, the (extremely) carefully articulated, 'impeccable', clearly enunciated version of the same sentence (*Azt hiszem, el kellene már egyszer menni színházba* 'I think we should go to the theatre at last') is also quite simple to identify (□ stands for 'pause'):

(2) [ˈɔst hisɛm □ ˈɛl kɛl:ɛnɛ ma:r ˈɛtʸsɛr ˈmɛn:i ˈsi:nha:zbɔ]

In what follows, the stratum of utterances like (2) will be referred to as **guarded speech**. Although an almost infinite range of intermediate stages is imaginable between those two extremes, the following two additional terms will suffice for classificatory purposes: examples like (3) will be referred to as instances of **colloquial speech** (CoS), whereas those like (4) will be taken to represent **casual speech** (CaS):

(3) [ˈɔsisɛm ˈɛl kɛl:ɛnɛ ma: ɛtˢ:ɛr ˈmɛn:i ˈsĩ:ɦa:zbɔ]

(4) [ɔs:ɛm ˈɛ:ke:nɛma: ɛtˢ:ɛ: mɛn:i ˈsĩ:azbɔ]

Superficially, the assumption that, by increasing the tempo of speech, (2) will automatically be converted into (3), then into (4), and ultimately into (1), appears to be fairly plausible. But is it true? It is easy to see why not. Consider the type of case occurring quite often in the radio or television when, for some reason, the announcer must speak faster than usual—yet he preserves all features of guarded speech as in (2). In other words, he strictly obeys the norms of fair-spokenness, even including cases which would, under normal circumstances, qualify as spelling pronunciation or at least a mannerism with respect to educated everyday speech such as [si:nha:z] for *színház* 'theatre'. It is true that one has to be a well-trained professional speaker to be capable of such accomplishment, especially under very substantial increase of speed: yet we should not disregard this type of speech (referred to henceforward as **accelerated speech** in order to be clearly distinguished from natural fast speech) since its existence is one of our main reasons to claim that increase of speed is not the only, in fact not even the most important, prerequisite for what are usually called 'fast speech processes' (even though their application normally cooccurs with increased speed of delivery). Another major type of justification for the distinction we try to draw here is that, although to utter (4) typically takes less time than to say (3) and the version that involves the longest time span is normally (2), all three variants may occur in a protracted, extremely slow tempo as well.

The foregoing considerations take us to our first conclusion: the differences among 'guarded speech', 'colloquial speech', and 'casual speech' (as the choice of terminology suggests) are not a matter of speech tempo but rather that of speech style. Let us tabulate what we have so far:

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="3">Speech style</td></tr>
<tr><td>Formal</td><td>Neutral</td><td>Intimate</td></tr>
<tr><td rowspan="3">Speech tempo</td><td>Normal</td><td>Guarded Speech
(GS) (2)</td><td>Colloquial Speech
(CoS) (3)</td><td>Casual Speech
(CaS) (4)</td></tr>
<tr><td rowspan="2">Rapid</td><td rowspan="2">Accelerated Speech
(AS) (2)</td><td>Swift Speech
(SS) (5)</td><td>Fast-Casual Speech
(FCS) (1)</td></tr>
<tr><td colspan="2">FAST SPEECH</td></tr>
</table>

Thus, the term 'fast speech' will encompass speeded-up colloquial (=swift) as well as speeded-up casual types of speech. An example of **fast-casual speech** (FCS) has been given under (1) above; a typical instance of **swift speech** (SS) is perhaps as follows:

(5) [ˈɔsisɛm ˈɛkɛɛnɛ maɛ̯tˢɛ mɛn:i ˈsĩãzbɔ]

As the examples suggest, one and the same phenomenon will refer the utterance to various styles, depending on rate of delivery. For instance, *l*-deletion in *el* 'away' or *r*-deletion in *egyszer* 'once' can be found in a neutral style if the tempo is fast enough (SS), whereas at a normal (and especially at a slow) rate it will characterize intimate styles only (CaS). On the other hand, *r*-deletion in *már* 'already' is lexically-determined and occurs in normal-tempo colloquial speech as well. In fact, it is not quite accurate to speak of *r*-deletion here. To see why, consider a parallel but more obvious case. The *n* of *-ban/ben* 'in' does not delete phonologically: otherwise it would (i) only delete before continuants and (ii) would trigger compensatory lengthening and nasalization of the left-flanking vowel, cf. [vɔ̃:sɛrɛn̲če:m] *van szerencsém* 'I'm lucky' (form of greeting) vs. [vɔmbɛn:ɛ] *van benne* 'there is (sg) in it'. Rather, the absence of *n* in *-ban/ben*, observable in any phonetic context and yielding a short, non-nasalized vowel: [bɔ]/[bɛ], is a lexical (allomorphy) phenomenon. Similarly, the use of [ma:] for *már* 'already' is a nonphonological matter, only indirectly related to *r*-deletion as in *egyszer* in (5).

Further examples of lexical choice include the CaS forms [ɔs:ɛm], [ke:nɛ], [ɔsonʸdʸɔ], [toŋke:p:ɛn] for *azt hiszem* 'I think', *kellene* 'should', *azt mondja* 'he says', *tulajdonképpen* 'in fact', respectively. This is not to deny that such forms **originate** in fast speech processes; however, the processes involved do not apply over and over again during speech: these forms are available ready-made in our mental lexicon. Similar pairs of items can also be found in GS: *azután>aztán* 'then', *talán>tán* 'perhaps', *mondotta>mondta* 'he said'; fast-speech origin can be recognized in these, too, but the use of the short forms by no means involves increased rate of delivery. Perhaps less obviously, but the same holds true for the CaS examples cited above as well.

Notice that most of these lexicalized CaS forms involve function words ([ma:] *már* 'already', [minʸdʸa:(r)] *mindjárt* 'immediately', [mɛ(r)] *mert* 'because', [mɔj] *majd* 'later', *kéne*, *tán*, *aztán*, etc.) or speaker-oriented material which is not strictly part of the message ([ɔs:ɛm] *azt hiszem* 'I think', [toŋke:p:ɛn] *tulajdonképpen* 'in fact', [ɔsonʸdʸɔ] *azt mondja* 'he says', [sɔ] *szóval* 'in other words', etc.). Why is that? Such items exhibit a fairly high frequency of occurrence, relatively low information value, and a lack of emphasis; these properties are of course interrelated and (partly) follow from one another. As a consequence, this type of material will be pronounced softer and at a lower pitch and, more important from our point of view, will normally also 'stick out' of the rest of the sentence both in terms of speed and casualness. Paradoxically, although it might be expected that the rest of the sentence can 'catch up with' these hasty portions as its overall speed or casualness increases, what actually happens is just the opposite: the faster the context, the more marked this 'precipitate' effect becomes. Hence, these FS/CaS forms will easily get lexicalized and crop up even when the context is neither particularly fast nor remarkably casual.

Given that speech situations favouring the acceleration of speech simultaneously tend to allow for a shift along the style scale towards the 'intimate' end (and vice versa: more intimate styles in general go together with increased speed), the two terms in the above taxonomy that are the most difficult to tell apart (and are, consequently, confused most of the time) are **casual speech** and **fast speech**. (See Siptár (1988) for discussion.) Fortunately, there are languages where this distinction is easier to pin down: consequently, looking at languages of this type might help in establishing the differences we are trying to capture, an enterprise that is in principle necessary for any language. As Hasegawa (1979) points out in a very interesting paper, Japanese is one of these 'more transparent' languages. Her conclusions, although their demonstration can be made more convincing than usual on Japanese material, equally hold with respect to any language:

Rate-dependent (FS) rules are phonetically motivated, lack syntactic conditioning, and apply in any style of speech as long as it is sufficiently rapid. Register-dependent (CaS) rules, on the other hand, may be phonetically arbitrary, syntactically restricted, and insensitive to rate of speech. And what is perhaps the most important: they apply only within a given style, i.e. they are sociologically conditioned.

So far, we can totally agree. But Hasegawa goes on to claim that register-dependent rules are, in fact, not phonological at all; they are so nonproductive that the variants present in different styles should be listed as allomorphs in the lexicon rather than being derived by the phonology. This appears to be true of Hasegawa's examples and, as was pointed out above, in a number of cases in Hungarian as well (cf. *-ba(n)/be(n)* 'in', *má(r)* 'already', as well as *asszem* 'I think', *tonképpen* 'in fact', etc.), but it will not work for many non-rate-sensitive processes in other languages. Kaisse (1985) discusses a number of rules taken from various languages pointing out that these rules (e.g. **liaison** in French or **raddoppiamento sintattico** in Italian) meet Hasegawa's criteria for register-dependent rules: they apply in slow speech as well as fast, they are sensitive to style or register, they are syntactically conditioned, and their phonetic motivation is not obvious. However, should we wish to consider these processes nonphonological, we would run into the problem that they apply to essentially every word of the language that meets their structural description. Hence, if we wanted to describe such phenomena in terms of allomorphs, it would be necessary to list two or more variants for all the appropriate items in the lexicon.

Accordingly, Kaisse proposes a three-way distinction among connected speech phenomena where Hasegawa has only two. Some variants can be best accounted for by listing suppletive allomorphs (respectively, pairs of word forms or phrases where the casual variant involves several morphemes) in the lexicon. Examples: [sɔksɛt] for *szakszervezet* 'trade union', [ta:šɔmtoma:n^y] for *társadalomtudomány* 'social science', [va:titɔna:č] for *vállalati tanács* 'Board of Directors', and the function-word cases cited above (whose number could be multiplied). Other variants are produced by what are called rules of external sandhi. These rules are part of the phonological component, but they have syntactic, morphological, and/or lexical conditions in addition to phonological ones. A potential Hungarian example would be *l*-palatalization if Vogel and Kenesei (1987)'s analysis is correct. Cf. *'Pál 'fél 'Jánostól* 'Paul is afraid of John' (neutral reading, no palatalization) vs. *"Pál fél Jánostól* 'It is Paul who is afraid of John' (focus on *Pál*, palatalization of *l* in *fél* ([fe:j:a:noštol])) and *Pál "fél Jánostól* 'Paul is indeed afraid of John' (focus on *fél*, palatalization applies). Finally, there are rules of fast speech, which are dependent entirely on rate and phonological information. Examples: *h*-deletion as in *tehát* 'hence', *lehet* 'may be', etc.; full assimilation of intervocalic clusters as in [bizoš:a:g] *bizottság* 'committee', [a:la:šfol:ɔla:š] *állásfoglalás* 'standpoint', [kiit:ɔt] *kiiktat* 'eliminate'; consonant elision as in [nɛɛdne:d^y] *negyed négy* 'quarter past three', [mɛɛtrɛnd] *menetrend* 'schedule', and so on. (Notice that the dividing line between the first and third types is not particularly clear-cut or easy to draw: the historical source of the allomorphic rules is often some frozen fast-speech rule that became lexicalized as time went by; particular lexical items may have reached various stages of this 'freezing' or lexicalization.)

Kaisse's model is almost entirely satisfactory (fuzzy data aside), but there is a minor difficulty we have to mention. In her framework, postlexical phonology consists of two strictly distinct sets of rules: sandhi rules and fast speech rules, applying in that order. But then: where should we put rules like **voicing assimilation** in Hungarian? This rule is obviously postlexical: it applies across word boundary just as much as within words or indeed morpheme-internally.

On the other hand, it cannot be a sandhi rule since it is phonetically motivated or 'natural', and is constrained by no syntactic, morphological, or lexical factors (that I know of): in other words, it applies 'across the board', irrespective of the number or type of intervening boundaries. Finally, it cannot be a fast speech rule, either, since the speed of speaking does not have any effect on it. Such effect might come in two possible varieties: the rule could be constrained to apply above a certain speed limit only, or its domain of application could extend as speed increases (cf. Nespor (1987, 81) on this distinction). Voicing assimilation in Hungarian is not speed-dependent in either of these two ways: it applies **obligatorily** at any rate of speech and in any style or register.

However, we might assume that this rule is a special case of sandhi rules whose application is 'constrained' by an **empty** set of syntactic, etc. conditions. In this case, the only remaining problem we have to look at is whether this assumption is compatible with a strict separation and the prescribed order of application of the two blocs of postlexical rules. If, for instance, we found a feeding relationship between some fast speech rule and voicing assimilation, we would either have to abandon the idea of a two-component postlexical phonology or else voicing assimilation would turn out not to be a sandhi rule even under the concession suggested in this paragraph.

Let us therefore pick out a fast speech rule and see what ordering relationship obtains between that rule and voicing assimilation. Let this rule be the simplification of morpheme-final consonant clusters as in (6).

(6) $\begin{bmatrix} +\text{cor} \\ -\text{strid} \end{bmatrix} \longrightarrow \emptyset \; / \; [+\text{cons}] \_\_ (\#) \; [+\text{cons}]$

This rule is rate-dependent in the sense that its domain of application widens with increasing speed. In cases like *dobd bele* [dob:ɛlɛ] 'throw it into it!' (i.e. where the flanking consonants are identical stops), the rule applies in normal-speed colloquial (noncasual) environments, too. If we increase speed, the type of cases that first enter the scope of the rule are those where the flanking consonants are still identical but not necessarily stops: *húst süt* [huš:üt] 'he fries meat'. The next step involves nonidentical obstruents as in *most pedig* [mošpɛdig] 'and now', *részt vesz* [re:svɛs] 'participate'. Increasing speed further, the rule extends to cases with sonorants on either side or on both sides: *fogd meg* [fogmɛg] 'grab it!', *várd meg* [va:rmɛg] 'wait for him!', etc. Where the left environment contains a nasal, as in *mind bejöttek* [mimbɛjöt:ɛk] 'they all came in', *kend vele be* [kɛŋvɛlɛbɛ] 'smear it with it!', *pont kétszer* [poŋke:t^s:ɛr] 'exactly twice', our rule feeds another fast speech process, the place assimilation of nasals (notice that this latter is a fast-speech extension of a lexical phonological and/or word level postlexical (sandhi) rule which, however, is non-rate dependent and obligatory word internally, cf. *ro*[m]*bol* 'destroy', *ro*[n]*t* 'spoil', *ro*[n̲]*cs* 'wreckage', *ro*[n^y]*gyos* 'tattered', *ro*[ŋ]*gál* 'dilapidate').

What ordering obtains, then, between voicing assimilation and this cluster-simplification rule? Examples like *lisztből* 'out of flour', *rázd fel* 'shake it up!' seem to allow either order:

(7) (a)		/listböl/	/ra:zd#fɛl/
	Cluster Simpl.	∅	∅
	Voicing Assim.	z	s
		[lizböl]	[ra:sfɛl]
(b)		/listböl/	/ra:zd#fɛl/
	Voicing Assim.	zd	st
	Cluster Simpl.	∅	∅
		[lizböl]	[ra:sfɛl]

(Notice that voicing assimilation is a **spreading** rule: it does not simply assimilate the last-but-one obstruent to the last one—rather, it 'spreads on' to the left as far as it encounters adjacent obstruents.)

If, on the other hand, we go on to examine cases where the rightmost consonant is a sonorant, we can see that the order predicted by Kaisse is not only **possible**, but **the only** possible order:

(8)	*oszd meg*	*azt mind*	*tartsd meg*
	'divide it!'	'all of it' (ACC)	'keep it!'
(a)	/osd#mɛg/	/ɔzt#mind/	/tɔrčd#mɛg/
Voicing Assim.	z	s	ǰ
Cluster Simpl.	∅	∅	∅
	[ozmɛg]	[ɔsmind]	[tɔrǰmɛg]
(b)	/osd#mɛg/	/ɔzt#mind/	/tɔrtčd#mɛg/
Cluster Simpl.	∅	∅	∅
Voicing Assim.	–	–	–
	*[osmɛg]	*[ɔzmind]	*[tɔrtčmɛg]
	(= *ossz meg*	(= *az mind*	(= *tarts meg*
	'divide me!')	'all of it' NOM)	'keep me!')

(For *oszd meg* and *tartsd meg*, we did not start from underlying /ost+j+d/ and /tart+j+d/, respectively, but rather from an intermediate representation, the output of lexical phonology. Notice also that for *tartsd meg*, another application of (6) (or rather a deaffrication process as [ǰ] is a single segment here) is a further possibility, yielding [tɔržmɛg].)

The conclusion we can draw from this example, then, is that Ellen Kaisse's conception of the internal organization of postlexical phonology is confirmed—or at least not refuted—by the Hungarian rules considered here (provided that we allow empty syntactic conditioning).

*

The exact definition of what 'fast speech' is becomes vitally important in view of the fact that various theories of phonology often refer to fast speech processes. (For a good overview, cf. Lass (1984, 294–314) and the references cited there.)

In natural generative phonology, for instance, fast speech phenomena are given great emphasis: this follows from the general perspective of that framework. See discussion in Hooper (1976, 111–6) where the author expounds her own ideas in terms of how she disagrees with what Stampe's natural phonology has got to say about fast speech. See further Rudes (1976) and Bolozky (1977); the views of these two authors differ over a number of cardinal issues, e.g. concerning whether discrete levels of speech tempo can be established or the whole scale of tempos should in principle—i.e. not merely because levels are empirically difficult to separate—be seen as a single continuum.

Among current theories of phonolgy, it is primarily the various theories of the 'syntax/phonology interface' that take special interest in these matters (cf. Selkirk (1984); Kaisse (1985); Nespor–Vogel (1986); for a comparison, with special emphasis on the role of fast speech rules in these three frameworks, see Nespor (1987)); but even non-linear phonologies—autosegmental, metrical, dependency, etc.—may benefit from a consideration of fast speech rules (see Lodge (1986) for details). Considerations of space prevent us from a thorough review of relevant claims in all of these schools of thought; Kaisse's conception, which is perhaps the most influential approach to 'connected speech' at present, has been briefly considered above.

In conclusion, let us recapitulate the major points we have made concerning the notion of 'fast speech'.

- It is by no means the case that whatever belongs to the postlexical phonology (or connected speech rules) of a language qualifies as 'fast speech'.
- The differences among the stylistic strata we have referred to as 'guarded speech' vs. 'colloquial speech' vs. 'casual speech' are not a matter of rate of delivery, although
- an increase in tempo usually (but not necessarily, cf. 'accelerated speech') goes hand in hand with a shift towards more casual styles, and
- more intimate speech situations usually favour an increase in rapidity.
- The consistent separation of CaS rules and FS rules is made rather difficult by the fact that a number of (optional) phonological rules can apply both in 'swift' (fast noncasual) and in nonfast casual speech—in a way that the higher the tempo the less casual impression is made by one and the same phonological phenomenon.
- Function words (and, depending on the speaker, certain other high-frequency lexical items, such as nouns) may stick out of the sentence as a whole in terms of style and/or local rapidity, hence
- such items may, in due course, develop lexicalized casual versions or 'weak forms';
- the use of these, however, is not rate-dependent on the one hand, and is not a matter of phonological rules but rather that of lexical choice on the other.

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ON HOW WE SPEAK WHEN WE SPEAK AS WE SPEAK (MULTI-LAYER *PR* AND (POST-)POSTLEXICAL PROCESSES IN HUNGARIAN)

TAMÁS SZENDE

0. The goal of this paper is to give an account of that aspect of the temporal structure of speech in which the structure of an utterance in a phonetic sense and the specific durational relations mutually influence each other, the former as a function of time, the latter as a function of the former structure. Since we believe that these mutual effects are realized in the distortion of the sequence of segments, more precisely in its lenitive processes with respect to the primary, idealized articulatory, i.e. systematic phonetic, representations of the (underlying) phonological representations of the sequences, two problems must be tackled in some detail: (i) the description of the underlying representation and (ii) the notion of 'lenition' as a post-postlexical process.

As the basic goal aimed at temporal structure clearly suggests, the two factors, the temporal phonetic structure and duration will not be treated as independent from each other, even if in theory both can be given a separate definition on a higher, more abstract level which does not directly connect the two things. Both the utterance as the linearly and nonlinearly concatenated sequences of basic constituents and time (duration) as the absolute organizing principle of events within the event space can be grasped without presupposing the other; however, speech communication is necessarily constituted by both.

The aspect noted above in fact covers a wide range of themes. We would like to delimit these themes by simply ignoring details and take for given the set of the undistorted variants of possible Hungarian speech utterances. This restriction, naturally, raises serious theoretical problems which must be briefly discussed, or at least touched upon, later. With this restriction in mind the goal of this paper can be stated as follows: to describe and classify those regular processes of pronunciation which take place in utterance phases of different magnitude in an input string form represented in the appropriate phonological framework as part of the tolerance band of pronunciation regarded as normative; that is, in the speech of standard language. The nature and range of my research is illustrated in the following example. In an s_i communicative situation, in which four people conduct a conversation about a topic that was given

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beforehand, one participant gives his contribution in the form of the emphatic sentence *Szóval nem!* 'So you won't!' which is a self-contained, complete unit of utterance, a very passionate rejection of the opponents' argument. The analysis will be restricted to the macroscopic segmental phonological description of the utterance. Thus we will disregard several aspects of content (contextual, semantic, pragmatic) as well as grammatical, suprasegmental phonological and phonetic factors which are all involved in the communicative situation. The utterance *Szóval nem!* thus appears in the following form:

(1) /#so:vɑl# #nẹm#/

Note that by assigning this representation to this form we introduced further, implicit constraints in the description. (i) We presupposed that there is a finite set of the segmental phonological units and the relations connecting them which can be defined, and it is exactly these segments above which adequately reflect the utterance. In other words, it is presupposed that Hungarian has short and long vowels and at least two phonemic nasal consonants, that this sequence contains only the word boundary feature and no other morpheme boundary feature, and so on and so forth. Also, it is implied that the segmentation in the example is authentic, though this is merely one possible and often used variant of phonological analysis and its exclusive adequacy is strongly debated (cf. Upside-Down Phonology and Griffen 1981). (ii) The given form can be the starting point for the pronounced form rather than (only) the endpoint of a derivation which derives from the pronounced form. For the derivations do not necessarily involve the same steps in the case of the opposite starting point and direction (cf. Eliasson 1981). (iii) Finally, we exclude from the analysis all those phonetic rules and processes, for example the nasalization of [l] or the sequence [ɑl] and in general all instances of partial assimilation, which either universally or in a language specific manner shape the pronunciation by automatic regularity even in ordinary, lento mode. This is because the rules of partial assimilation are coded in a (sub)segmental programming automation (cf. e.g. Vértes O. 1958; Elekfi 1968) and they do not distinguish meaning.

The description in (1), though phonologically very revealing, does not in itself say nearly anything about the utterance in question. The produced variant which most closely follows the underlying representation of the utterance given in (1) is as follows:

(2) [so·vɑl nẹm]

In the recording this pronunciation form can be recognized at best only in traces and only by somebody who speaks Hungarian as his mother tongue.

What is heard, or more precisely, what somebody with no knowledge of Hungarian can hear is the "distorted" variant of the form above, in broad transcription:

(3) [[sa'nẹm:]]

It is easy to see without further ado that, on the one hand, (2) and (3) belong together, for both are—in set-theoretical terms—in one-one correspondence with and only with (1), and on the other hand that (2) and (3) in some way follow from one another. Their difference lies in the difference of their pronunciation program. It seems that the [[a]] part of the variant in (3) represents a four-member, nonindependent section of (2):

(4) [o·vɑl] $\leftrightarrow$ [[a]]

and, similarly,

(5) [m] $\leftrightarrow$ [[m:]]

and while the correspondence noted in (4) shows an "articulation surplus" for the form [[ ]], that in (5) does the same for the form [ ], certainly without canceling out the identical nature of the correspondences (1) $\leftrightarrow$ (2) and (1) $\leftrightarrow$ (3) through the differences. It is a fact, however, that (1) is harder to derive from (3) than from (2), for—as can be seen in the correspondence with (4)—the form [[a]] is the articulatory realization of four phonemic segments simultaneously and in principle requires $2^4=16$ binary decisions for identification, while the identification of the section [o·vɑl] of (2) follows from itself on the basis of one single decision. In accordance with the condition that (2) is closer to the underlying representation we have to derive (3) from (2): ((1) $\longrightarrow$) (2) $\longrightarrow$ (3), and this derivational chain looks like (3) $\longrightarrow\!\!\!\!\longrightarrow$ (1) from the point of view of the hearer.

(3) can only follow from (2) when certain specific conditions hold and certain rules apply which express these conditions. We have to be able to say then (i) what should happen to (2) phonetically in order to appear in the articulatory variant in (3), and—if we can—(ii) what this modification derives from.

We have to add—using the terminology of the theory of "double (en)coding" of Fónagy (1971)—certain distortion rules in the derivation of (2) determined by (1) which bring about the alternations. In the given case, bearing in mind the noted factors, the realization of the sentence *Szóval nem!* can be described in (6) and (7) as follows:

(6) (i) [s(o ·vɑl)] ←-- <e; ‘discourse modifier’ position>
↓ LEN (reduction over the sequence)
(ii) [[sa]]

(7) (i) [’nẹ(m)] ←-- <phrase boundary + pause; stress>
↓ FORT (lengthening)
(ii) [[’nẹm:]]

The explanation of the notation and the attributes is as follows.

/ / denotes that the units in between the slashes belong to a phonological category and the letters are symbols of phonemic units;

[ ] denotes a ‘first-order’ (that is, close to the phonological representation) normative ‘lento’ phonetic representation which is possible in pronunciation (is generally isolated but does not appear in this form in every production), which is free of distortion, is made independent of context and suprasegmental factors, represents a self-contained phrasal unit, and which is directly determined by the underlying representation;

[[ ]] denotes the distorted phonetic representation

( ) that section of the pronounced form which is directly affected by a distorting process;

< > the factor(s) serving as the source of distortion;

____ [= italic] the graphic picture of the utterance in its correct spelling;

⟶ the derivation and its direction: the entity on the left-hand side of the arrow becomes the entity on the right;

⟶⟶ denotes that the derivation takes two (or more) intermediary steps;

--→ denotes a cause bringing about an alternation and the effect the arrow points from the source of the effect towards the entity undergoing the change;

-→-→ the change takes place in two (or more) steps;

$ denotes syllable boundary;

LEN and FORT: the basic types of distortion: next to LEN[ition] and FORT[ition] we include the (sub)types of distortion in parentheses, e.g. FORT(lengthening) = a fortition type which is realized in a relatively longer duration of one or more segments;

lento and allegro: metaphors for complete, undistorted vs. incomplete, distorted pronunciation of the utterance, with indirect reference to tempo effects.

In accordance with the above <e> in (6i) denotes that the 'illabial' component of the vowel in the form [[sa]] came into being through the effect of the [['ę]]—which itself is illabial—in a strongly stressed later section of the sequence. For the same example, the position 'discourse modifier' means that the word *szóval* as an adverb—as opposed to the phonemically identical noun with case ending—does not belong structurally to the one-word sentence *nem* that it introduces but it simply refers to it as a communicative connective element. In (7i) the sources of distortion are the markers of the phrase structure as well as the intensive presence of a suprasegmental feature.

1. For Hungarian there have been few investigations up to the present which would give a regular analysis of the phonetic characteristics of a large corpus of spontaneous speech. Thus some works are, in a sense, to be regarded as exceptions which consider the full corpus of spontaneous language use at least for certain aspects of it (see e.g. the distributional relations of alterant form in G. Varga 1968; the tendencies of alternations in the pronunciation of certain phone types in E. Abaffy 1975; Fónagy–Fónagy 1971; pause durations in Hegedüs 1953; the distributional relations of certain atomic components in Szende 1973; for process-phonological aspects see Kerek 1977, Vogel 1987). This is true in spite of the fact that the scientific significance of such investigations is undisputable. In addition to their usefulness they can protect the discipline from the temptation of theoretical ephemerism and from the situation in which the linguistic intuition of the researcher and the judgement of informants providing authentic information coincide. The real theoretical and methodological problems, however, do not derive from the insufficiency of the scientific history of the defined objectives but rather—I believe primarily—from the seemingly infinite abundance of the corpus on the one hand, and in general from the insufficient inventory of the methodology on the other. Below I would like to touch upon these problems.

1.1. What should we regard as sufficiently informative and at the same time properly authentic material with respect to exploring the actual pronunciations? I have answered this question in the simplest possible way, with some kind of a naive certainty, by choosing the given procedure. In the fall of 1986 I had four young intellectuals between 20 and 22 talk, three females and one male, putting one male intellectual of 43 among them in the silent-room of the Linguistic Institute of the Hungarian Academy of Sciences for the period of two full hours. All of them knew that the conversation was being recorded, otherwise the only instruction they were given was that they should talk about the previously agreed topic. The age restrictions were complemented by another one. All the four young people were students being trained to be teachers, thus, potentially professional speakers. For I found that I could get a representative sample from those who were careful about pronunciation; the strict adherence to articulatory norms can better filter out contingencies. What was to remain after this filtering, I thought, would perfectly mirror the real situation with respect to regularities of pronunciation to be explored. However, my expectation that the environment and the presence of microphones would encourage the subjects to speak carefully with stylized articulation was not met at all. After the first few minutes of the conversation (when different views came to the surface) the participants completely forget about the circumstances.

The taped material—on the basis of word-to-word and sound-to-sound identification—contained approximately two thousand different phenomena belonging to roughly fifty different types which are unknown to any rule or previous description.

1.2. Compared to what systematic, phonetic and in general linguistic categories must and can the phenomena be discussed which are offered for analysis by the registered data? The theoretical insufficiencies of traditional methodology suggest that we need considerably knew, innovative methods.

As the example in the introduction shows, in every single case we have to have a clear picture of the phonological form of the unit carrying one of the types of distortion. It is very difficult to find the right and easy device to achieve this—partly because the chosen description of the underlying representation is theory-dependent. (The practical difficulties deriving from this fact are wittily illustrated by Kenstowicz–Kisseberth (1977) when discussing the contradictions of traditional analysis.) For the objective of processing I chose the in some sense naive analytic–descriptive method which is briefly defined in the introduction explaining the notations /   /, [   ] and [[   ]] for the example. Since with this the matter is not settled yet, and since the conclusions to be drawn from the investigations will be to outline a proposal to give a more realistic definition of the underlying representation, some aspects of this question will also be taken up separately in sections **1.4** and **1.5**.

Even if we do not go on searching for the determinants outside of phonetics which play a role in the final shaping of the articulatory form, we have to reckon with the requisites of the full range of speech communication. Among the motives for distortion there are several that are in a direct causal relation with a lenition or fortition process. This was illustrated by the examples in (6i) and (7i).

1.3. What are the epistemological traps we have to avoid in order to arrive at reliable conclusions? This problem is more closely methodological than the previous one in **1.2** above.

1.3.1. The strategy of the research conceals a seemingly insoluble epistemological dilemma. In case we want to build our investigations on certain processes of the articulation, but in a fashion that we in no way intervene in the spontaneous speech production, then from the very first we give up those classical procedures (palatography, registration of pressure and current, electromyography, etc.) which can give firsthand data as to what is going on in the process of speech production. In other words, we have to take upon ourselves the responsibility that we find the characteristic features of articulation in the acoustic signal and only in the acoustic signal. More precisely, the dilemma ranges over the following facts.

In the approaches to the analysis of speech it can be taken as evidenced that the articulation and the acoustic processes are in a close, causal relation on which the phonological analysis can be based (see primarily Fant 1960). The phonologies—at least up to recent times—have considered in an *a priori* manner and as an absolute methodological principle the fact that phonological entities correlate with physiological–acoustic–perceptual objects (cf. Jakobson–Fant–Halle (1952) as the full elaboration of this principle, and Postal's (1968) Naturalness Condition). On the other hand, we also know that different articulatory mechanisms can result in nearly identical acoustic output, thus we can produce identical vowels by different resonating formations in the oral cavity, basically through compensatory production procedures, as has been established by Jespersen as early as in 1904 (113–20).

1.3.2. The auditive analysis has preconceptions even at the outset, as soon as it comes to identifying linguistic signs, for the process of perception is not independent of the further steps of signal processing. Thus for example, playing the word *madzag* on the tape backwards the [dz] section, which in the proper order is naturally perceived as one single segment, is heard as a [z] + [d] sequence of sounds (this is known to be an early and very important argument for treating affricates as a sequence of sounds, cf. Kázmér 1961); and I found the same with respect to syllable number in the cases of reduction and loss of vowels.

1.3.3. Without going into details and giving the otherwise important arguments, the solution I found was that I simply took the problems raised in **1.3.1** and **1.3.2** as unavoidable deficits in the acquisition of knowledge for the given case, believing that the reliability of the data was not risked considerably. I did this because I considered it to be an infallible necessity that the speech material be free from any outer intervention. Additionally, I intended to improve the proper assessment of the data by describing the hardly identifiable alternants in their full form, then making sentences out of the collected words and having them read by the subjects in the isolated variant. The pairs of the distorted and the full alternants also proved to be indispensable in the typological analysis.

1.4. In the last analysis, however, what should be the phonological equivalent of the full form appearing on one side of the comparison, that of the linguistic sign (word form) which is consistently and fully represented by this form in the range of the representation without any distortion?

The question in its full complexity is explored in generative phonology (cf. Chomsky–Halle 1968) and in general in what is called the process phonologies. It is well known that in these approaches, as opposed to the taxonomical phonologies aiming at exploring and classifying elements, research centers on the following questions. (i) In what way, from what elements and through the application of what rules does the full phonological formula (phonological representation) of a word take shape? (ii) What is the method of description which expresses the connection of a given word form with its elements (morphemes) appearing as alternants in other words? (iii) A further requirement for the representation to be defined is that the actual phonetic representation can be derived from it in a consistent fashion. Finally—closely connected to (iii)—(iv) the representation must only contain information that can not be predicted (by rules).

The diverse and hotly debated views concerning the underlying representation call for at least a brief summary of the most important trends (as of 1987).

1.4.1. After the emergence of the Standard Theory the definition of the underlying phonological representation remained, or better to say, became an open question in generative phonologies. Though widely known, I cite word by word the two key sentences of the relevant view of Generative Phonology which set the starting point for nearly any further debate and criticism, and which reflect two aspects of the Standard Theory; (i) the fact that it denies the existence of an autonomous phonemic level, and (ii) that it requires (grammatical) rules for the composition of lexical items: "[W]e propose that each item in the lexicon be represented as a two-dimensional matrix in which the columns stand for the successive units and the rows are labeled by the names of the individual phonetic features. We specifically allow the rules of the grammar to alter the matrix, by deleting or adding columns (units), by changing the specifications assigned to particular rows (features) in particular columns, or by interchanging the positions of columns" (Chomsky–Halle 1968, 296). I will demonstrate the concrete method of analysis applied in Generative Phonology with respect to the (underlying) representation—just for the sake of clear illustration—by way of two examples, SPE and Chomsky (1964), a direct predecessor of SPE. A remark for the illustration: in Generative Phonology the methodological principle is that the concrete forms, that is, the phonetic representations are derived from underlying forms, and since simplicity is a primary maxim to be followed in the derivation, the description of units must contain the paradigmatic relations. In practice this meant the following. The words *divinity* and *divine* obviously belong together, for *divinity* is derived from *divine*; if however their relatedness is to be expressed by the derivation /ai̯/ ⟶ /i/, and on the other hand for the pair *vary/variety* showing similar relations we postulate a reversed /i/ ⟶ /ai̯/ derivation, then we have to establish two rules working in contrary direction at the same time. This contradicts the requirement for simplicity. The difficulty can be removed if we presuppose /i:/ in the common stem, which is realized in one case as /i/—through shortening—and as /ai̯/—through diphthongization—in the other. (For this procedure see especially Chomsky–Halle 1968, 295–8.) If however we consistently follow this line of the phonological interpretation, then we have to write down the stem for the pair *right/righteous* as /ri:xt/. Not only does it raise the difficulty that the consonant before *t* is never pronounced as [x] but that such an element does not exist at all in the sound system of English (for the general problems of this view see Kiparsky 1973, for the critical analysis of the forms in question see Sommerstein 1977, 211–2; Vennemann 1986, 5–7).

It was the phenomenological onesidedness of the formulas given by Generative Phonology that in the first place encouraged Natural Generative Phonology to come up with its criticism and propose a new approach.

1.4.2. The Standard Theory received a kind of criticism in Natural Generative Phonology which itself was conceived in the standard theory, especially in the sense that Natural Generative Phonology also recognizes the distinctive features as components of the underlying abstract phoneme level, and additionally it accepts and applies the rewriting rules to a moderate extent, though with severe restrictions on the degree of abstractness of the (underlying) representation (cf. Hooper 1976 passim, especially 13).

Let us use as an example to illustrate this concept the Latin American Spanish verb *crecer*, which has been discussed earlier by Saporta (1965, 220–

2) in this respect. The stem, similarly to the behavior of other verbs, is in morpheme final position and shows /s/~/sk/ alternation: in first person Sing. it is *crezco* $\longleftrightarrow$ /kresko/ etc., in other persons, e.g. in second person Sing. it is *creces* $\longleftrightarrow$ /kreses/. This phenomenon, however, is not general. In no conjugated form does the verb *coser* have a morpheme final /sk/, cf. /koso/, thus—Saporta argues—we have to suppose that in the critical position in one of the verb types, e.g. in *coser*, there is an /s/ in the relevant position while in the other verb type, among others in *creser* there is another phonemic component, /ϑ/, which is modified by the following rule (cf. Hooper (1976, 6)):

$$(8)\quad \emptyset \longrightarrow \mathrm{k}/\mathrm{V}\vartheta \_\_ + \begin{Bmatrix} \mathrm{o} \\ \mathrm{a} \end{Bmatrix}$$

More precisely, it is *k*-insertion, then /ϑ/ $\longrightarrow$ /s/ alternation through replacing the interdental feature by the palato-alveolar one, or in acoustic terms through interchanging the [–strident] and the [+strident] features. The choice of /ϑ/ is justified by the fact that in certain dialects, for example in Castilian, the /ϑ/ vs. /s/ is a valid phonemic distinction. However, the problem looks like this. On the one hand, *coser* in Castilian is in fact /koϑer/ but no *k*-insertion takes place in the relevant conjugated form; on the other hand,—and this objection is serious in spite of appearance—there is no trace of /ϑ/ whatsoever in the competence of Latin American Spanish speakers. In other words, a very different route must be taken in defining the underlying representation.

Since the alternation gets its role in the paradigm of the disputed verbal class, it seems practical, with a view to the Alternation Condition of Kiparsky (1973), to add the /s/~/sk/ alternation to the lexical underlying form of the relevant verbs. Accordingly, the verb *crecer* will be:

$$(9)\quad \underset{[+\mathrm{K}]}{/\mathrm{kres}\text{-}/}$$

The critical phenomenon in the relevant underlying form in this way becomes a morphophonemic distinction—instead of a phonemic one—in the description in which the diacritic [+K] is to be interpreted as an instruction in order to apply the rule (10) (cf. Hooper 1976, 7):

$$(10)\quad \emptyset \longrightarrow \mathrm{k}/\mathrm{Vs}\ \underset{[+\mathrm{K}]}{\underline{\qquad\qquad}}]\ \mathrm{verb} \begin{Bmatrix} \mathrm{o} \\ \mathrm{a} \end{Bmatrix}$$

It is important to see in this interpretation that the diacritical use of the very general [+K] is far removed from the formations (more) closely related to the articulation programs to be applied. Furthermore, by phonologically relating the stem forms beyond a certain limit we run into unsurmountable difficulties. The Spanish word *leche* $\longrightarrow$ [leče] can not be described phonologically as /lakte/—as done by Harris (1969, 169)—on the basis of the fact that Spanish also has *lactar*, *lactico* etc., for the /č/–/kt/ correspondence is lacking in the competence of the Spanish speaker because the phonological relation between them is too distant, and because the original Latin /kt/ $\longrightarrow$ Spanish /č/ alternation was a productive rule only in a specific historical period but not later (see ib., 10) In other words, the less we exclude the morphological regularities from the identification of the underlying representation, the more distant we (can) get from the phonetic representation. Illustrating the same in a Hungarian example, if the imperative verb form *lássa* 'see+Imp+3.Pers.Sing.' is described in the phonological formula that the stem form /la:t-/ is connected with the morphemic underlying form of the imperative suffix /-j(-)/, then with the personal suffix /-(j)$\left\{\begin{matrix} \text{ɑ} \\ \text{ẹ} \end{matrix}\right\}$/, then we get the output /la:t-j-ɑ/ $\longleftrightarrow$ [la·ʃ:ɑ]. (The double arrow in both directions indicates that the one-one correspondence of the two forms presupposes intermediary rules to apply.) And since the word *látja* 'see+Ind. 3.Pers.Sing' in the analysis gives the formula /la:t-jɑ/, by leaving out the morpheme boundary features which do not have regular phonetic equivalents we create unjustifiable, nearly full homomorphy in the description of *lássa* and *látja*.

It is just in order to avoid the above noted "overgeneralizating" phonological interpretation that Natural Generative Phonology, more precisely Vennemann (1971, 1974), introduces the Strong Naturalness Condition in which (i) "the lexical representations (= lexemic underlying forms) of the nonalternating parts of the morphemes are identical to their phonetic representations", and on the other hand (ii) "the lexical representations of the stems are identical to one of the radical 'allomorphs' of the paradigm and to the units derived by the (often empty) set of supplementary rules" (Vennemann 1974, 347). In this way nothing can get into the underlying representation that is phonetically predictable, nor anything that is not present in some surface form.

Based on the above, the correct procedure to define the underlying representation as proposed by Natural Generative Phonology is briefly as follows: the underlying representation is in general simply identical to the phonetic representation. (The underlying representation of *kép* 'picture' is directly derived from the form [ke:p] and gives the underlying representation /ke:p/.) In those morphemes which show non-phonetic alternation, such as /kres-/ and /kresk-/ $\longleftarrow$ *creser*, one of these alternations are chosen as the underlying form and the others are derived by morphological rules. (This would roughly mean for Hungarian that we take the unit /lov(ɑ)-/ as the primary one of the two stem alternations /lo:-/ and /lov(ɑ)-/ in the case of the word *ló* 'horse', and derive /lo:(-)/ from this unit.) In the course of the derivation only those values of the distinctive features are shown which in fact appear in the surface representation.

As for the phonemic underlying form of morpheme alternations, we can find two different solutions in Natural Generative Phonology. (i) Vennemann (1974) believes that every alternation and word form is an independent unit in the lexicon, put down in accordance with its own phonetic form. The removal of the differences among them to be found in the morphemes—in other words the combination of them into a single common unit—is done by the redundancy rules. (ii) Hooper (1976, 119–27, especially 124) however holds the view that the underlying form of the morpheme undergoing natural changes must not be fully specified but they must be described in the form of a "partially specified, archisegmental representation", leaving room for the phonological rules specifying the features. If we find then that one regular form of the Spanish word *montar* is *monto*, but *contar* appears as *cuento* in the relevant person, then the underlying representation of *contar* will be $/\mathrm{k}\begin{Bmatrix}\mathrm{o}\\ \mathrm{we}\end{Bmatrix}\mathrm{nt}\text{-}/$.

The following theoretical objections can be made against Natural Generative Phonology.

(i) The simple identification of the phonological and phonetic representations (cf. Vennemann (1974, 347) or their "direct" linking (cf. Hooper 1976, 20) is logically mistaken and unclarified. The entities appearing in the surface forms; that is, the types of realizations (e.g. the [a:] units of the word *átállás* 'switchover' together) belong to the logical category of the concrete general, while the corresponding entities (in the given case the phoneme /a:/) is part of the logical category of the individual abstract or the abstract general. Therefore their relationship is one of one-one correspondence (see Szende 1984, 299). Inasmuch as we see a one-to-one mapping in the relation between the components of the patterns of realization and the underlying forms, we first can not talk about the identity of the underlying and surface forms, and furthermore we have to exclude *a posteriori* any alternation from the underlying representation which we intended to give in the formula $/\mathrm{k}\begin{Bmatrix}\mathrm{o}\\ \mathrm{we}\end{Bmatrix}\mathrm{nt}\text{-}/$ for the stem of the verb *contar*. Making the logical levels unjustifiably homogeneous also entails that with the Strict Naturalness Condition ("the lexical representation of the non-alternating parts of the morphemes are identical to their phonetic representation") the protagonists of this trend are forced to deny the possibility without saying it that the underlying representation can be composed differently in different levels of abstraction.

(ii) The theory does not give us theoretically clear information as to what should be considered a basic 'radical' allomorph.

(iii) Nor is it satisfying how the alternant components of the underlying form are handled in the theory. By showing the optional alternants we allow for the disjunctive linking of such units from which no common, underlying archisegment can be derived; such as /o/ and /we/ in the pair *contar/cuento*. Furthermore, in describing the inessive *-ban/-ben* as one single form, whether the front or the back alternant is considered primary (radical), the character referring to only one of them, for example /A/ allows only this phonetically derivable segment; the other element of the alternation is nor expressed by the symbol. The objection of Natural Phonology can be made equally relevant to both. The only argument for the existence of elements with optional specification, the uncertainty of the element, is not a sufficient criterion to postulate such a category (see Donegan–Stampe 1979, 162). The relevant part is eventually interpreted by the hearer either as this or that element, never as a third kind. Stating the same in theoretical terms, the aggregate of things of the same genus can not contain an element whose existential status deviates from that of the others.

1.4.3. The Natural Phonology founded by Stampe (especially 1973/1979)—similarly to Natural Generative Phonology—has been conceived in the radical criticism of Generative Phonology, its critical approach being sharper and more refusing. Its proponents consider the thesis of the standard theory a mistake that the underlying representations come into being after the application of morpheme-structure rules and before the application of the "true phonological rules" governing the alternations. Contrary to this they hold the view that the processes governing the formation of the underlying representations can be found among the rules shaping the phonetic representations and *vice versa* (cf. Donegan–Stampe 1979, 161). Furthermore, if the processes in question are common; that is, they apply in both the underlying and the phonetic representations, then "the basic level of the underlying representation is the phonetic representation" (ib. 162). From this it follows that there is no place whatsoever for any kind of an archisegment in the phonological system; the underlying representation only contains phonemes of identical status. The only argument for the archisegment—as in the case of the stop unit in the German word *Weg*, which has [k] in final position and [g] between word boundaries in the word *Wege*, and thus /G/ would be an archiphoneme—based on uncertainty is not a sufficient criterion for its existence. The phonologists must be able to decide, in the same way that the hearer always does, which one of the two or more elements can be considered the actual phoneme in the critical part of the word. This line of argument leads us straight back to the Prague view: *Weg* ⟷ /we:g/, and when it is not realized in its direct equivalent but rather in the form /ve:k/, then we simply have an effect of "natural" neutralization in word final position. The ultimate rationale of the argumentation is that the speaker eventually intended to reproduce a /g#/ in the underlying representation but the structure of his mother tongue repressed in him the natural inclination of speech production to perform devoicing at the end of the utterance.

Natural Phonology derives its source for its basic view of the underlying form, that it is identical to the speaker's 'phonological intention' (in Prague terminology 'Lautabsicht'), from old concepts. Dressler (1984) names Baudouin de Courtenay (1895) as his source, for Donegan–Stampe (1979, 164–5) it is Edward Sapir (1933). Donegan–Stampe (op.cit.) makes mention of yet another clarifying factor. Though the depth of the representations (= the degree of abstractness) varies from case to case, only those can be regarded as a phoneme which remain in the realization even after 'fortition', the rest are always allophones.

We have to reject the view of Natural Phonology in two critical points concerning the phonological representation of an utterance in general and concerning that of a word (form) in particular. (i) The given nature of the phoneme in the word (form) is not determined by the intention of the speaker, not even by the fact whether at a certain place he is aware that he is just realizing a certain phoneme, but—as has already been pointed out by Trubetzkoy (1939, 39) and in Hungary Tamás (1939)—rather by its intersubjectively mandatory, fixed and "stable" nature (for my own wording see Szende 1980, 64: the phoneme is objective in the sense of intersubjectivity).

We can not base an underlying representation straightforwardly definable for every one of its components on the intent of the speaker if the speaker most likely does not even know whether in the word *kámfor* ⟷ [ka˙ ɱ̥˙or] the [m] is a labialized [n] before [f] or it is an /m/ fixed on the lexical level, in the Prague terminology: whether [ɱ̥˙] is a realization of the phoneme /m/ or it is a combinatorical variant of the phoneme /n/. (ii) This trend presupposes that—as Alan Sommerstein (1977, 236) puts it with no intent of irony in his critical survey—the segments taking their place in the lexicon are also determined by the so-called paradigmatic or dominant subset of natural processes. From such a hypothesis it would follow that the lexicon of a language would only contain "natural formations". This supposition is not at all justified by certain data (the natural form of the Hungarian verb stem *teremt* would thus be **terent*, for the partial assimilation of the nasal consonant in the articulation of the two word final consonants is strongly motivated, cf. e.g. Fónagy 1977, 106).

The above discussed two approaches were given some prominence in this survey because they directly address the problem of the segmental phonological architecture of the phonological representation. In this respect the situation is different today. (For further details and a more profound overview, see Szende 1992, 9–86.)

1.4.4. In phonology the past is closed down completely by the mid 70s. This was the time when new theories came onto the surface, each of them—though only concerned with a single, however important subset of the phenomena, e.g. the close/open contrast of vowels—hastily ensuring for themselves an *epitheton ornans* suggesting separateness and at least the certainty of temporary eternity: autosegmental, metrical, dependency, particle, atomic. What is really new in them is that they are all non-linear phonologies. In view of our discussion this especially means two things: (i) the utterances are not conceived of as a mere sequence of homogeneous segments; and (ii) they provide a direct link between the segmental and the suprasegmental components in the description of the representations. (This does not hold for the particle phonology of Schane (1984), which provides a description only for the system of vowels and their historical alternation types.) Although there have been strong argument for the existence of an autonomous phonemic level even after 1976 (cf. e.g. Goyvaerts 1981, especially 8; Lass 1984, 62–8) and also for the existence of an *a priori* given (distinctive) phoneme in the classical sense (cf. e.g. Schane 1984), the new trends do not strive for a phonemically fully deep and/or authentic description of any kind of an underlying representation. (There is an exception here too: Natural Phonology has retained its need to account for the phoneme in all the critical points of its procedural description, including the consideration for the distinctive features of the phoneme.) Strictly from the point of view of how they reflect the underlying form their main types are as follows. (i) They are only concerned with those fundamental or supplementary, empirically sound rules independent of the grammar which refer to the description of structure (Atomic Phonology, cf. Dinnsen 1979), or they only aim at handling the (morphophonemic) alternations adequately (Leben 1979).

(ii) They describe the sequence of segments between the word boundary features as an ordered set of articulatory factors, but the phonemic relevance of the segments is excluded from the description. In other words, the phoneme as such does not play a role in the description (e.g. Dependency Phonology, cf. Anderson–Durand 1986; Davenport–Staun 1986, and Autosegmental Phonology, cf. Goldsmith 1976, this latter is in reality not even a theory: practically speaking it is limited to the description of the sound image of the sequence). (iii) They include in the description the syllable, the timing structure and/or the prominence relations (Metrical Phonology, cf. e.g. Liberman–Prince 1977, and also the earlier cited Dependency Phonology and the approach taking the phrase structure as its base, see Nespor–Vogel 1986). Not denying their merits: the principle of non-linearity and multidimensionality, we have to see that these approaches—whose proponents raise *techné* to the throne instead of *eidos* under the influence of the current fashion—care very little or virtually nothing about the functional features of the underlying representation and thus can add little to the exploration of the phonological (underlying) form. In this situation, especially bearing in mind the analysis of lenitive processes, it is justified to make a practical attempt at capturing the underlying form on the word level.

1.5. In order to overcome the theoretical difficulties concerning the underlying representation the following solution offers itself.

(i) I presuppose that the phonological representations, which—as has been touched upon earlier—doubtless belong to *langue*, to the category of the abstract, are layered in their abstractness. The same representation appears in a different form on a lower or higher level of abstraction, both from the point of view of the actually chosen standpoint and from the viewpoint of the functioning of language in its broadest sense. If the same word form *lássa* is subjected to an analysis of various degrees of depth (breaking into its elements and structural decomposition) separated into grammatical–morphological and phonological planes, we get a different but equally authentic final result both in the case of structure and for the set of elements. We get results which belong together and follow from one another; in a rough description, from the viewpoint of production:

(11) (i) $//\#\text{la:t}\#/$ $\quad$ $-/\#\text{j}\#/$ $\quad$ $-/\#\left\{\begin{matrix}\text{ɑ}\\ \text{ẹ}\end{matrix}\right\}\#//$

]verb stem]mood suffix]person suffix

(ii) /la:ʃʃɑ/

Remark: morpheme structure and phonological rules play a role in the formulation of 11(i) and (ii) that are not detailed here. //# and #// denote a word boundary feature; { } embrace the possible alternants of a morpheme; – symbolizes the connection of morphemes. To 11(i) we can add the historical antecedent 11(iii) coordinated with it on the same level of abstraction from which 11(i) can be derived by in the present (partly) no longer productive morpheme structure and phonological rules:

(iii) $///\#\text{lat}\begin{bmatrix}\text{V}\\ -\text{front}\end{bmatrix}\#// = //\#\text{sV}\#/ \_\_ /\#\text{C}\left\{\begin{matrix}\text{a}\\ \text{e}\end{matrix}\right\}\#///$

Remark: ///# and #/// denote a phrase boundary feature; $\begin{bmatrix}\text{V}\\ -\text{front}\end{bmatrix}$ stands for a non-palatal vowel; = for a syntagmatic connection.

By breaking up the unit in accordance with the number of syllables, as one instance of (fortitive) production, we get the following underlying form:

(iv) /$la:ʃ$ʃɑ$/

Remark: in the given case the number of syllables is shown by the number of vowels—based on this we can read off the difference in the syllable number between 11(i) and 11(ii); if the morpheme has a vowel, the morpheme boundary feature as well as the word boundary feature are at the same time a syllable boundary; since syllabification according to the syllable rules is automatic, except for a few exceptions the inclusion of the syllable boundaries in the underlying form is redundant.

(ii) The phonological representation—as in the example of *lássa* in 11(ii)—is invariant, for the (abstract) signs of *langue* are invariant; that is, discrete and of constant form. Since in the production of speech the relevant word form is not invariant; it is an analog sign showing variability, I presuppose that the underlying representation is not identical to the commands of the speech production program which produces the acoustic output of the individual pronunciation. Accordingly, certain interface rules must be working between the underlying representation and the ordered set of commands of the pronunciation program. I assume the working of (i) levelling rules and (ii) *gestalt* rules between the phonological and phonetic representations.

(i) The levelling rules perform the

(12) /la:ʃʃɑ/ ---→ la·ʃ:ɑ

transformation. The sign ---→ denotes level shift and by the dropping of // I want to indicate that the formation on the right-hand side is neither a phonological nor a phonetic category but rather an independent category on an intermediate functional level as a realization program. Such a thesis can be justified by considering the fact that in case we have invariances on one side of a correspondence, then this means that we accept the psychological reality of morphemes, even if we can not really tell which element of language can be considered isomorphic with psychological factors and to what extent (cf. Linell 1979, especially 10–2). In the given case the levelling rules eliminate the morpheme boundary feature between /ʃ/ + /ʃ/, bring in ʃ: for /ʃʃ/ through a pronunciation subroutine, and finally make the [+long] feature of the first vowel relative, in case we do not believe it would be more justifiable to fill in this position by the pair of features 'tense/lax'.

I place types of accommodation among the levelling rules, on the consideration that on the one hand these directly connect to the surface phonemic representation, and on the other, because they are localized on two adjacent phonemic units. This view retains the traditional interpretation of the relevant phenomena, cf. e.g. Vértes O. (1958), and thus it differs from the approach which, when speaking about 'distant assimilation', ranks every kind of interaction between the word boundary features, thus e.g. Kassai (1981, 160) and which up to the present considers *umlaut* to be a partial assimilation process (cf. e.g. Lass 1987, 122–4).

(ii) The task of the *gestalt* rules is to bring the pronunciation pattern of the unit of utterance to a homogeneous form. In the given case it means the harmonization of four different units of the pronunciation program; that is, the effect of the medial set of the open vowels on the place of articulation of ʃ:, the effect of the labial component of *a* on the acoustic values of the noise components of ʃ:, the certain modification of the lingual articulation type of the lateral consonant under the influence of the open vowels, the delabialization process of *a* as a word final vowel in an open syllable in weak position, and so on.

The effect of the *gestalt* rules spreads over the utterance as a whole, or using a computer analogy, none of the subroutines is independent from the other.

In the example, if the /ɑ:/ becomes more labialized, then as a consequence the [ʃ̫:] is not of distinctive value; however, with respect to speech production its unavoidable labialization results in the acoustic modifying effect of a resonator open at the front (essentially the dominance of the lower frequency components). The main properties of the gestalt rules—skipping details for lack of space—are as follows. (ii/a) The *gestalt* rules globally determine the utterance unit in the production of speech. This is straightforwardly shown in my findings for the lenitive cases of 'reduction over the sequence' and 'sequence size truncation'. The same is indicated in that phase of the child's language development in which the "false" or "roughly" programmed, non-adult language variant of a word form builds the mobilized articulatory components into the word form differently from the arrangement defined by the underlying representation; for example in Smith (1973) this is the way in which *squat* becomes [ġɔp] and *queen* becomes [ġi:m] etc. through the transfer of the labial component (see for this also Wilbur's (1981, 411) slightly different explanation or at least different terminology). (ii/b) The range of the units coming under the influence of the *gestalt* rules can also differ. Sometimes they involve only one morpheme in the same way, but sometimes—in the case of the so-termed 'discourse modifiers'—even several semantically linked word form (this latter can mostly be observed in the case of 'sequence size truncation'). (ii/c) In the global articulation program the *gestalt* rules modify the individual articulatory events in the course of lenition by a varying degree of force. For example, the units marked as identical phonemes in the underlying form within a single word, e.g. the $/k/_{1-3}$ elements of the word *gyerekek*, do not each lose the affected component in lenition, in this case the formation of the closure. This depends on the sequential and phonotactic position of the given unit, on the degree of lenition, the phonetic set up of the segment in question, and so on. In addition, it is also dependent on the feature itself; for example, in the case of sound replacement mistakes—in the investigations of Shattuck-Hufnagel (1986, especially 124)—the deviation of the [+front] feature in the mistakenly replaced units was several times over the expected probability value and was much greater than the deviation of the [+back] feature.

(iii) As the above outline indicates, I argue that the phonological underlying form—on the lower level of the underlying form shown in 11(ii)—must contain reference in a simplified form to morpho(phono)logical facts in addition to lexical information; on the other hand, it must directly serve as a basis for the levelling and *gestalt* rules of "the phonological/phonetic interface" (and therefore it can not contain characteristically morphological references, such as for example morpheme alternation in the several forms of case endings).

Inasmuch as we are discussing lenitive processes, the starting point must be this level of the underlying representation.

As has been made obvious in the foregoing discussion, the set of phenomena called distortion belong most directly to the category of *gestalt* rules. It is also clear that the elements of this set are to be interpreted with respect to the undistorted, general(ized) realization belonging directly to the phonological underlying form. However, it is not clear what these phenomena have to do with the temporal structure of the utterance. The question below refers to this problem.

1.6. Is there any connection between the temporal structure of the utterance and distortion, that is, the *gestalt* rules altering the articulation with respect to the generalized underlying variant? Let us take again the alternants in (2) and (3), or rather, their differences projected onto the initial sequence of segments in (4) and (5).

(i) (5) clearly reflects a duration difference (which is perceived, intended on the part of the speaker and not deriving from a psychological constraint) to the benefit of the fortitive [[m:]]. If on the two sides of [m] $\longleftrightarrow$ [[m:]] we show the (possible and actual) articulation of the same person, then we neutralize the idiosyncracies of the articulation characteristic of the individual. Thus, the two sides of the connection become comparable, though the actual content of their difference does not yet reveal itself. The : symbolizing "length" is merely a rough-and-ready reference to the auditory–perceptual experience to which we attribute the meaning of duration surplus on the basis of certain conventions. In fact, in the example the articulatory equivalent of this symbol is created through the diversity of the articulatory factors, in the greater relative duration of the nasal component, in the slow realization of the noise section after the release of the closure, in the decrease of the intensity and the fundamental frequency, in a steeper descent at certain sections, and furthermore, in the decrease of the relative duration of the preceding vowel, etc. Though most of the factors playing a role in the acoustic–perceptual output do not directly correlate with physical time, yet they prove to be of primary importance in the constitution of the temporal structure. (The enumerated factors are trivially known in phonetics. Lehiste (1970, 41–53) gives a regular list of the duration factors.)

(ii) The relation in (4) seems to be of a different nature. In the articulation of the right-hand side member of the connection, as we saw in (3), in the pronunciation of [[sa]] the sequence [[s]] + [[a]] would correspond to the realization of the regular production of *ça* for a native speaker of French without perceiving any kind of distortion. In accordance with its temporal structure the sequence—as an articulation process—reflects a possible normative CV sound connection in Hungarian, too. However, in the case of the speaker giving the data the phonological equivalent is not the sequence that can be derived in a chemically pure form from the articulation formula, for in such a position [a] is only virtually a Hungarian speech sound, but rather another one which is represented by the realized variant somewhat globally and under specific circumstances (in accordance with 6(i) and (ii)). While keeping the regularized order of the articulation gestures the speed of signal transmission increased, which basically means—in this case too—the modification of the temporal structure of the utterance. (For the sake of clarity it is in order to remark here that the temporal structure of the sequence is not identical with the duration of the sequence. The temporal structure remains the same even if the utterance in (3) covers a longer or shorter absolute period of time in physical time.)

2. In continuous speech articulation is built on the underlying form which changes into a pronunciation program through the interface rules. The outcome of the latter is itself a generalized form: the category "phonotype" shown between [ ] which can be correlated with the underlying representation by the smallest number of rules but which takes this form in stylized utterance situations and pronunciation. The undistorted formulas—though interpreted as general—have actual articulation indices by their concrete nature which can be grasped concretely and described in a parameterized fashion, thus for Hungarian see Bolla (1982). In a natural situation *gestalt* rules of stronger or weaker force play a role in the further development of the generalized realization until the articulation form enclosed in [[ ]] is reached. The collective term for these *gestalt* rules is 'distortion'. The term truly reflects the essence of the notion, the relation (to the neutral).

2.1. The conceptional antecedent of distortion has been the thesis of Stampe (1973, 1979). As is well known this thesis states that both the tendencies of child language development, the evidence of the mistakes and the observations in casual speech point to the fact that there exist natural phonological processes which shape the articulation in a way neutral to values with respect to the linguistic signs and the content conveyed and in a non-language-specific way. The "lento" pronunciation of an expression is created from the underlying form through changes relating to such natural phonological processes. (If the speaker lets all of these have a chance to apply, then the expression *divinity fudge* gets its final pronunciation in thirteen steps, see Stampe 1973/1979, 59.)

In the relational system in which distortion is interpreted, that is, in which it is compared to the full articulation form close to the underlying form, distortion shows two major directions (i) fortition and (ii) lenition (cf. e.g. Donegan–Stampe 1979, especially 158; Dressler 1984, especially 33–5).

2.2. Out of these two it is fortition that we are not going to discuss in detail here. In general, with respect to temporal structure, fortition exercises its influence in the direction of lengthening and breaking up; it results in the articulational realization of the full array of the phonological features, the full exploitation of the articulatory components and the introduction of supplementary components, as can be seen in the variants below. The major types are given in the following list (on the basis of fortitive processes occurring in my collection of data):

(i) shifting the articulation towards a normative, lento variant in a speech genre in which lenition is dominant; hypercorrection;

(ii) dissimilation: repression of accommodation rules
(Remark: this phenomenon raises the theoretical problem of the relationship between the levelling rules and the *gestalt* rules: the levelling rules are "superordinate" in the sense that on the one hand they directly link to the surface phonemic components, and on the other, they are not of optional nature; it seems, however, that the general *gestalt* rules can be given priority over them.);

(iii) insertion: j/h-epenthesis and schwa-epenthesis (between two consonants or following a word final consonant);

(iv) lengthening: the slowing down of the process of speech in the sense of increasing physical duration limited to one or more segments or the whole sequence; phonetically it essentially means the increase in the number of temporal units containing identical information;

(v) sequence fortition: raising F_0 (raising the fundamental frequency) and I-raising (increasing intensity, especially at relevant portions conveying prominence);

(vi) juncture creation: morpheme boundaries and the marking of other boundaries (e.g. of the syllable);

(vii) splitting: breaking up into phonemes (pronunciation of names, extracting metalingual forms from their original paradigm);

(viii) introduction of pause (as a rule, at morpheme boundary only).

2.3. Lenition—in its types and the phonetic details of the forms in which it appears—does not simply mean the mirror processes of fortition: epenthesis for example can also function as simplifying pronunciation, and thus as a lenitive process. (Thus distortion is not a symmetric system.) With respect to the common properties of some of their processes we can see pure opposition. Thus, lenition results in acceleration and a smaller degree of breaking up concerning the uniform sequence also by condensing the full duration: certain segments take a value of 0 in their own time window (for example, certain word final consonants), the same happens to some of the character shaping components of the segments (if for example the closure is not realized in intervocalic position at the boundary of unstressed syllables), certain features are realized as the concomitant articulatory components of other segments (e.g. the relevant feature of the nasal consonant on the preceding vowel). In short, lenition means the decrease of the full inventory of components mobilized for the articulation, the lower value of articulatory potentials in the realization of the components, and—last but not least—the breaking up of the strict order of the events prescribed by the underlying form. Its types accomplish these functions to various degrees, as we shall see later. Before discussing them (see section **3.3**) I would like to address briefly the question as to how the two main types of distortion appear in casual speech. (The bracketed numbers refer to the registered items in my research corpus. In this coming section of the study we can no longer do without directly referring to the data.)

2.4. Distortion in speech production emerges at individual places of the articulation process but it can also range over the articulation of a whole text of an utterance or even over a genre of speech. In certain genres of speech, such as a conference lecture, or in a special situation, such as spelling a name in a telephone conversation, or on special, essentially semantic levels, such as metalanguage use, speech production can be on the whole fortitive. Similarly, in an everyday dialogue the articulation program of the utterance is usually lenitive. The quality of the whole of a speech production taken in this sense naturally builds on the frequency of the individual distortions defined by the actual genre. Thus, "fortitive speech" will have a lot of individual types of fortition, and "lenitive speech" will abound in instances of lenition. Yet on the two opposite sides of distortion: any process of fortition or lenition can appear in any genre in order to ensure the possibility of providing contrasts at individual places. For example, the first longer section of the third cycle of the collected material is in general a speech process of "lenitive articulation". In spite of this, in the lengthy sample III/99 (M: *Azt hiszem, hogy nemcsak...*), and in the also long sample III/101 (M: + *mert akkor ugyanott vagyunk.* +) the speaker—arguing resolutely—shifts the global program of his allegro (and this word is to be interpreted as fast here, not corresponding to the use of the original musical term) articulation to the genre of "fortitive articulation". In the text he ignores the use of lenition rules, and even in the sequence *Azt hiszem* of the sample III/99 he takes good care not to do *t*-elision, which is very common in other parts of the material. However, he applies *t*-elision twice in the word *most* when it is in a weak semantic position functioning as a "pleonastic" word. In III/101 in the section on morphophonemic alternation we can observe the lenition *mert* $\longrightarrow$ [mȩr] which is a case of *t*-elision occurring in a genre of fortitive articulation. But we can also see in the same word some secondary fortition which matches the articulation of [mȩr] with the /mȩr/ hypercorrect realization producing a *mert*-alternant, in the form of [mȩrə].

The joint appearance of fortition and lenition crossing the boundaries of genres can also be observed within a word. In the sample IV/530 (Z: '*pontosan azért*) the speaker makes fortitive the [o] segment of the first, stressed syllable through increasing the degree of labialization for the [o] (thereby giving room for the accommodational effect of the labial elements of the sequence in further positions), but at the same time the [ɑ] segment of the last syllable of the word is reduced and there is closure lenition on the [n]. In the sample III/354 (I: + *Tehát, mit tudom én*) in the phrase initial component *Tehát* assimilation with syllable elision takes place, but parallel to this fortition through schwa-epenthesis also takes place, giving the output [[t^{e}a·$t^{ə}$]], as an expression of hesitation. Note here the normative representation of [a·] which is the phonetic trace of *h*-deletion. What is really noteworthy here is the conceptual dialectics of distortion: fortition indirectly plays a part in the shaping of a given type of lenition.

The value of normative articulation alternants, viewed from the opposite sides of distortion, is ambivalent. In lento realization the normative portions of the sequences distorted by fortition seem to be relatively lenitive, while in the lenitive sequences of allegro speech production the elements unaffected by lenitive processes prove to be relatively fortitive. This form of relativity and contrast is so much conspicuous that one subtype of lenition, deletion is separated from the other type of elision, loss in the form of hypercorrection. This connection also helps express the composition of the higher level of the phonological underlying form, as shown in the following example.

In juncture production, more precisely the marking of morpheme boundary features as an articulatory/acoustic unit is known to be possible in several different forms. Apart from some conventional solutions, the fortitive production of a segment next to the boundary feature is exclusively characteristic of allegro articulation. In the sample IV/256 (I: *és olvasásóra nuku +*), the composition boundary of *olvasásóra* contains an articulation marker by way of lengthening the duration of $[\int]_2$ and—at the same time—increasing the intensity of the noise bands. As it can be seen, fortition is realized in this case by the joint application of two procedures accomplishing the same goal; of these two the first, lengthening—as the representation of the [+continuous] feature in a fashion "bigger than life-size"—emphasizes merely through making the perceived experience more enduring; however, the more emphasized acoustic representation of the primary distinctive features of [ʃ] carries the boundary marker itself. The distinctive value and effect are increased in the example by the fact that in the first constituent of the compound word lenition, *l*-deletion takes place which makes more prominent the fortition on the closing consonant of the first constituent within the whole sequence.

3. Informal but careful everyday speech applies lenition in a wide and typologically diverse range. (The texts for the research were produced by virtually professional speakers and were recorded in an experimental situation; the texts are normative, the speakers were just as equally ignorant of the fact that their articulation contained lenition as, for example, of the fact that they made a pause.) In ordinary language, lenition belongs to the "natural order" of speech production, in spite of some degree of (individual, sociolinguistic or genre-related) differences.

3.1. The lenition processes, which are ultimately the product of the application of *gestalt* rules, can be classified into the following main typological groups logically related to one another.

(i) reduction (see below);

(ii) deletion (the elimination of the primary and secondary articulation features of the segment—leaving behind phonetic traces);

(iii) dropping and truncation (the complete disappearance of the segment from the sequence, with the exclusion of further lenitive *gestalt* rules);

(iv) reduction over the sequence (cumulative presence of some subtype of reduction over the components of a sequence identical in some respect);

(v) sequence size truncation (truncation taking place on several components of the sequence identifiable as a unit which is closed [delimited] in a grammatical, semantic or pragmatic sense supplemented by a segment not present in the phonemic underlying form);

(vi) coalescing and fusion (the adjacent segments in the sequence form a unified section in an acoustic/articulatory respect which differs from the realization of the segment ["complete passive assimilation"]).

3.2. Of the various types of lenition I will introduce reduction (and only reduction) in the following section. The reason for this choice is that reduction is the most generally used type of lenition in casual speech. Contrary to other processes of lenition (such as e.g. truncation or reduction over the sequence) the application of reduction is not excluded by any communicative–pragmatic factor of speech. This can be explained by the fact that it is reduction among the lenitive processes which produces the least "distance" between the phonetic and the phonological representations and thus the losses in intelligibility are of minor significance.

3.2.1. One distinctive feature of reduction is that as a result of it the realization of the phoneme is incomplete. This means that one or more articulatory gestures or the corresponding acoustic feature(s) whose intensity decreased and whose structure changed do not accomplish the optimal value that would be an undistorted value, or they do not reflect the proper character. As a general example, we can mention the realization of the phoneme [z] in the word *ezeket* in the sample IV/5 (Z: *Az első napokban ez, ez, tudtam csak alkalmazni ezeket a módszereket*). In this case the front part of the tongue, the (apico-)dorsal part gets into a loose, partial contact on a smaller surface with the (denti)-alveolar part of the palate. As a result, the characteristic noise components in the acoustic pattern of [z] show up for a shorter time and in a smaller range of the acoustic spectrum.

Through reduction the original syllable structure of the word form is retained. As an example, in the above-mentioned word *ezeket* the three [ę] segments distinctly signify the nuclei of the three syllables even after reduction, for the reduced [z] continues to mark the syllable boundary.

3.2.2. In the case of reduction several identifying components drop out; however, at least one primary and one or more secondary articulatory components of the affected segment are retained. If this component is the realization of a distinctive feature, then we have to apply the following constraint. The primary feature that is retained after reduction must have the ability to separate the affected segment from other phoneme classes. This means that the remaining feature can not be limited to a single major classificatory feature; thus e.g. it can not itself be an exclusively remaining primary feature [±cons]. The deletion of a feature in reduction, on the other hand, does not allow for any judgement as to whether the feature dropped in reduction is primary or secondary. The omitted feature may be primary, this is the case when in phrase initial position (in the first syllable) there is no voicing in the vowel, or in *k*-spirantization when the stop component—and at the same time the feature

[–strident]—disappear. It can also be secondary though, e.g. in the case of the feature [+per], that is "peripheral articulation" also in *k*-spirantization.

In so far as the component unaffected by reduction is an articulatory gesture, let us say the formation of the closure or its effect on the acoustic side, which as an alternant can only be observed in the case of complex consonants, the two classes of obstruents: stops and affricates, reduction means the elimination of one of the components. It appears that both in *v*-reduction and in *k*-reduction articulation undergoes the same distortion inasmuch as we have an "imperfect" articulation of the narrowing in the first case and that of the closure in the second.

3.2.3. Even if this is so, the interpretation of reduction amounts to much more, for the broadening of the opening with respect to the optimal features of the production of the closure merely results in a realization with less intensive noise components which also makes identification of the given segment more difficult. So for example, the acoustic spectrum of the [v] in the sample IV/136 (M: *annak is a következménye, hogy*) clearly shows that the intensity of the contact was low in the production of the labiodental narrowing but the contact was in fact made and the arrangement of the noise components also reflect a state characteristic of labiodental fricatives. Contrary to this a [k] reduced between palatal consonants—which involves complex articulation in the sense that the closure and the noise component after its explosion are physically different in character—loses one of its components, the closure part itself in the course of reduction: in the sample IV/662 (G: *meg nekik, hogy*) the two [k] segments display two degrees of spirantization; the same effect is shown—in velar vowel context—in the sample IV/548 (Z: *szakmák*) and in the case of voiced stops in the sample IV/557 the [g] of (Z: + *Igen* +). Even more striking is the case of affricates. (Before citing the examples, let me add two remarks: I consider [c] and [ɟ] to be affricates—following Gombocz (1925)—, cf. e.g. Szende 1974, 347; partly because in their articulation we can acoustically differentiate a partly turbulence noise phase alternating with an intermittent mute phase and an opening noise phase.) In the sample IV/531 (Z: *nagyon*) the turbulence noise component of [ɟ] is missing; in the sample IV/706–707 (Z: + *Szóval, hogy nem egyetérteni* +) in the [ɟ] of *hogy*—before and under the influence of the [n]—the articulation of the opening is missing.

3.2.4. When discussing its major phonetic categories we interpret reduction uniformly for vowels and consonants. The conceptual uniformity of the interpretation is ensured by the fact that reduction—whichever phoneme class is affected—involves the common component of lenition that in it decreased energy is used as compared to normative articulation, especially in the case of the oral articulatory organs. In this respect the function of the larynx is partially independent from the working of vocal tract from the pharyngeal cavity up to the lips. By "partial independence" I mean that the hypertonic status of the larynx in the course of articulation generally is not consistent with the lenition of the other speech organs, though there is no direct correlation between the two. On the other hand, however, the articulation resulting in a reduced F_0 permits lento speech, what is more, even fortition (see in the sample IV/376–377).

However, since different speech organs can play a determinant role in the production of vowels and consonants, the actual modes of reduction show different variants. Considering the differences and the common bases of the variants the similarities and differences are the following when reduction is viewed from the point of view of vowels:

(i) "Decrease of duration", which primarily means the reduction of what is called the pure articulatory phase, generally in the middle section of the segment. Put it differently: the essence of the change is that the part of the transitional phases belonging to the vowel constitutes a greater part of the full duration of the segment than its lento equivalent does. For vowels a considerable amount of the samples is like this. The same takes place in the case of consonants with the feature [+continuant] (except for [r], which requires a different interpretation of reduction) such as [s], [z] etc. The number of the examples for these is also great. This is not true, however, of consonants with the feature [–continuant]. If reduction for example involves a stop, and the degree of reduction reaches the strength of the change stop ⟶ fricative, then the duration of the outcome of reduction, the secondarily formed fricative is greater than the duration we can postulate for the starting point stop unit. We can see a significant quality difference in the changes as consonant reduction in [k] ⟶ [ç], in the sample IV/19 (Z: *+ és neki nagy tekintélye van +*) in the *k*-spirantization in the word *tekintélye*, or in the [k:] ⟶ [x:] lenition process in the word *akkor* in the sample IV/20 (Z: *+ Na most 'akkor, amikor*).

The different and at the same time common character of the reduction types of vowels and consonants in this respect can also be supported by an argument pursued in a different route. The question has a very important theoretical aspect. Since the consonants' increasing duration in the course of reduction achieves this increase by receiving a duration surplus that is inherent of fricatives in the acoustic pattern, it is not sufficient to simply say that a stop has been spirantized. The adequate description is that there has been a change in the phoneme class: the original stop has been moved to the class of fricatives. The same phoneme class change can take place in the case of vowels as well, this is shown e.g. by the labial ⟶ illabial change, but in the description of the "long ⟶ short" lenition process pointed out for vowels the use of the feature [+long] is nearly metaphorical: maybe it is physical duration that plays the least important role in it.

(ii) The changes resulting from reduction in the shapes of resonators as well as in the operation of the speech organs all derive from the decrease in the fortition value. The tension of the lips, the tongue and the resonator walls is weaker—which gives some physiological support to the definition of reduction as a lenitive process—, which does not go with a decrease in volume but which usually takes place at the expense of the stability of the configuration and the articulatory activity. There is a double consequence to this. On the one hand, the fine and marked acoustic arrangement of the fricative sections formed in the resonators with stiffer walls becomes loose (both for vowels and consonants), and on the other the realizations of the speech sounds belonging to the same phoneme show a greater variation in their acoustic features (for labiality, see Szende 1969).

The nature of this lenitive process is well reflected by a parallel—but in essence identical—connection concerning the distribution of vowels in stressed position. The intensity carrying stress—as was pointed out decades ago—is brought about by stronger muscular activity (cf. e.g. von Essen 1953, 119; Fónagy 1958; Ladefoged 1962, 1963). When comparing stressed and unstressed Hungarian vowels for their labiality feature this difference was successfully documented in the measurements (cf. Szende 1969, 369–70). The stressed/unstressed opposition can correspond to the lento vs. allegro normative/reduced opposition. Inasmuch as this parallel truly holds, we have justification for the choice of terminology we used to mark the alternants by the term 'lenition' which make up the greater part of allegro distortive phenomena.

The low intensity working of the speech organs—as mentioned earlier—results in a transition whereby the starting unit entering the reduction process and the outcome unit are classified into different phoneme classes. Yet the relationship between the initial segment and the output segment is different depending on whether the object of reduction is a vowel or a consonant. There is a significant reason for this. The articulatory structure of obstruents has an effect that is not limited to (re)formation of the acoustic filter (supraglottal resonator cavitites) or to changing the acoustic properties of the resonator cavities, most of all to changing the echoing characteristic fundamentally influencing the acoustic quality of the complex sound being produced. We get different types in the case of consonant articulation for example, if noise is produced on greater or smaller touching or approximating surfaces between the speech organs, and this is even more so if the obstruction is formed with lower or higher intensity. Reduction covers the latter feature in the sense that it changes the higher intensity of the obstruction to lower intensity. Thus the common component between the reduction of vowels and consonants is the lower intensity of production, and the difference lies in the location of the decrease in intensity.

In the light of the data taken from allegro examples it seems that the remark made about the intensity of the obstruction is still too cursory. The category change of consonants as a result of reduction is of many different types. Generally we see that stops spirantize—through obstruction release—and thus we get [k] $\longrightarrow$ [ç] or [x] and [m] $\longrightarrow$ [w̃] alterations. In addition, however, very often affricates change phoneme class, for example the intervocalic [tʃ] goes into [ʃ], but the group of affricates [c], [ɟ], especially the [ɟ] of the conjunction *hogy* result in either [d] or [j], depending on the phonetic context. (In order to avoid misunderstanding, this is not a case of fission, for in the phonetic representation of the [ɟ] element of the underlying representation it is not [d] + [j] that we get but either one or the other.) Nevertheless, one piece of data in the collected sample has this kind of alteration. In the sample III/222 (M: *ez olyan volt, hogy + az órát*) the [ɟ]—as an introductory part of the pause for thinking—is split into its organically unified, non-autonomous (= constituting a uniform atomic speech event) components through fortition in lento as well, then the palatal semi-vowel gets devoiced and is realized in its reduced form [ˁ]. The outcome [dˁ]—in accordance with the character of the process—accomplishes the same type of distortion that produces the alternants for *tehát* and *hát* when the word final result is the element [tᵊ]. The reduction alteration of stops and affricates without any doubt belongs to a different category of a decrease in intensity in the course of articulation: the release of the obstruction involves the restructuring of one unit of the atomic speech event, while in the case of affricates it means the elimination of one of the components within the boundaries of the respective—complex—unit of the atomic speech event. In this elimination—that is, the dropping of the turbulence phase or the noise component of the release—the decrease in intensity is achieved by leaving out one of the successive articulatory factors, while in the case of the stop $\longrightarrow$ fricative change the higher intensity articulatory event is replaced by a lower intensity one at the given place in the process of production. (We have to stress that this concerns one single point of events in the articulation. Talking in general about a decrease in energy in speech production is obviously not sensible: whoever uses a lot of reductions but speaks lengthier or more "casually" altogether does not use more energy than a more careful speaker in his lento mode. The most we can say is that an allegro speech produced with the same amount of energy can accommodate more phonemic elements than a lento one.)

It appears that this variant of lenition must be regarded as a loss in speech. This is supported by the fact that in every case in which the discrepancy between the phonemic representation and the next-to-phonetic and its actual realization increases, successful perception of speech necessarily decreases. This kind of argumentation would however be rather short-sighted for it is false in its starting point. This is because it contains the hidden premise that the understanding or identification of speech relies on the identification of each of the units of the speech events. However, under normal circumstances it is not possible to separate a strategy in the (ap)perception of speech which looks for the phonemic counterparts of individual phonetic events. In the identification of the content of speech the cooperation of "perceptual levels" accessible to a scientific approach is constantly in force: speech perception is a complex identifying process globally moving forward. If the set of data to be identified are scattered in a smaller domain, the identification task is easier and more secure because the number of the necessary atomic decisions is lower. Although in the stop $\longrightarrow$ fricative alteration we in fact have a category change but—and this is another aspect of the case which makes the task of the hearer easier—the articulation of the fricatives on the output end of the process is more stable. In Hungarian fluctuation in the production of fricatives is considerably smaller than it is for stops: palatographical experiments show that the average fluctuation of fricatives is related to that of stops as the ratio 10.45:6.30 in terms of the area of the surfaces where the obstructions are made (see Szende 1974, 350). The type of reduction under discussion also reflects a certain retention of balance, if we consider these two, contradictorily interpreted effects which are somewhat made constant by the historical changes [k] and [g] $\longrightarrow$ [χ] and [γ] that took place in Old-Hungarian (cf. Bárczi 1958, 111).

(iii) Finally, the reduction types discussed above in (i) and (ii) can apply together and at the same time as well. In this case the sum of the parts is equivalent to the whole as an exception, we can only add that in this mixed reduction type the two modifying factors reinforce each other in the lenitive process. This mixed form is very common among units with the [+continuous] feature (vowels and liquids).

3.2.5. When considering the acoustic/articulatory features of the various kinds of reduction we need to stress that the reduction of the individual units of the articulation is not identical to the "looseness" of the whole speech process. This is not so even if we can establish a correlation between the reduction of the speech sounds and the other components of the full inventory of speech (for example fundamental frequency related to reduction). In the first section of the sample I/66 (M: *Nem tudom* + L: *Nem tudom*) the relative volume of F_0 is rather weak, yet we can observe only a single reduction phenomenon in the sequence, the lenition of the *d*-closure, and the slight closure release of the [d] in the second *Nem tudom* is also compensated for by an intensive noise after the explosion. To be able to interpret this phenomenon correctly it is worth mentioning that the sequence *Nem tudom*—in the 'discourse modifier' position—is affected by a lot more intensive variants of lenition without having any relative decrease in volume in the fundamental frequency; similarly in the sample IV/62 (M: *értékelték vagy nem tudom, de*) in the *d*-elision variant of [tuom]; and also even in the sample of the most conservative speaker, in IV/825 (G: *Nem tudom*), at a normal average volume, *d*-flap reduction takes place in the sequence (of primary communicative value).

In order to show the phonetic analysis I will now discuss the case in which reduction involves lip articulation. As a methodological principle I intend to capture that determinant articulatory event of the type to be described from which the acoustic output can be derived. For *k*-spirantization then, the method of description is that—noting the absence of the closure component in the acoustic spectrum—I consider the phenomenon to be an instance of replacing the eliminated closure formation with a narrowing. Since the speech apparatus is the same, I do not separate vowels from consonants, not even on the grounds that certain reduction types apply only for one, and certain others only for the other phoneme class. In the final analysis,—in the sense of articulation—delabialization in a [o] ⟶ [ə] and an [m] ⟶ [w̃] change can be captured in the functional differences of the same articulators. The base of the reduction type chosen as a sample, lip articulation is a rather complex phenomenon. Though in the case of consonants it always involves either a bilabial or a labiodental narrowing or closure formation, in the case of vowel quality however, there are two factors determining it: labialization proper which produces a different shape and size of the frontal resonator in proportion to the degree of lip protrusion, and lip rounding which determines the shape and size of the outer opening of the oral resonator (cf. Szende 1969, 361–2). Since the data concerning lip articulation verify the concurrence of these two components (see Szende 1969, 370–4), their separation from the point of view of the reduction type being described is unjustified (and impossible in the acoustic spectrum).

The criterion of reduction deriving from lip articulation is the deviation from the value of normative labiality, roundedness and closure value, respectively. (For the lip articulation of the speech sounds of standard Hungarian there are several works documented with data, e.g. Szende 1969; Molnár 1970; Bolla 1982; among them Bolla's is the most complete.) This reduction type covers those segments in which the articulatory component of 'labiality/roundedness' is the identifying factor of a segment (given in itself). This is the sense in which we talk about the reduction of [o] or [b], but we have a case of a different reduction type if a certain lip articulation secondary to the production of [s] appears different from the lip formation we get for a normative production of [s]. The latter is always modified in relation to the alteration of the articulatory component that is primary from the point of view of the identification of the speech sound, as a phoneme realization, and the sequence in question.

The clarification of this interpretation requires that the notion of deviation be made more precise by further constraints. In the case of consonants the phenomenon concerns only bilabial stops ([p], [b], [m],) while the reduction of labiodentals ([f], [v]) is grouped with the category of opening expansion. In the latter case it is only the lower lip, and only its movement forming an obstruction through fortition that accomplishes the realization. Second, the lower degree of labiality or roundedness within vowels is qualified as reduction only in the case of labial vowels, e.g. in the alternation [ɑ] $\longrightarrow$ [a]. Within the illabial vowels reduction is constituted by the change of lip articulation in the opposite direction, e.g. [i] $\longrightarrow$ [ɪ] replacement by decreasing the degree of illabiality.

With respect to this classification we have to note that one can raise serious methodological objections to grouping [p] and [b] here, for the reduction of [p], [b] and [m] unambiguously involve closure release, and this is an absolute condition for their identity as homorganic fricatives in the same way as it is a condition for the alternation [k] $\longrightarrow$ [x]. As for [m], we can say that in an [m] $\longrightarrow$ [w̃] alteration—from the aspect of the quality of the segment—the obstruction as an articulatory component has a concomitant role. That is, despite the lip closure the vocal tract is partially open and the air can escape freely through the nose cavity. Therefore, the reduction of [m] is justifiably regarded as a phenomenon of delabialization. However, the same argumentation can not apply to the pair [p b]. If delabializational closure release or delabialization accompanied by closure release takes place in [p] and [b], then we can only take practical factors in consideration for their classification. The articulatory homology of [p], [b] and [m] and the fact that visual information plays a greater role in the identification of [p] and [b] as an aid to the hearer than in the separation of [t d] and [k g] all speak for classifying the reduction of these bilabial consonants with delabialization.

In some detail I will discuss the case of [o] among the alternations of delabializational reduction. The delabialization of [o] is strikingly present in unstressed open syllables preceding a stressed position within the sequence (see e.g. in the sample I/24–25 (I: [*megoldás, de*] *ez a kapcsolat 'odáig*). Delabialization manifests itself primarily in a marked ability for accommodation. As a result of this, its formants are shifted towards the frequency values of dominant vowels in the environment. Thus, the normally 500 Hz formant (F1) of the reduced o segment in the word *kapcsolat* shows a 100–150 Hz increase, which means getting close to the relevant formant of [ɑ]. It also contains a frequency—with lower intensity—characteristic of [ɑ] in the higher frequency components, in the 2800 Hz range, which does not appear in the normative alternant of [o]. At the same time it also exerts an accommodational effect in its immediate environment in the sense that on the one hand during the articulation of the following *l* it keeps the shape of the oral resonator in a configuration needed for its own values, and on the other, it produces a tendency for labialization towards an [o] in the case of the [ɑ] following the [l].

The authenticity of delabializational reduction in the above sense is strikingly supported by a comparison with [o, o·] segments in which these are reinforced by the deletion of a following segment. Thus the [o] of the word *mikor* in the sample I/61 after *r*-deletion and the [o·] segment of the word *igazából* in the sample I/174 after *l*-deletion fit very well the acoustic picture given by Bolla (1982) for [o:].

The range of the delabialization of [o], as is general for vowels, can not be limited by any other distinctive feature than [+cons]. We can find alternants in its range at the boundary of normative articulation to the delabialization of which certain phonetic but not necessarily quantitative features are countereffective. This situation is illustrated again, by the [o] of the word *kapcsolat* in the sample I/24–25. In the case of extreme delabialization, which is naturally supplemented by other effects as well, the realization of [o] may as well result in the acoustically amorphous formation of the explosion noise of a stop; this is what happens in the case of the relevant element of the word *tartozik* in the sample II/86 (Z: *nem tartozik bele a kert*): here the phonologically rounded vowel produced in the middle of the sequence of six unstressed syllable in itself can only be identified by two of its features, as a vowel [+vocalic] and as back [+back].

4. Based on the discussion of the previous chapter it is to be expected that both practical (close-to-sounding) and at the same time theoretical, for example morphological conclusions follow from the data and the findings of the research on the various phenomena of lenition. In the final part of this study I will dwell on two of these from opposite sides. The relationship between these two is not obvious at first sight, though the relation between the lenitive processes and speech tempo and the development of morpholexemic alternations—as we will see—belong together in a causal chain.

4.1. Speech tempo, as the first derivative of speech communication in time, is expressed in terms of the number of elements for a unit of time. The actual value of the tempo, however, depends on what is regarded as a transmitted element. To this we have to add the following remarks. In the course of speech both the operation of the speech organs and the series of acoustic events are constantly modified: one speech organ (e.g. the larynx) behaves the same way throughout the production of a speech sound, while another (say the tongue) considerably changes its position, direction and speed. It is important to note here that the speed capacity of the individual organs itself differs a lot (the lips are slower than the tongue etc.). Additionally, even during slow articulation the speed of speech can be rather fast if the slow section involves the joint articulation of several successive phonological elements. From this it also follows that the definition of tempo only makes sense if the speech event is examined in terms of the number of the produced elements per unit of time within a longer duration. If we do not intend to limit ourselves to the tempo indexes of articulational movements but what we bear in mind is the whole of speech production, then the number of elements per unit of time can not be anything else but the linguistic components of the utterance; that is, phonological entities. Naturally, there is no contradiction concerning tempo between the facts of articulation and the linguistic events based on a large body of speech, since the structure of the sequential temporal patterns of speech correspond to the 'probability variations' in the linguistic process, as can be seen in the series of chains in the Markov-processes (see Schwartz–Jaffe 1968). On a segmental level, strong correspondence—and the leading role of phonological factors—is evidenced by the fact that when there is a mistake made in the temporal pattern of a phoneme realization in natural (lento) speech the speaker intends to adjust this mistake in the timing of the following phoneme, at least within the same syllable (cf. Huggins 1968).

As has been referred to earlier with respect to "length" (see **1.6** (i)), the relative value of duration, and therefore that of speech tempo (fast, average, slow) as well, will be the resultant factor of vectors with different timing of their own. The fact that the effect of these factors and components is not limited to influencing the temporal relations of individual speech sounds is shown by indirect evidence. The tendencies of sound changes explored in historical phonetic studies in this direction reveal that in Hungarian the duration relations have always been determinant in the development of these tendencies (cf. Kubínyi 1958). Nevertheless, we have to note: synchronic phonetic facts indicate that even in the above mentioned studies "speech tempo" must have been a metaphor for lenitive processes. The perception of speech tempo and the characteristic features of articulation are inseparable, which make this use of the metaphor all the more obvious. If however we can not operate only with physical time in the case of tempo, since it excludes the multi-layered temporal constituents of the utterance and therefore gives a false picture with respect to articulation, the following question may be raised. Where can we find an authentic reference point between duration and the utterance with respect to the lenitive processes? The answer to this in brief is this: in the narrowed event space of articulation. This remark can be supported as follows. The undistorted equivalents make use of each and every articulatory gesture on a wider scale of the possible states of the speech organs; in other words, the set of the possible states of the undistorted utterance realizing the same (segmental) phonemic underlying form is greater than in the case of a lenitive utterance. Thus in a lenitive utterance the amount of information per unit of speech time is as an average smaller than in the undistorted equivalent. The result is the "informational time compression" of lenition. (This interpretation of the question is based on the fact that the information content carried by duration is itself a constituent of time [for this, with respect to speech communication see Ornstein 1969]; without presenting the details the heart of the interpretation is the combinatorical analysis of the relevant phenomena [cf. e.g. Feller 1978, 40–6] which—apart from a few unforeseeable difficulties—can be done easily; this interpretation gains its justification simply by the fact that if the question is treated in the domain of physical time duration, it results in complete confusion: the alternants distorted by lenition may be slower than the undistorted ones, the fortified alternants may have a shorter duration etc., the inherent temporal relations are not revealed by measuring duration only.) Considering what has been said so far, as well as some other factors, we can make the following remarks about the types of lenition.

(i) Reduction speeds up the tempo of the utterance, more precisely in the sense that the reduced alternant contains an ordered combination of a smaller number of elements per unit of time than the undistorted one.

(ii) In this context deletion shows a more complex picture. Its definition states that after the elimination of an element the production of the neighboring elements on the two sides of the deleted one comes close to the lento alternant or to normative pronunciation, and most likely it reaches its optimal level. Consequently, in the given place the articulatory representation of an $/x_k\ x_{k+1}\ x_{k+2}/$ lento phonemic representation, possibly enriched with the phonetic traces of $[[x_k\ x_{k+2}]]$ or perhaps $[[x_{k+1}]]$ produces a relatively faster tempo than its $[[x_k\ x_{k+1}\ x_{k+2}]]$ lento equivalent, since it seems to be the articulatory representation of a restricted underlying form $^*/x_k\ x_{k+2}/$. In the case of deletion it seems suitable to choose an example for the temporal relations which can immediately be put into contrast with a symmetric phenomenon, a formation that is a subtype of fortition being very similar in its phonemic underlying form. The example is the deletion alternant of *tehát* in the sample III/257 (M: *tehát végül is*) and the word *teát* ←-- *tea*. The representations for the two word (forms) are as follows:

		tehát		*teát*
	phonemic representation:	/teha:t/	and	//tea:t/
	primary, lento [= undistorted]			
	phonetic representation:	[teha:t]	and	[tea:t]
1.	allegro [= distorted]			
	phonetic representation:	[[tea·t]]	and	[[te^{j}a·t]]
2.	allegro representation	[[teat]]	and	[[teja·t]]

As can be seen, the allegro phonetic representations of *tehát* undoubtedly correspond to the narrowing down of the phonemic representation without, however, producing an articulatory homonym at one single step of the subderivative allegro alternants. (There is an example for this kind of an alternation in the allegro [[va·l:ɑt] ⟵ *vállalat* vs. the lento [[va·l:ɑt]] ⟶ *vállat*; these, however, belong under **4.2** dealing with morphophonemic alternations.) The narrowing as a result of deletion and the increase in speech tempo are evident in this example.

On the other hand, we also have to reckon with the fact that deletion can, as it were, lift out the neighboring segment from the lenitive processes, and this is what happens in the above cited example. Through this deletion slows down the process of articulation. As a consequence, deletion carries in itself two different tendencies exerting their effect in two opposite directions.

Concerning the case of *tehát* vs. *teát* I think it is in order to say that there also exist objections to the allegro alternants. Siptár—citing the relevant points in Szende (1987)—first questions in general terms whether 'deletion' as a subtype of lenition excludes further reduction at the relevant place in the word form, which statement "does not seem to hold" (see Siptár 1988, 23). It is basically impossible to find counter-arguments against this kind of an objection, for it replaces an epistemological unit—one that I have used as the characteristic feature of the relevant notion—with a reflection concerning the object of discussion. An answer to it on the same level could be: "but it seems to hold"; which, of course, would not make sense. However, Siptár makes a concrete remark (ibid. 24) concerning the allegro variants of *teát*, [te^{j}at] and [teja·t]: "in the case of an increase in tempo ... such an inserted [j] is dropped and in *really fast, casual* speech (through an [e̯a] diphthong stage) both words can result in a realization like [ta·t]" (italics in the original). This argument is not convincing for two reasons. (i) The author does not verify that the variant *teát* $\longrightarrow\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\longrightarrow$ *[ta·t] in fact exists. (ii) It appears that one can not find data for this alternant either, based on the following argument. In the word *tehát* between the two vowels a laryngeal gesture appears—as a phonemic segment—which prevents the linking together of the two vowels in the articulation program. There is nothing like that in the word *teát*, but in the direct transition between the two vowels—after the body of the tongue moves—an articulatory gesture necessarily producing the acoustic pattern of [j] is made. The more the two vowels lose their original character, the less marked the linking element [j] will be. It is also natural that the evaluation of the transitory phase is made in the context of a two-vowel environment. This is mainly the reason why the words *Beát*, *deák* etc. never give alternants like *[[ba·t]] or *[[da·k]]. A parallel for *reá* and *rá* could be raised here where the correspondence is between *-eá* and *-á*; but both words have a laryngo-glottal or laryngeal gesture in their historical background (cf. the relationship of the relevant alternants with the original root *rok-* [$\longrightarrow$ *rokon*]). (I would not completely exclude, on the other hand, a practical possibility of what is theoretically impossible. It might be the case that, especially in strongly "casual" speech, the instance of *teát* is heard by a possibly hearing impaired listener as [[ta·t]]. This, however, is the case of Jakobson's five-legged cat then against which the form *tehát* $\longrightarrow$ [[tat]] $\sim$ [[ta·t]] is rather common.)

(iii) In the case of elision—as a consequence of the definition of this lenitive type—no phonetic traces appear. Therefore, the influence of elision on increasing speech tempo is directly observable. It is self-explanatory that fortition in the mirror position has the opposite effect. Thus, the allegro *t*-elision variant of *miért* ⟶ [[me·r]] or [[mie·]] involves increased speech tempo as opposed to the lento representation [mie:rt]—under identical conditions, but the fortitive phonetic representation [[me·rə]] of the subderivative morphophonemic alternant /me:r/ of *miért* involves a decrease in tempo.

(iv) Reduction over the sequence increases tempo without any constraint, exactly in the same way as reduction.

(v) Sequence truncation also has the effect of increasing tempo without any constraint. And similarly:

(vi) Fusion increases tempo without any constraint.

Let us finally raise the question as to what effect the increase or decrease of speech tempo as the second derivative of speech in time has on the appearance of distortive processes in allegro speech.

The increase in speech tempo—under the same conditions, by which I mean the stability of the components of the communicative situation—does not necessarily go with some type of lenition or with an abundance of lenitive phenomena in sections of speech produced at faster speed.

(i) The temporary increase in speech tempo and the number, intensity or degree of lenitive events do not show any correlation if, for example, the only apparent reason for increasing tempo is for the speaker to be able to finish with what he has to say. In the sample I/79 (M: *akkor megint ott vagyunk, mint az előző*) it is merely the flapping of the [r] which shows some weak lenition, which can simply be explained by the influence of the following segment [m] on narrowing down the oral tract as a secondary effect, and the *t*-elision production of *megint* is rather common even in natural articulation close to lento speech. There is no *n*-reduction in *megint* and there is no observable nasalization of [i] in the same word either; [k:] shows normative length and the pronunciation of the [t] in *mint* is also regular. Similarly, in the sample I/352 (M: *satöbbi, és hogyha 'nagyon*) at the faster section we can only observe vowel duration decrease as an irregular modification. Increased tempo does not result in increased lenition even in cases where the increase is not made on content elements: in the sample II/397 (Z: *+ ami nem kevés pénz, azt hiszem*) in the clause *azt hiszem* the only thing to be observed as opposed to what could be expected is the delabialization of the [m], naturally in addition to the *t*-deletion quite common in this sequence.

(ii) Lenition also co-occurs with a decrease in tempo. In the sample I/93–4 (G: *vagy ezt kell, vagy azt kell*) *t*-deletion takes place after the [z] ⟶ [s] assimilation, which again makes the case stronger that a certain part of the distortions is an integral part of the articulatory program of everyday language and is regular in slow, carefully articulated speech as well.

4.2. Let us take now the other dimension of time with respect to lenition, that of the historical. Certain groups of the morphophonemic and morpholexemic alternations will amply justify this choice.

In Hungarian homologous morphophonemic alternations (in identical or similar position and of identical function) such as *csepp/csöpp*, *fent/fönt*, *-ban/-ben*, *-hoz/-hez/-höz*, (originally) *család/cseléd*, etc. have a special group whose development can not be traced back to neither of the known processes: vowel harmony according to high/low (*-ban/-ben*) or labial/illabial (*-tok/-tek/-tök*), doubling through word split (an example for this, according to Lotz (1963) is *magyar/Megyer*), or some other type of disintegration such as broadening or narrowing through an element having (originally) an independent morphological role in the phonemic representation (*nő/-né*) or some apparent onomatopoeic effects (*kavar/kever*), etc. The homology of the pair *aztán/azután* can not be attributed to any of the above noted morphophonemic alternations, and on the other hand neither can it be ascribed to any of the subtypes of normative accommodational processes. Since there seems to be no useful explanation for the development of such alternations, I believe there is good reason to interpret these directly in the context of the allegro processes of everyday speech—through setting up lento/allegro alternant pairs. As a starting point: I automatically presuppose the causal relationship of a certain group of allegro processes and (homologous) morphophonemic alternations—as the starting sentence of the argumentation below shows—because on the basis of registered factors of pronunciation I can point out the same distortive processes in their development as the ones appearing regularly in allegro speech.

As a result of lenitive rules new morphophonemic alternants (can) come into being. In addition to the morphophonemic alternant pair *azután, ezután* there are alternant pairs like *aztán* /ɑsta:n/, *eztán* /ęsta:n/, for *miért* there exist *mér* /me:r/, *mié* /mie:/, and *odaad*, *odad* /odɑd/ etc. which came or come into being as a result of lenition rules. (From among these examples *aztán*, *eztán* can be derived through the deletion of [u] after devoicing, then through the partial assimilation [z] $\longrightarrow$ [s] characteristic of normative pronunciation as well; in the case of *odad* through the fusion of the identical elements superimposed over the word boundary features. With respect to the forms derived through lenitive rules the most important theoretical question—in the borderline of phonetics and morphology—that can be raised is this: to what extent are the considerably frequent forms to be regarded as "occasional" alternants, and where is the point beyond which they should be assigned an independent morphophonemic variant? Since the etymological formula of the above-mentioned words (cf. *azután* ⟵ *az* + *után*, etc.) shows the phonetically more complete form to be the original, these are the primary variants with respect to which the newer forms are taken to be secondary, subderivative (on the basis of the relationship *azután* + devoicing, *u*-deletion, [z] ⟶ [s] partial assimilation ⟶ *aztán* /ɑsta:n/). These secondary, subderivative formations behave in two different ways in spontaneous, allegro or even in allegrissimo, production.

(i) After the lenitive rules apply, they assume their new basic form that is final in the articulation and which is changed with respect to what was fixed in the phonemic representation. Thus for example, the final variant of the word *azután* modified by lenitive rules is as follows:

	phonemic representation:	/ɑzuta:n/	
	lento articulation:	[[ɑzutã·n]], or perhaps [[ɑzutã:n]]	
	allegro articulation:		
(i/a)	[a:] ⟶ [a] reduction:	[[ɑzutãn]]	(actual pronunciation)
(i/b)	after *u*-devoicing:	[[ɑzu̥tãn]] or [[ɑzˀtãn]	(not registered but possible articulation)
(i/c)	*u*-deletion:	[[ɑztãn]]	(actual articulation)
(i/d)	*n*-deletion:	[[ɑztã]]	(actual articulation)
(i/e)	after regular, regressive voicing assimilation:	[[ɑstã]]	(actual articulation)
(i/f)	F_0-reduction:	[[ɑ̥stã]]	(actual articulation)
(i/g)	after *t*-reduction:	[[ɑs·ã]]	(not registered but possible articulation)

Remarks: I disregarded enumerating all the other possible and actual variants such as [[ɑstã·]] which is produced by the lack of shortening indicated for its lento realization earlier; the small Roman numerals do not express order but rather they separate each of the steps of lenition from one another; the alternants in (i/f–g) illustrate lenition made on the new underlying form.

(ii) In the other case the application of the lenition rules does not mean the end point of the changes but the articulatory program is made complete by fortition. Thus for example, the articulatory formula of the word *miért* looks like this:

	underlying form:	/mie:rt/	
	lento pronunciation:	[[mie·rt]] or [[mi^{j}e·rt]]	
	allegro pronunciation:		
(ii/a)	*i*-reduction:	[[m^{i}e·rt]]	(actual pronunciation)
(ii/b)	*i*-deletion:	[[me·rt]]	(actual pronunciation)
(ii/c)	*t*-elision:	[[me·r]]	(actual pronunciation)
(ii/d)	fortition:	[[me·r^ə]]	(actual pronunciation)

The step indicated in (ii/d) means that morphological homonymy is formed between *miért* and the 3rd person singular, indicative, present tense form of the verb *mér*, since fortition in the realization *mér* $\longrightarrow$ [[me·r^ə]] produces the same articulatory/acoustic output as the word *miért*. Now if the final reason for fortition is greater iconicity, a kind of (morphological) naturalness, an increased ability to separation, then fortition and the application of lenition rules are clearly contradictory in the light of the degree of intelligibility to be expected. Consequently, the basic morphological form of the unit [[me·r^ə]] $\longleftarrow$ *miért* before fortition must have had /me:r/ as its phonemic representation. By this we state at the same time that in addition to *miért* we must have an alternant *mér* for *miért*. Briefly going into a sidetrack of the argumentation I want to cite the element [[ɑze:r^ə]] of the sample II/202 (I: *Szóval ami olyan, + hát a főiskolán azért*). The degree of fortition in this word is indicated by retaining the full length of the [e:] as well as by the [[^{ə}]], which leaves little doubt as to what the underlying form could have been. If this is so—confronting all this with the case of *miért*—we have to say that apart from the lexemic morphophonological alternations we have here a case of the morphophonemic alternation of a bound morpheme *+ért*. (However, here I do not intend to go into discussing the morphological pertinence of this question, not even in passing.)

Based on the above discussion the following theorem presents itself. The criterion for the evolution of a new phonemic underlying form; that is, a secondary, subderivative variant is that it should be able to undergo the same changes in the further phonetic alternations of the word as those forms which are original, primary in terms of their underlying form. It is to be stressed that this is merely a phonetic criterion. In reality several other (e.g. semantic) considerations play a role as to whether a given form receives its proper qualification. Among other things, scientific convention also plays a part in this: the Dictionary of Definitions (Értelmező Szótár) votes for equivalence in the case of *azután*, *aztán*, but not in the case of pairs like *azért/azér*, *odaad/odad*.

However loose the variants of morphophonemic alternation may be, the appearance and development of subderivative thus secondary alternations are not without constraints. In reduction over the sequence two or even more words may be merged. In this case the truncated word form fuses with the following element though (which itself also may result from lenition through a reduction rule) and the two may constitute one single phonetic articulatory group, but the two elements taking part in the fusion still retain their original lexemic status. In the sample IV/173 (Z: *+ Szóval ez +*) the element *szóval* undergoes truncation resulting in double syllable elision, then merger takes place as a result of which we get [[s°ez·]]. However, this formation does not show a uniform vowel harmony formula—though the whole sequence is reduced to a single syllable through truncation—, which is the absolute criterion of monosyllabic morphemes in Hungarian. (The word *Szöul* 'Seoul' in Hungarian also necessarily has two syllables, apart from other reasons because its two vowels belong to two different groups of the non-neutral vowels with respect to vowel harmony.) It is also worth noting that, knowing the underlying form as a starting point, the articulatory variant we would expect for the word *szóval* is one with an acoustic output of velar dominance rather than the actual articulatory variant. But even in a velar context the truncated variants of *szóval* can have a reduced alternant with a palatal vowel, which again indicates that the vowel system does not restrict the lenition rules to a great extent. Consequently, the form of *szóval* fused through reduction over the sequence could have assumed a realization with uniformly high vowels. However, it did not. Finally, in all the places where the word boundary feature, as it were, closes the room for the application of the vowel harmony rule, it just does not make sense to speak about the presence of a morphophonemic alternant taking shape over the word boundary features or that of a new morpheme.

5. In this final section I would like to summarize briefly the major points made in the study shedding some light on the internal proportions of the whole theme as well.

If *lento*, i.e. fully elaborated and next-to-underlying/phonemic phonetic representations lenite, they will be *allegro* representations due to reshaping procedures. Reshaping procedures are based on what I call the *gestalt* rules, i.e. rules which—being put into action—cover sequences as wholes (instead of segments or a certain series of segments) turning them into natural utterances in casual articulation. For example, the extreme instance given by Stampe (1973/1979, 8) *I don't know* ⟶⟶ [ãõɾṍũ] or even [m̩m̩m̩] with the latter derived by (i) V_{1-3}-deletion and (ii) substituting $\begin{bmatrix} \text{C} \\ +\text{ nas} \\ +\text{ cont} \end{bmatrix}$ for C_{1-4} in the sequence, both (i) and (ii) are triggered off by the 'discourse modifier', i.e. their semantically weakened position of *I don't know*. This example mirrors the sequential, that is, nonsegmental character of these rules in a pure form. I tried to argue that *gestalt* rules occupy an independent position in the phonology of the casual speech phenomena and are supposed to belong to the class of 'interface rules' bringing about 'individual phonetic representations' [category: *concrete* and *individual*] from 'surface representations' [category: *concrete* and *general*, in logical parlance]. In so doing, they—the *gestalt* rules—give zest, among other things, to the temporal pattern of the sequences prone to lenition by distorting/reorganizing them in casual speech. (Theoretical aspects of interface rules, including *gestalt* rules, as well as [the architecture of the] underlying representation were at some length played around in the study [see **1.6**].)

On the basis of some 2,000 samples of various length taken from normative but casual or, rather, casual but normative speech (Hungarian dialogues) investigations were carried out in view of what sorts of lenition processes with direct relevance to what I call the temporal pattern distortion occur. In a bird's-eye overview, the results allowed for the following conclusions.

5.1. There is a theoretical necessity to ascribe independent status to *gestalt* rules—putting various distinct types of lenition processes into action in casual speech—within the system of a casual-speech phonology.

5.2. There is a theoretical possibility of defining and describing lenition processes or, rather, *allegro* phenomena in general, along the lines of the classificatory criterion of temporal pattern distortion. Classified in such a way, the main types of lenition will be: (i) reduction, (ii) deletion (not identical with (iii) dropping and truncation;—(i–iii) manifest themselves in segment size units; (iv) reduction overs the sequence, (v) sequence size truncation, and (vi) coalescing/fusion.

5.3. There is a practical possibility of describing reduction—a type of lenition chosen for a more detailed analysis in the paper—as a sound-class-independent procedure functioning uniformly irrespective of the "phonotype" it affects. (In fact, this was exemplified in the domain of a subtype of reduction, i.e. delabialization, in this part of the research work.)

5.4. Reshaped/reorganized temporal patterns in the sequence—brought about by distortion processes in lenition—eventually should be led back to a substantial modification of the informational space of the articulation as a main factor whereas durational attributes are of lesser importance in this respect. ('Informational space' is here meant to be the total number of potential elementary events across time including, among other things like intensity, the scales of the maximal expansion/activated [functional] capacity of the speech organs.) Generally speaking, lenition results from and, at the same time, reflects back to a (dramatic) restriction of the 'informational space' of articulation.

5.5. The data and further investigations suggest that lenition processes play an important part in bringing about morpholexical alternants in Hungarian, cf. pairs of alternation like *mondotta/mondta* and *azután/aztán*.

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DOES THE ONSET BRANCH IN HUNGARIAN?

MIKLÓS TÖRKENCZY

0. This paper examines the phonological status of syllable-initial consonant clusters (complex onsets) in Hungarian. In the literature one can find two different views concerning this problem: i) Traditionally, the onset of the (phonological) syllable in Hungarian is said to consist of one element at the most. According to linguists who subscribe to this view, words which happen to contain syllables with complex onsets are foreign words, so they are not characteristic of the phonological structure of Hungarian, and thus can (and must) be disregarded in the analysis of Hungarian sound structure (e.g. Papp 1966). ii) Linguists holding the other view maintain (explicitly or implicitly) that in Hungarian the onset of the phonological syllable may consist of $n \leq 3$ elements. The words which contain syllables with complex onsets have the same status as those with simple onsets, i.e. they are "just as Hungarian" as the words which only contain syllables with a simple onset since both types occur in the language. Consequently, it would be a mistake to disregard the former type in the course of the analysis (e.g. Siptár 1980a, b; Hall 1944; Greenberg 1978). In this paper we will try to show that neither view is correct in the form described above:[1] on the one hand, there *are* words containing syllables with complex onsets in Hungarian, but on the other hand, there *is* at least one phonological characteristic of these words (other than the fact that they contain syllables with a complex onset) which sets them apart from the other Hungarian words. Thus, these syllables seem to behave differently from those which contain a simple onset. First, however, a few words must be said about the terminology and the phonological framework we are going to adopt.

In this paper we accept the claim that the syllable is the appropriate structural basis for the statement of phonotactic constraints. Thus, the phonological grammaticality of a word depends on whether it can be exclusively parsed into phonologically grammatical syllables in the given languages. For example the (hypothetical) word *kamnba* is not permitted in Hungarian because *mnba*, *nba*, *kamnb*, *kamn* are not permitted syllables (cf. Kahn 1980);

[1] Later we will examine these views in more detail.

Clements–Keyser 1983; van der Hulst 1984; Harris 1983). This means that an intervocalic consonant cluster is permitted if it consists of a permitted coda followed by a permitted onset.[2] However, some polysyllabic words can be analysed into permitted syllables in more than one way: e.g. *mostál* ('you washed something'): *mo-stál*, *mos-tál*, *most-ál* (compare *ma* 'today', *stáb* 'film crew', *mos* 'he washes something', *most* 'now', *ól* 'sty'). Therefore, in addition to **syllable structure rules**, which specify the notion "well-formed syllable of language L", we also need **syllabification rules**, which specify how a string of phonemes in language L is divided into syllables (cf. van der Hulst 1984). As we will maintly examine monosyllables, we will disregard syllabification rules in this paper.[3]

Syllable structure specify which syllables are well-formed in language L. In our analysis we suppose that the syllable structure of formatives is built up in the lexicon. Thus, syllable structure is part of the phonological representation, and the phonological rules may not only refer to features, segments and morphological boundaries, but also to syllable structure. We also suppose that the syllable has a hierarchical structure. This hierarchical structure is illustrated in (1):

(1)
```
            σ
           / \
          /   \
         /     R
        /     / \
       /     /   \
      O     N    Co
```

(where s = syllable; O = onset; N = nucleus; R = rhyme; Co = coda)

The syllable tree in (1) implies that the relationship between the nucleus and the coda is closer than between the onset and the nucleus (Fudge 1969, 1987; Harris 1983; Kiparsky 1979; Selkirk 1982, among others, make use of the same structure). This prediction seems to be borne out as in general the claim that in natural languages intrasyllabic co-occurrence conditions hold primarily between the nucleus and the coda, or within the constituents onset, nucleus,

[2] There are languages of which this statement does not hold true. In these languages there are intervocalic consonant clusters which cannot be analysed as permitted onset+coda combinations (cf. Fischer-Jørgensen 1952). Hungarian does not seem to be such a language.

[3] For some remarks on polysyllabic words and syllabification cf. Section **3**.

and coda (cf. Fudge 1987). This does not mean that there are no co-occurrence restrictions holding between the onset and the nucleus, or even between the onset and the coda. Such restrictions do exist (e.g. in English the 1st segment of a complex onset cannot be identical with the first segment of the coda in the same syllable: *[spəʊp]), but they represent the marked case, and thus are not as natural (and perhaps not as "strong") as the former. The terminal elements of the syllable tree and the feature matrices (i.e. the elements of the segmental tier[4]) are connected through the central tier. The units on the central tier are represented with X's, where each X corresponds to a traditional (SPE) segment deprived of all its phonological features. Thus, an X is a slot, or a timing point corresponding to one segment (cf. van der Hulst 1984; Hyman 1985). Such a representation renders the use of the feature [syllabic] unnecessary, so this feature is not present on the segmental tier. The terminal elements of the syllable tree, the units on the central tier and those on the segmental tier are linked by association lines. A unit on a given tier may be associated with more than one unit on another tier, but association lines cannot cross (i.e. association satisfies the Well-formedness Condition, cf. Goldsmith 1979; van der Hulst 1984; van der Hulst–Smith 1982; McCarthy 1982).

We impose some further general restrictions on possible association: A terminal element of the syllable tree may be associated with more than one unit on the central tier, but a unit on the central tier may not be associated with two different terminal elements of the syllable tree within the same syllable. Furthermore, a segmental matrix may only be associated with two X's if the two X's are associated with one terminal element of the syllable tree and not two different terminal elements. Thus, the onset, the nucleus and the coda each may be complex in principle, but a (traditional) segment may not be part of, say, the onset and the nucleus at the same time. These general conditions exclude the structure given under (2), and therefore these structures are ill-formed (segmental matrices are symbolized with Greek letters):

[4] Naturally, some feature(s) of the segmental tier may be 'autosegmentalized' (i.e. treated on separate autosegmental tiers) if necessary. The autosegmental tier(s) is/are also directly connected to the central tier. In Hungarian such (a) tier(s) is/are needed to handle vowel harmony. We shall disregard autosegmental tiers in our analysis because they play no part in the phenomenon examined.

```
(2) (a)      *σ                         (b)      *σ
             / \                                 / \
            /   \                               /   \
           /     R                             /     R
          /     / \                           /     / \
         /     /   \                         /     /   \
        O     N     Co                      O     N     Co
         \   /      |                       |      \   /
          \ /       |                       |       \ /
           X        X                       X        X

    (c)      *σ                         (d)      *σ
             / \                                 / \
            /   \                               /   \
           /     R                             /     R
          /     / \                           /     / \
         /     /   \                         /     /   \
        O     N     Co                      O     N     Co
        |    / \    |                      / \    |     |
        X   X   X   X                     X   X   X     X
        |    \ / \ /                      |    \ /      |
        α     β   γ                       α     β       γ
```

Thus, in phonological representations the association lines between the terminal elements of syllable tree and the central tier show which (traditional) segment belongs to which syllable constituent. As is usual in nonlinear phonology, phoneme length is indicated by the number of X's a given segmental matrix is associated with (i.e. association between the central tier and the segmental tier).

```
(3) (a)  X        (b)  X   X      (c)  X        (d)  X   X
         |              \ /            |              \ /
         u               u             t               t
```

(3a) represents a short vowel, (3b) a long vowel, (3c) a short consonant, and (3d) a long consonant. In the case of affricates, one slot on the central tier is associated with two non-identical segmental matrices:[5]

[5] In this paper we shall represent geminate affricates as

```
X   X
| \ |
α   β
```

```
(4)   X
     / \
    t   s
```

In this framework e.g. the words *cél* 'aim' and *kedd* 'Tuesday' will have the following phonological representation:

```
(5) (a)        σ                          (b)[6]        σ
              / \                                      / \
             /   \                                    /
            /     R                                  /     R
           /     / \                                /     / \
          /     /   \                              /     /   \
         O     N     K                            O     N     K
         |    / \    |                            |     |    / \
         X   X   X   X                            X     X   X   X
        / \   \ /    |                            |     |    \ /
       t   s   e     l                            k     e     d
```

Van der Hulst (1984) points out that in the case of a phonological representation such as the one described above, syllable structure rules (which specify the well-formed syllables in L) have three different functions: i) they have to characterize the strings of segments that constitute a well-formed syllable in L, i.e. they specify the permitted **linear structure** of the syllable; ii) they have to determine how these segments are to be grouped into syllable constituents, i.e. they specify the **hierarchical structure** of the syllable; and finally iii) they have to determine the association between the (auto)segmental tier(s) and the central tier, i.e. they specify the **autosegmental structure**. The types of structures described above are shown in (6) (cf. van der Hulst 1984, 38).

This is not offered as the only possible (or even the correct) representation. But as in this paper, nothing hinges on this matter (geminate affricates occupy two X slots anyway) we shall use this representation without explanation.

6 A late realisation rule will ensure that underlying

```
X   X
|   |
e   a
```

appear on the surface as phonetic [ɛ], [ɔ] and not [e], [a].

(6)

```
              σ
             / \
            /   \
           /     R
          /     / \
         /     /   \          hierarchical structure
        /     /     \
       O     N      Co
      / \   / \    / \
     /   \ /   \  /   \
    X   X X   X  X    X       autosegmental structure
    |   |  \ /   |    |
    α   β   γ    δ    ε       linear structure
```

In this paper we will mainly examine the hierarchical structure of the Hungarian syllable.

1. Now, let us return to the original question: Does the onset branch in Hungarian? As we pointed out earlier there are two different answers to this question in the literature. Everybody accepts the fact that there are syllables in Hungarian whose onset branches, but according to some linguists these syllables are anomalous (they only occur in "foreign" words), and according to others there is noting anomalous about them. This question is all the more interesting because in the current nonlinear literature the first view (which, as we will see shortly, is highly questionable) occurs as a "fact about Hungarian phonology"[7] (e.g. Kaye–Lowenstam 1981; Kaye–Lowenstamm–Vergnaud 1988; Jensen–Stong-Jensen 1988).

The usual arguments put forward in favour of the first view are the following:

i) Syllables with a branching onset only occur after a word boundary.

ii) Native speakers consider these words to be foreign.

iii) These words are not fully integrated into the Hungarian phonological system, they have not completely conformed to the native pattern.

iv) These syllables only occur in foreign words.

[7] Kornai (1986) is a notable exception.

Siptár (1980a, b) convincingly shows that these arguments are untenable. He points out that ii) is simply untrue: phonetically/phonologically untrained native Hungarian speakers do not identify words like *próba* 'rehearsal', *tréfa* 'joke$_{\text{noun}}$', *drága* 'expensive', *srác* 'lad', *platán* 'plane tree', etc. as "foreign". Therefore, iii) is meaningless: It is highly unlikely that these words will become "more Hungarian".[8]

There **was** a rule in Hungarian which simplified or broke up branching onsets, but apparently this rule has been lost (cf. Siptár 1980b, 343). Thus, iv) is only true if **foreign** means 'loan', but then it is synchronically irrelevant as an argument because languages in general are full of loan words. The claim under i) is not strictly true. There are a few words that undoubtedly contain non-initial syllables with a branching onset, e.g. *angström* 'id'. But even if i) were true, it would not be a valid argument for the special status of syllables with a branching onset because there is nothing unusual or surprising about the phenomenon that syllables which are adjacent to the word boundary behave differently from word-internal syllables. This state of affairs is also attested in languages other than Hungarian. For examples, in English in stressed word-final open syllables the nucleus must branch (i.e. must be a long vowel or a diphthong), but non-branching nuclei occur in word-internal stressed open syllables.

1.1. We have seen that the claims (i–iv) are either untrue or are untenable as arguments for the anomalous character of syllables with branching onsets. Let us now examine the other view, according to which in Hungarian a syllable with a branching onset has the same phonological status as a syllable with non-branching onset. Consider the following words (the analysis which follows is restricted to monosyllabic words with a morphologically simple coda[9]):

[8] Indeed, it is only some non-systematically occuring phoneme clusters that are altered or simplified (e.g. initial /ps/, /ks/, etc.), and even these combinations are left unmodified in ECH (Educated Colloquial Hungarian):

[ps]ichológia	'psychology'	>	*[s]ichológia*
			[ts]ichológia
			[pis]ichológia
[ks]erox	'xerox'	>	*[s]erox*
never e.g. *frász*	'fright'	>	**frász* or **[fVr]ász*

[9] Cf. note 3.

(7)[10]

	I	II	III	IV	V	VI
	$\breve{V}C\#$	$\bar{V}C\#$	$\breve{V}CC\#$	$\bar{V}CC\#$	$\breve{V}\bar{C}\#$	$\bar{V}\bar{C}\#$
	hit	*sír*	*fing*	—	*itt*	—
	nem	*kém*	*szent*	*férc*	*kedd*	*épp*
	sün	*bűn*	*csüng*	—[11]	*függ*	—
	sör	*bőr*	*gyöngy*	—[12]	*fönn*	—
	fut	*rút*	*must*	—[11]	*ujj*	—
	lop	*kór*	*gyors*	—	*orr*	—
	hat	*táp*	*tart*	*márt*	*vall*	*száll*

($\breve{V}$=short vowel; $\bar{V}$=long wovel; C=short consonant; $\bar{C}$=geminate consonant; CC=consonant cluster)

(7) shows the permitted nucleus+coda combinations (complex rhymes) in Hungarian monosyllables with a simple onset or with no onset. Strings representing types I, II, III, V freely occur. A non-branching nucleus may be followed by a non-branching coda (type I) or a branching coda (types III and V), and a branching nucleus may be followed by a non-branching coda (type II). However, a branching coda may only follow a branching nucleus if the nucleus is [e:] or [a:]. This condition on superheavy rhymes seems to be even more restrictive. There are very few morphemes in which a long vowel is followed by a tautosyllabic geminate (the full list seems to be *-képp*$_{\text{suff.}}$ 'as', *épp* 'just$_{\text{adv}}$', *váll* 'shoulder', *száll* 'fly$_{\text{verb}}$', *áll* 'chin', *szakáll* 'beard'). Notice that /ll/ regularly degeminates in this case (*száll* 'fly$_{\text{verb}}$' and *szál* 'thread' are both pronounced [sza:l]). Therefore we will consider (7)/VI empty and regard *épp* and *-képp* to be exceptional.[13] Thus, the restriction on morphologically simple super-heavy rhymes is as follows:

[10] Glosses:
hit 'faith'; *sír* 'tomb'; *fing* 'fart'; *itt* 'here'; *nem* 'no'; *kém* 'spy$_{\text{noun}}$'; *szent* 'saint'; *férc* 'tacking thread'; *kedd* 'Tuesday'; *épp* 'just$_{\text{adv}}$'; *sün* 'hedgehog'; *bűn* 'sin$_{\text{noun}}$'; *csüng* 'dangle$_{\text{verb}}$'; *függ* 'depend'; *sör* 'bier'; *bőr* 'leather'; *gyöngy* 'pearl'; *fönn* 'up'; *fut* 'run$_{\text{verb}}$' *rút* 'ugly'; *must* 'grape-juice'; *ujj* 'finger$_{\text{noun}}$'; *lop* 'steal'; *kór* 'illness'; *gyors* 'quick'; *orr* 'nose'; *hat* 'six'; *táp* 'nutriment'; *tart* 'hold$_{\text{verb}}$'; *márt* 'dip$_{\text{verb}}$'; *vall* 'confess'; *száll* 'fly$_{\text{verb}}$' (all verbs are ind. 3rd pers. sing.).

[11] The vowels of verbs like *gyűjt* 'collect', *gyújt* 'light$_{\text{verb}}$', are normally pronounced short in ECH (=Educated Colloquial Hungarian, cf. Nádasdy–Siptár). Also, as A. Kornai has pointed out to me, the codas in these monosyllables are best considered morphologically complex.

[12] The vowel in *őrs* 'patrol$_{\text{noun}}$' is pronounced short in ECH.

[13] As Á. Nádasdy has pointed out to me in ECH *-képp* is often pronounced [ke:b], in which case it ceases to be an exception.

(8)[14] A branching nucleus may be followed by a branching coda if:

i) there are not any two X's dominated by the coda associated with the same segmental matrix

and

ii) the X's associated with the nucleus are associated with /e/ or /a/ on the segmental tier.

The coda is an optional syllable-constituent in Hungarian, and in simple (non-branching) rhymes the nucleus may be simple or complex (e.g. *ma* 'today', *nő* 'woman', etc.).

To sum it up, in monosyllables contaning a non-branching onset or no onset

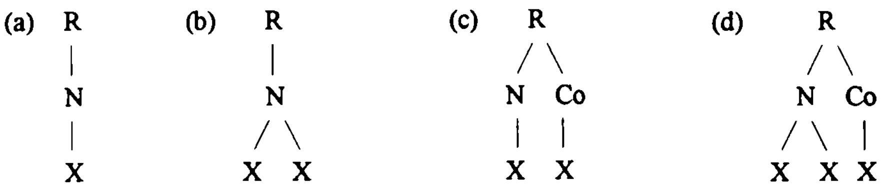
(9) i) the rhyme and the coda may be branching or non-branching

ii) the nucleus and the coda may be branching or non-branching

iii) the coda may be branching or non-branching if the nucleus is non-branching

iv) a branching nucleus may only co-occur with a branching coda if condition (8) is satisfied.

Thus in the syllable-type examined the following rhymes are well formed:

(10)


[14] Of course, there are many monosyllables in Hungarian in which a long vowel is followed by a tautosyllabic geminate, but in such words there is always a morpheme boundary before the geminate or between the two 'complements' of the geminate, i.e. they are the result of suffixation (*főbb* 'major$_{adj}$', *nyűtt* 'shabby', *bízz* 'trust!', *húzz* 'pull!', *láss* 'see!', etc.).

```
(e)    R           (f)     R            (g)     R
      / \                 / \                  / \
     N  Co               N    Co              N    Co
     | / \              / \  / \             / \  / \
     XX  X             X  X X  X            X  X X  X
                        \/  |  |             \/  | / \
                     [ – high  ]          [ – high  ]
                     [ – round ]          [ – round ]
```

1.2. Let us now examine the syllables which contain a branching onset (just like above, we concentrate on unsuffixed monosyllables).

(11)[15]

I	II	III	IV	V	VI
$\breve{V}C\#$	$\bar{V}C\#$	$\breve{V}CC\#$	$\bar{V}CC\#$	$\breve{V}\bar{C}\#$	$\bar{V}\bar{C}\#$
frigy	*fríz*	*klipsz*	—	*brill*	—
Fred	*stég*	*steksz*	—	*slepp*	—
—	*prűd*	—	—	*plüss*	—
—	*blőd*	*flört*	—	*fröccs*	—
klub	*snúr*	*grund*	—	*plu[ss]*	—
sznob	*gnóm*	*bronz*	—	*sto[pp]*	—
kvasz	*frász*	*flanc*	*spájz*	*snassz*	—

($\breve{V}$=short vowel; $\bar{V}$=long vowel; C=short consonant; $\bar{C}$=geminate consonant; CC=consonant cluster)

At the first sight (11) seems to be very similar to (7). VI is empty in both cases (remember that we have found the occurrences in (7VI) exceptional), there is no difference between (7II), (7V) and (11II), (11V) respectively, and we might argue that the differences between (7) and (11) in columns I, III and V (i.e. the lach of *üC*, *öC*, *üCC*, *éCC* in (11)) are accidental.

However a closer look at type (11I) reveals an interesting difference between syllables with a branching onset and syllables with a non-branching onset. Notice that (apart from *kvasz*) all the examples in (11I) end in a voiced

[15] Glosses:
frigy 'marriage'; *fríz* 'frieze'; *klipsz* 'clip'; *brill* 'cut diamond'; *Fred* 'id.'; *stég* 'landing stage'; *steksz* 'money'; *slepp* 'entourage'; *prűd* 'prudish'; *plüss* 'plush'; *blőd* 'silly'; *flört* 'fliert'; *fröccs* 'wine mixed with soda'; *klub* 'id.'; *snúr* 'pitch-and-toss'; *grund* 'vacant lot'; *plu[ss]* 'plus'; *sznob* 'snobbish'; *gnóm* 'gnome'; *bronz* 'bronz'; *sto[pp]* 'stop'; *kvasz* 'kvass'; *frász* 'fright'; *flanc* 'flashiness'; *spájz* 'pantry'; *snassz* 'not good enough'.

obstruent. In fact I could only find two items (*kvasz* and *prof* 'professor') that belong to (11I) and do not end in a voiced obstruent. I suggest that these two items are irregular. That in (11I) the norm is for the syllables to end in a voiced obstruent is corroborated by the fact when we examine syllables that belong to type (11V) we find that the full list of geminates that can realise the coda is [pp, tt, t^jt^j, kk, t^st^s, $t^št^š$, ff, ss, šš, mm, ll, hh]. Each geminate in this list is either [–voicel] or [+sonorant].[16] These facts suggest that in syllables with a branching onset

(12) a non-branching nucleus must be followed by a branching coda unless the segmental matrix associated with the coda is [–sonorant, +voice].

That means that there is an important difference between syllables with a branching onset and syllables with a non-branching onset. For syllables with a non-branching onset restrictions are only imposed on the **maximal** complexity of a complex rhyme (super-heavy rhymes are only permitted if condition (8) is met). In contrast, for syllables with a branching onset not only the maximal complexity of a complex rhyme is set (they also have to satisfy condition (8)) but its **minimal** complexity as well (a complex rhyme must meet condition (12)). Thus, syllables with a branching onset must satisfy conditions (9i, ii, iv) but (9iii) is replaced by (12).

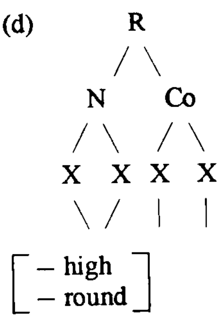
To sum it up, in monosyllables with a branching onset the following templates are available for complex rhymes:[17]

```
(13) (a)     R            (b)     R            (c)     R
            / \                  / \                  / \
           N   Co               N   Co               N   Co
          / \   |               |   / \              |    |
         X   X  X               X  X   X             X    X
                                                          |
                                                     [ – son   ]
                                                     [ + voice ]
```

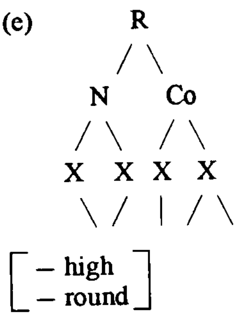
[16] [$d^žd^ž$] occurs in the word *bridzs* 'card game', but this is not a counterexample to the regularity we have just observed because [$d^ž$] is always long except in word-initial, preconsonantal and postconsonantal position (cf. Nádasdy 1986).

[17] (13) applies before suffixation. Suffixation may create syllables in which a complex nucleus associated to a segmental matrix other than /a/ or /e/ is followed by a complex coda (e.g. *trónt* 'throne$_{acc}$', etc.).

(d)



(e)



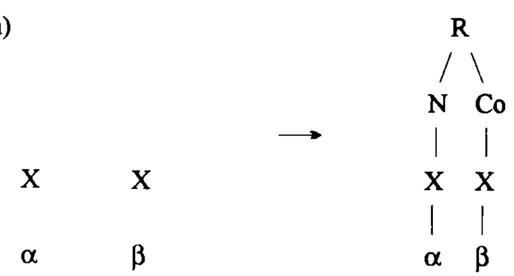
Condition: the onset in the syllable branches

The templates of (13) function as well-formedness conditions: on the one hand, they filter out (i.e. specify as ill-formed) syllables that are incompatible with them (e.g. **fragg*, **prem*, **krátt*, **smörc* etc.), and on the other, they ensure (together with the general well-formedness conditions) that only well-formed rhymes are created by association.

Disregarding syllables with a branching onset whose rhyme does not branch, the segmental matrices associated with X's dominated by the onset may be followed by i) two different segmental matrices within the same syllable; ii) three different segmental matrices within the same syllable; or iii) four different segmental matrices within the same syllable. The X's dominated by the onset may be followed by two, three or four X's on the central tier within the same syllable. Furthermore, two X's are permitted only if the last segmental matrix within the syllable is [–son, +voice], and four X's are permitted only if after the segmental matrices realising the onset there are at least three segmental matrices of which the first is [–high, –round].

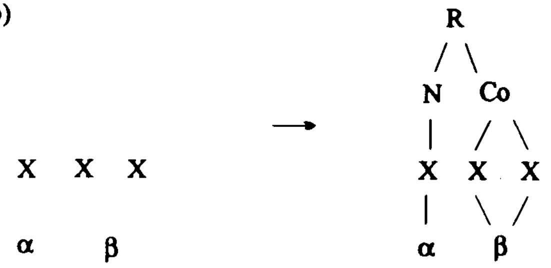
In case i) the following associations are pemitted by the general and language specific well-formedness conditions (Greek letters denote segmental matrices):

(14) (a)



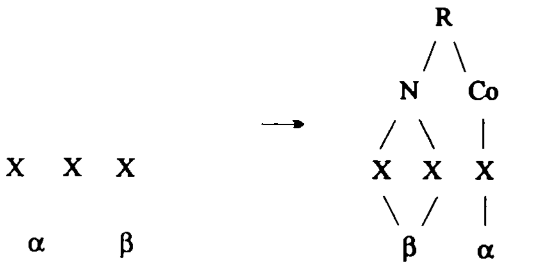
e.g. *frigy* 'marriage'

(b)



e.g. *plüss* 'plush'

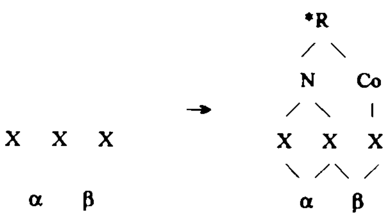
(c)

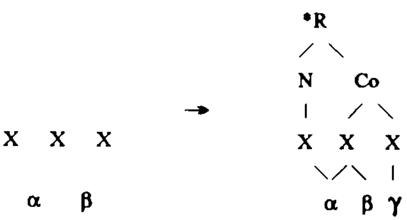


e.g. *frász* 'fright'

Only these associations are permitted in the case of a segmental melody consisting of two elements.[18]

[18] Other associations are excluded by
a) the general well-formedness conditions (cf. Section 1) e.g.

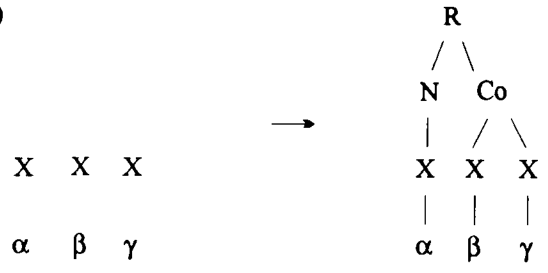




or

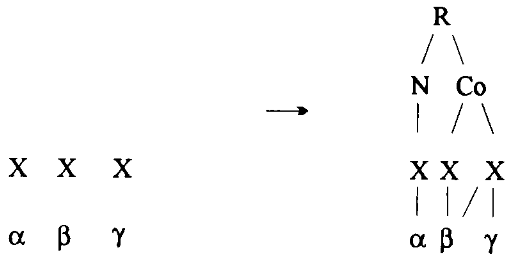
In the case ii) the following associations are permitted by the general and language specific well-formedness conditions (Greek letters denote segmental matrices):

(15) (a)



e.g. *steksz* 'money'

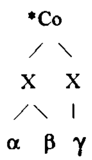
(b)



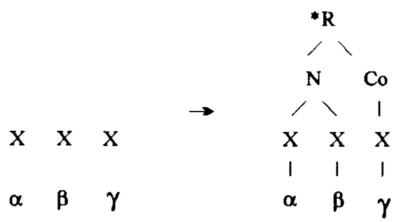
e.g. *priccs* 'bunk'

---

b) by language-specific restrictions on linear or autosegmental structure
e.g. as opposed to C+affricate strings, affricate+C strings are virtually nonexistent as morphologically simple codas (apart from an extremely limited number of exceptional items such as *palack* 'bottle', *barack* 'peach', *tarack* 'howitzer', *Recsk* 'place name')—hence the lack of



There are no phonological diphtongs in Hungarian, therefore



```
(c)                                  R
                                    / \
                                   N  Co
                          ──→     / \  |        e.g. srác 'boy'
       X   X   X                 X X   X
                                 \ /  / \
       α   β   γ                  α  β  γ
```

```
(d)                                  R
                                    / \
                                   N    Co
                          ──→     / \   / \     e.g. spájz 'pantry'
       X   X   X   X             X  X  X  X
                                  \ /   |  |
         α   β   γ                 α   β  γ
```

Only these associations are permitted in the case of a segmental melody consisting of three elements (cf. footnote 18).

In case iii) the following associations are permitted by the general and language specific well-formedness conditions (Greek letters denote segmental matrices):

```
(16) (a)                             R
                                    / \
                                   N  Co
                          ──→      |  / \        e.g. svarc 'illegal'
       X X   X                     X  X  X
                                   |  | / \
       α   β  γ δ                  α   β γ δ
```

```
(b)                              R
                                / \
                               N   Co
                   ——→        / \ / \        e.g. hypothetical smérc
    X X X X                  X  X X  X
                              \ / | / \
    α β γ δ                    α  β γ δ
```

Only these associations are permitted in the case of a segmental melody consisting of four elements (cf. footnote 18).

As can be seen there is a difference between the syllable structure constraints that refer to syllables with a branching onset and those that refer to syllables with a non-branching onset. In other words the phonological behaviour of syllables with a branching onset is different from the phonological behaviour of syllables with a non-branching onset. Inevitably, this fact brings us back to the original question about the phonological status of complex onsets.

1.3. There is a group of monosyllables in Hungarian whose members conform to the templates of (13), but do not (necessarily) begin with a consonant cluster (cf. Nádasdy 1986). All these words are of foreign origin (e.g. *sokk* 'shock', *giccs* 'kitsch', *chip* [čipp] 'id.', etc.). Nádasdy notes that these words seem to follow the mora-balancing principle, which otherwise is not characteristic of Hungarian ("[...] while Hungarian does not know the mora-balancing principle in its native (and 'old' borrowed) material, it applies it to the 'foreign' (= more recently borrowed) element" (Nádasdy 1986, 4). He points out that Hungarian seems to treat (more) recent borrowings in a strange way. Rather than being modified to meet "native" constraints these seem to have to conform to "foreign" principles even if they satisfy the native constraints in their original form: e.g. *chip* originally has a short vowel followed by a short consonant, which is a perfectly well-formed Hungarian pattern (cf. *csap* 'tap'), and still it is pronounced [čipp] in ECH. Nádasdy suggests that the words which exhibit this behaviour should be assigned the arbitrary diacritic feature [+foreign] in the lexicon, and the mora-balancing rule will be triggered by this feature. If we reformulate (13) as (17)

```
(17) (a)    R          (b)   R            (c)   R
           / \              / \                / \
          N  Co            N   Co             N   Co
         / \  |            |   / \            |    |
        X  X  X            X  X   X           X    X
                                                   |
                                              [- son  ]
                                              [+ voice]

     (d)     R                (e)     R
            / \                      / \
           N   Co                   N   Co
          / \  / \                 / \  / \
         X  X  X  X               X  X  X  X
          \ /  |  |                \ /  |  / \
       [- high ]                [- high ]
       [- round]                [- round]
```

then this appears in our framework as[19]

(18) [+foreign] $\longrightarrow$ [+rule 17]

The only difference between (13) and (17) is that the condition that appears in the former has been left out of the latter because—as we have seen—the templates also characterise a number of words that are not syllables with a complex onset. Note, however, that while only **some** simple-onset monosyllables satisfy (17), **all** complex-onset monosyllables conform to it. Thus, **all** the complex-onset monosyllables would have to be marked with the feature [+foreign], which shows that the value of the feature [foreign] is predictable/redundant in monosyllables beginning with a branching onset:

```
(19)   O  ⟶ [+foreign]
      / \
```

[19] Nádasdy (1986) does not formalise this rule, but Nádasdy–Siptár (1987, 24) mentions a compulsory "prelexical" gemination rule which in words labelled [+foreign] changes short consonants into geminates after a short vowel. This rule roughly corresponds to (13) in our framework.

Thus—as opposed to words that are not syllables with a branching onset—these words do not have to be arbitrarily marked [+foreign] because redundancy rule (19) will assign the diacritic feature correctly.

2. This is a significant fact bearing on our answer to the question posed in the title of this paper. It seems to be true that syllables whose onset branches only occur in "foreign" words. However, these words are not foreign in the sense the traditional view interprets the term: they are not foreign because they are of foreign origin, but bevause synchronically they behave differently from the majority of formatives in the Hungarian lexicon. Thus, there is a group of items in the lexicon of Hungarian to which special syllable structure conditions apply ((17)), and all the monosyllabic words that contain a branching onset belong to this group (in order to avoid the ambiguity of the word **foreign** we could refer to the feature [special] instead of [foreign] and talk about the members of this group as "special" items). Therefore Siptár (1980a,b) is not entirely correct when he says that native speakers of Hungarian do not know that these words are "foreign". Of course they do not—in the sense that they cannot identify them as "foreign" words; but they definitely do know that these are foreign (=special) words in the sense that they treat them differently form the rest of the formatives in the Hungarian lexicon.

3. Finally, I would like to touch upon the validity of (17) in polysyllables. The problem is that there seems to be a partial mismatch between the templates of (17) and the types of branching-onset syllables occurring in polysyllables. Consider (20). (Note that in (20) the substrings examined are not necessarily tautosyllabic):

(20)[20]	I	II	III	IV	V	VI
	$\check{V}C\#$	$\bar{V}C\#$	$\check{V}CC\#$	$\bar{V}CC\#$	$\check{V}\bar{C}\#$	$\bar{V}\bar{C}\#$
	slemil	*tróger*	*flaszter*	*spárga*	*stukker*	—

As can be seen in (20) in these words only type VI is unpermitted. Words like *spárga* are unproblematic as they satisfy (17) if the syllabification is *spár-ga* (this is the only possible syllabification since /rg/ is unpermitted as an onset or a coda). Words like *tróger* are no problem either because on the one hand they satisfy (17) if syllabified as *tróg-er*, and on the other (as branching and

[20] Glosses:
slemil 'shlemiel'; *tróger* 'dishonest person'; *flaszter* 'cobblestone'; *spárga* 'string'; *stukker* 'pistol'.

non-branching nuclei are equally possible in a non-branching rhyme regardless of the complexity of the onset) do not violate any syllable structure constraints if the syllabification is *tró-ger* (syllabification rules will have to choose between the alternatives). No special mechanism is needed to account for words like *flaszter*. If the syllabification is *flasz-ter*, (17) will require a geminate in the coda (*fla/s/* ⟶ *fla/ss/*). This geminate is then regularly changed into a short consonant by an independently motivated degemination rule (which degeminates consonants when they are adjacent to another consonant) and we get the correct surface form (*fla/ss/ter* ⟶ *fla/s/ter*).

The lack of type VI, however, cannot be explained with reference to (17) because strings that would fit in type VI are syllabifiable in such a way as to satisfy (17): (hypothetical) *frátter* ⟶ *frát-ter*. Still, type VI is empty. It is not clear to me how it should be done, but in such cases somehow we have to exclude geminates after long vowels (i.e. we have to express that long vowels cannot be followed by (morphologically simple) geminates even if the geminate in question is divided by a syllable boundary).

The simultaneous existence of types I and V is also a problem. The difficulty is that (as *slemil* and *stukker* show) we cannot predict whether a geminate or a short consonant will follow after a short vowel (something that is predictable in monosyllables). One possible solution is to represent words like *slemil* as *sle-mil* and words like *stukker* as *stu/k/-er*. (17) requires a geminates in the coda in the second case (*stuk/k/* ⟶ *stu/kk/*), so we get the correct surface form. Unfortunately, this is not really a way out as in order for this mechanism to work we have to encode the place of the syllable boundary into the representation.

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EMPTY CONSONANTS IN THE MORAIC PHONOLOGY OF HUNGARIAN*

ROBERT M. VAGO

1. Introduction

Virtually all versions of nonlinear phonological theory have assumed that the terminal units of prosodic structure may, under certain conditions, be "empty", i.e. associated with no features within the autosegmentally organized segment structure. For the most part, the terminal elements of prosodic structure have been assumed to constitute the skeleton of the segment. In these conceptions the vocabulary of the skeleton consists of either C and V units, corresponding on the whole to consonants and vowels, respectively, as proposed principally by McCarthy (1985) and Clements-Keyser (1983), or more abstract X units, as suggested by Kaye-Lowenstamm (1984) and Levin (1985). Recent research, under the rubric of moraic phonology, has challenged the validity of positing the skeleton as an independent autosegmental tier and has instead advanced the claim that prosodic structure is erected directly upon segments; see in particular Hyman (1985) and McCarthy-Prince (1986).

In this work I will draw on the insights of moraic phonology with respect to prosodic organization and will aim to propose that an empty consonantal root underlies a number of alternations involving the consonant /v/ in Hungarian. As a direct consequence, the driving force behind the argument of previous linear analyses for an abstract /w/ segment in Hungarian (Vago 1980, 1982)

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falls by the wayside.[1] In Section **2** I outline some basic assumptions about syllabification in Hungarian, in Sections **3–6** I develop analyses for the various subclasses of morphemes for which an empty consonantal root is suggested, in Section **7** I account for some apparent aberrations, and in Section **8** I offer an overview of the main points raised in the preceding sections.

2. Assumptions

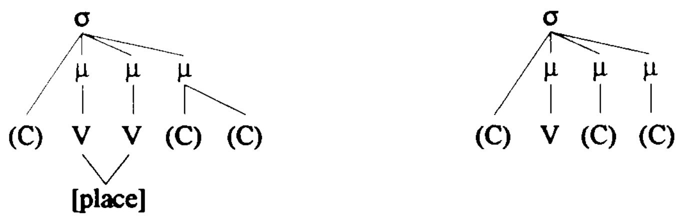
Since syllabification plays a critical role in the ensuing analyses of the Hungarian data, a brief discussion of my assumptions regarding the following topics is in order: a) the most salient facts of syllable structure in Hungarian; b) the internal structure of the syllable; and c) the syllabification of morphemes. For a more detailed account, see Vago (1989).

In Hungarian, syllables minimally consist of a vocalic nucleus; they may also have at most one consonant in the onset, and up to two consonants in coda position.[2] In intervocalic position consonants are syllabified in the following manner: V.CV, VC.CV, VCC.CV, where . indicates syllable juncture. That is, one, and only one C must be syllabified as the onset in prevocalic position.

Both consonants and vowels may occur short or long (geminate). Geminate consonants are syllabified in the same way as two nonidentical consonants: e.g. *sakk* 'chess', *sak.kunk* 'our chess, *sakk.ban* 'in chess'.[3] Intervocalic geminate consonants are thus ambisyllabic. Long vowels, on the other hand, are tautosyllabic: *szám* 'number', for example, is monosyllabic.

The core syllables of Hungarian can be represented in the for of the following templates:

(1) (a) Long V syllables (b) Short V syllables



[1] The abstract analyses of linear theory are often obviated by the empty segments of nonlinear theory. For two especially convincing cases, cf. Anderson (1982) and Marlett–Stemberger (1983).

[2] These core syllable structure configurations may be violated at the edges of words in the cases of onomatopoeic words and words of foreign origin. These marked syllable structures do not impact on the present subject matter.

[3] Hungarian examples are cited orthographically throughout. Vocalic length is indicated diacritically: /í ű é ő á ó ú/ are the long equivalents of /i ü e ö a o u/, respectively. Geminate consonants, on the other hand, are indicated by double letters.

The representations in (1) contain three prosodically relevant tiers recognized by moraic phonology: the syllable tier (σ), the mora tier (μ), and the segmental root tier (C, V). The root tier as an independent level of segment structure is motivated in detail by Clements (1985). Following the proposal of McCarthy (1988), I assume that C and V units stand for the features [consonantal] and [sonorant]; in particular, C is [+consonantal] and V is [−consonantal]. It should be borne in mind that in the moraic phonology paradigm C and V are root tier elements, not skeletal.[4]

Vowels are intrinsically mora bearing such that single vowels are monomoraic, long vowels bimoraic, onset consonants never are, and coda consonants are in some languages, not in others. In Hungarian, as argued in Vago (1989), codas receive mora weight. It appears that on a universal basis the maximum number of mora bearing units within a syllable is three.

Therefore, in syllables containing a long vowel plus two coda consonants, as in the case of *áld* 'bless', the last consonant receives no mora count, but rather is adjoined to the mora unit of the preceding consonant.

The root tier representation of long segments is controversial. Nearly all research within the moraic phonology model assumes single root structure. Selkirk (1988), on the other hand, proposes a two root theory for long segments, both vowels and consonants. In this work I will assume the correctness of Selkirk's approach; in Vago (1989) I argue explicitly in favor of the double root representation of long segments in Hungarian.

The segmental root tier not only serves as the terminus of prosodic structure, but also as the anchor of the feature hierarchy. Thus, C is further associated with features relevant to consonants, V with those relevant to vowels. The internal structure of segments, excepting the root tier, has no bearing on the focus of this paper. It will therefore suffice to refer to segments in their orthographic representations (cf. footnote 3), essentially representing phonemes, or in terms of archiphonemes, as will be done later on. Of course, in the case of empty segments, which are to be understood as C and V root tier units that dominate no other features, segmental representation beyond the root tier is absent. I will use the cover terms C_E and V_E to refer to such segment structure configurations.

As concerns the syllabification of morphemes, two distinct approaches can be found in the literature. In the template-driven theory (e.g. Selkirk 1982;

[4] I will use the term 'root' in both of its morphological sense, referring to an underived lexical entry, and segmental sense, referring to the [consonantal] (and [sonorant]) feature tier mediating between prosodic structure and segment structure.

McCarthy 1985; Itô 1988, 1989) lexical entries have fully elaborated syllable structures, based on templates like those in (1), augmented by well-formedness conditions. In the rule-based theory (e.g. Steriade 1982; Levin 1985; Selkirk 1988) syllable structures are omitted from underlying representations; instead, they are supplied by syllable building rules. In this article I will sidestep this issue and will simply assume fully syllabified structures coming out of the first (underived root) cycle. As for derived representations, I will assume a continuous or "anywhere" process of SYLLABIFICATION (SYLL) whose function is to produce syllable structures in conformity with the templates in (1). I will further assume that one significant component of SYLL is that in prevocalic position onset syllabification supersedes coda syllabification. These assumptions are rather benign; cf. Itô (1989) and references cited there.

3. /VC$_E$/-final roots

About a dozen verbal and nominal roots have a final long vowel (mostly /ö/ or /ó/) word finally and before C-initial suffixes; before V-initial suffixes the long vovel appears short, followed by /v/. These alternations are apparent in the representative nominal inflections given in (2):

(2)	Nominative	Dative	3sg possessive
'horse'	*ló*	*lónak*	*lova*
'stone'	*kő*	*kőnek*	*köve*
'grass'	*fű*	*fűnek*	*füve*
'stem'	*tő*	*tőnek*	*töve*
'maggot'	*nyű*	*nyűnek*	*nyüve*
'liquid'	*lé*	*lének*	*leve*
'pipe'	*cső*	*csőnek*	*csöve*

The following verbal roots exhibit the same alternation pattern: *nő* 'grow', *lő* 'shoot', *fő* 'cook, boil (intr.)', *sző* 'weave', *ró* 'scribble'.

We see in (2) that the dative and 3sg possessive suffixes have two shapes: one with a back vowel and one with the corresponding front vowel. This alternation is due to the well-known vowel harmony process of Hungarian. Leaving details aside, in the simplest and most general cases suffix vowels assimilate for the feature [back] to the root vowel(s); short mid vowels adjust for the feature [round] as well. Clearly, this matter does not impinge on the main concerns of the present paper, beyond recognizing that derived vowels are subject to harmony. In general, vowels appearing in derivations will be given with their surface harmonic values. On occasion, though, it will be more revealing to refer to archivowels: /U O A/ or /Ú Ó Á/. The capital letters in the first set stand for the values /u ü/, /o ö e/, and /a e/, respectively, those in the second set /ú ű/, /ó ő/, and /á é/, respectively.[5]

In (2), the nominative inflection represents the shape of the (underived) root in word final position, the dative inflection the shape of the root before consonant initial suffixes, both derivational and inflectional, and the 3sg possessive inflection the shape of the root before vowel initial suffixes, again both derivational and inflectional.[6] To see this, consider the words in (3), all built on the root for 'horse':

(3)(a)	/*lov-*/ before V		(b)	/*ló-*/ before C	
	lovam	'my horse'		*lóra*	'onto (the) horse'
	lovak	'horses'		*lóhoz*	'to (the) horse'
	lovunk	'our horse'		*lótól*	'from (the) horse'
	lovas	'equestrian'		*lóban*	'in (the) horse'
	lovagol	'ride (a horse)'		*lónál*	'at (the) horse'
	lovász	'stableman'		*lóról*	'off (the) horse'

Taking these facts into account, I will henceforth supply only the nominative, dative, and 3sg possessive inflections to demonstrate the shape of roots in word final position, before consonant initial suffixes, and before vowel initial suffixes, respectively.

The distribution of the root allomorphs in (2) is predictable on the basis of syllable structure. These roots end in a consonant in case that consonant can be syllabified as the onset of a following syllable, i.e. if a vowel initial suffix follows. However, in contexts where onset syllabification is not possible, namely in word final position (no syllable follows) and before consonant initial suffixes (only one onset position is allowed, and that is already filled), the root final consonant is incorporated into the preceding vowel which thereby becomes long.

[5] For the sake of simplicity, I systematically ignore the question of underspecification with respect to the segment inventory. It should be obvious that the symbols used here to refer to segments have straightforward interpretations in descriptions that deal with underspecification explicitly.

[6] The suffix for 'his/her/its' is vowel initial: cf. *ház* 'house', *kép* 'picture', *hajó* 'ship', 3sg possessives *háza*, *képe*, *hajója*. The last form shows the effects of a general /j/ insertion rule; see Vago (1980).

The observed alternation between a long vowel and a short vowel plus consonant is highly suggestive of compensatory lengthening. On this view, we set up a final short vowel plus an extra segmental root tier unit which must be capable of bearing mora weight. This segment must be C, since it must be able to undergo onset syllabification, in which case it surfaces as /v/. We cannot assume, however, that the morpheme final C is specified as /v/, since in the productive paradigm this segment does not induce compensatory lengthening: cf. for example *öv* 'belt', *övnek*, *öve*. (Setting up underlying final long vowels is ruled out as well: cf. for instance *só* 'salt', *sónak*, *sója* and *nő* 'woman', *nőnek*, *nője*, representing the productive paradigm.) Instead, the morpheme final C root is left empty underlyingly, and, if gathered into the onset of a following syllable, becomes linked to /v/ by a late rule:

(4) /v/-FILL

$$\begin{array}{c} \sigma \\ | \\ C_E \\ \vdots \\ v \end{array}$$

If onset syllabification is not possible, then the root final empty C remains in coda position, which, it will be recalled from Section **2**, in Hungarian entails mora assignment. The moraic empty C then lends its timing weight to the vowel preceding, creating a doubly linked, i.e. long vowel. However, on the assumption that the nodes which immediately dominate multiply linked features must be identical (Selkirk 1988), the final C root cannot directly link up with the melody of the preceding vowel. Rather, it is converted to a V root in two steps, as suggested by Selkirk (1988). By general rule a mora bearing empty C root (coda) is lost:

(5) Empty Consonant Deletion (C_E-DEL)

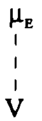
$$\begin{array}{c} \mu \\ \nmid \\ C_E \end{array}$$

The unsyllabified C_E root produced by C_E-DEL undergoes stray erasure (Steriade 1982), forced by the requirement of prosodic licensing (Itô 1988).[7]

[7] Alternatively, deletion rules are formulated so as to bring about deletion outright.

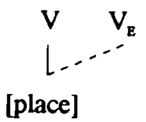
The mora count of the empty C root is not affected by the deletion on the root tier. As Hayes (1989) convincingly shows, in languages where codas are moraic empty mora units left behind by deletion processes on lower tiers typically induce compensatory lengthening. This is precisely what obtains in the cases under investigation. In the two-root theory of length proposed by Selkirk (1988) and followed here, the floating mora is supplied its own root unit (μ_E = empty mora):

(6) V Root Insertion (V-INS)



The compensatory lengthening process is completed by associating the empty V root with the features of the preceding vowel:

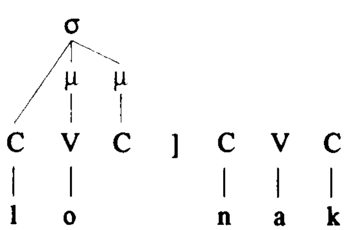
(7) V-SPREAD



In brief, a postvocalic root final empty C surfaces as /v/ if it can be syllabified into a syllable that follows, or else it triggers compensatory lengthening in the preceding vowel.

Let us proceed now to derivations. Suppose roots are fully syllabified coming out of the first cycle, as shown in (8) for the dative form of the root for 'horse':

(8)

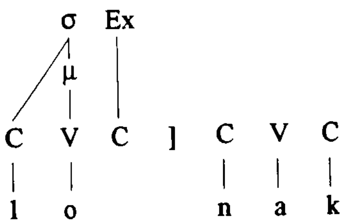


I assume, along with others, that the Elsewhere Condition blocks rules other than structure building ones from applying on the first cycle; for the details of this approach, cf. Kiparsky (1982a) and Pulleyblank (1986). Specifically, any changes in the structure of the root final consonant must await the next cycle, for only then is it known whether onset syllabification is possible, which, as we have just seen, is crucial to the ultimate development of C_E.

Moving onto the suffix cycle in (8), the structure of the suffix syllable is erected first; equivalently, syllable structure is present underlyingly. Then the compensatory lengthening process must be set in motion, beginning with C_E-DEL, in order to derive surface *lónak*. But this chain of events flies in the face of the Strict Cycle Condition (cf. Kiparsky 1985, among others): on the suffix cycle the structure of the root morpheme remains unaltered from what it had been on the first cycle; in particular, the resyllabification of the root final consonant into onset position is not possible.

I believe the problem is solved if we adopt the suggestion made by Itô (1988) that morpheme final consonants are treated as extraprosodic (Ex):

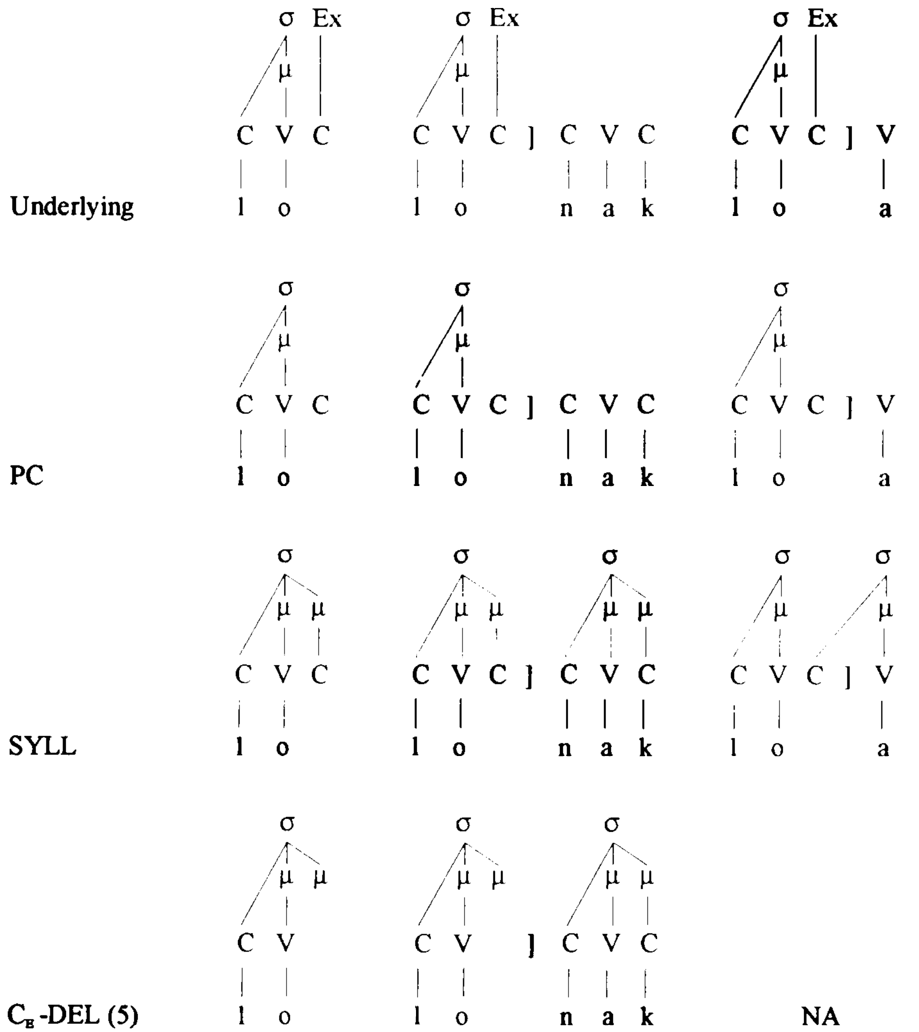
(9)



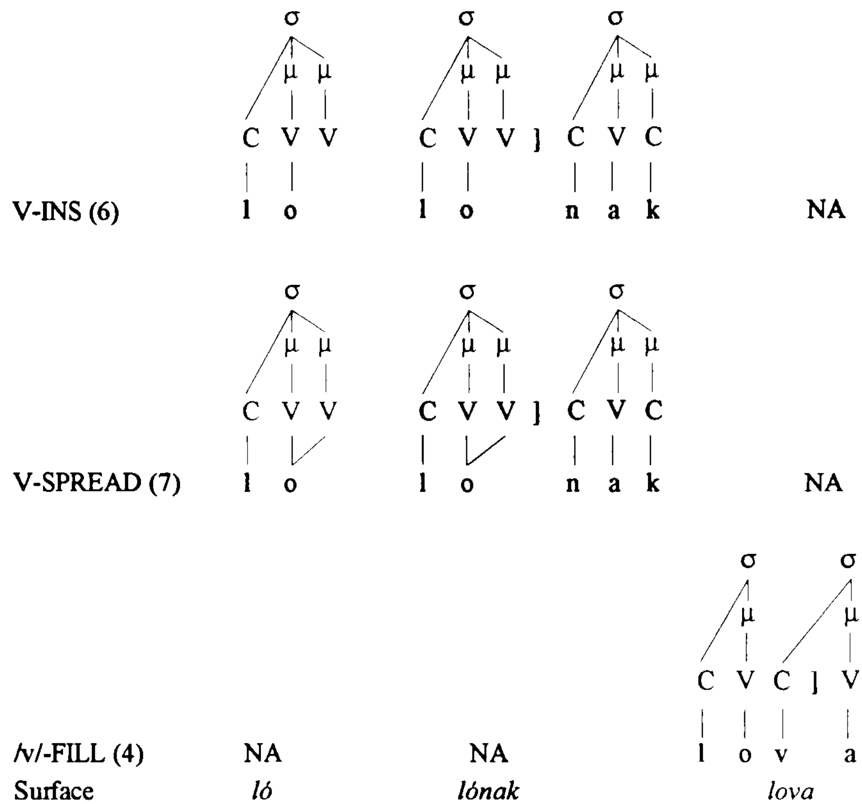
Subsequent to the first cycle, the extraprosodicity of the root final empty C is lost before suffixes by the well-established Peripherality Condition (PC), proposed by Hayes (1982) and Harris (1983), according to which a segment automatically loses its extraprosodicity if it ceases to be at the edge of the cyclic domain. If the suffix begins with a vowel, then the root final consonant is syllabified into onset position and, in the case of C_E, becomes linked to /v/ via /v/-FILL. Extraprosodicity is also lost if resyllabification into onset position is not possible: before a consonant initial suffix by the Peripherality Condition, in word final position by parametric setting according to which extraprosodicity does not obtain at the word level (Itô 1988). For ease of reference, I will attribute the loss of extraprosodicity at the word level to the Peripherality Condition as well.

Following the invocation of the Peripherality Condition in word final position and before consonant initial suffixes, the syllabically unaffiliated root final empty C undergoes coda syllabification. This in turn triggers compensatory lengthening in the manner discussed above. In (10) I provide sample derivations.[8] (NA = nonapplicable)

(10)



[8] In a large set of roots, including the entire class of what I claim to be empty C final roots discussed here, the connecting vowel that appears before certain suffixes is low instead of mid, the expected quality (cf. Vago (1980) for details). In nonlinear accounts of this fact such roots are assumed to contain a final floating (lacking segmental root specification) [+low] feature; cf. Kornai (1986) for example. This property will be ignored, since it has no impact whatsoever on the suggested analyses.



In derivations I ignore the end-cyclic bracket erasure convention of the lexical phonology framework (Kiparsky 1982b; Mohanan 1986). Also ignored is the resyllabification of the V root derived by V-INS into a separate syllable, since following the application of V-SPREAD that syllable is incorporated into the preceding one anyway, yielding monosyllabic long vowels.

The derivational history of root morphemes is identical word finally and before consonant initial suffixes; cf. the derivation of *ló* and *lónak* in (10). For the sake of brevity, in future derivational illustrations I will omit words in which the root is followed by a consonant initial suffix; the unsuffixed root will stand in for these cases.

Before concluding this section, a slight variation exhibited by a few $/VC_E/$-final roots needs to be addressed. In the following nouns the short vowel reflex is low instead of mid:[9]

[9] In a few cases the height alternation is relexicalized. Thus, the adjective *jó* 'good'

(11)	*tó*	'lake'	*tónak*	*tava*
	szó	'word'	*szónak*	*szava*
	hó	'snow'	*hónak*	*hava*

In comparing the two classes of lengthening roots exemplified in (2) and (11), the following generalization emerges: the lengthened vowel in the former group is never /a/. Therefore, we may safely assume that roots like those in (11) end in /aC_E/ and undergo the raising of /a/ to /o/ if the root final empty C is syllabified into coda position:

(12)

$$a \rightarrow o \;/\; \begin{array}{cc} & \mu \\ & | \\ V & C_E]_M \\ | & \\ \_\_ & \end{array} \qquad (]_M = \text{morpheme boundary})$$

Except for this extra rule, the derivation of the roots in (11) is exactly the same as that of the roots in (2).[10]

4. /VVC_E/-final roots

The following nominals end in a long vowel word finally and before consonant initial suffixes, but have a /v/ after the long vowel before vowel initial suffixes:

(13)	*mű*	'oeuvre'	*műnek*	*műve*	
	szú	'woodworm'	*szúnak*	*szúvas* (~ *szuvas*)	'worm-eaten'
	bű	'magic'	*bűnek*	*bűvös* 'magical'	

The verbal roots *nyű* 'wear down' and *rí* 'cry' and the adjective *bő* 'loose' also belong to this category: cf. 3pl present *nyűnek*, *rínak* and 1pl present *nyűvünk*, *rívunk* on the one hand and dative *bőnek* and *bőven* 'loosely', *bővebb* 'looser' on the other. Once again, the fact that normally neither /VV/-final nor /v/-

has the allomorph /jav-/ in certain derived stems: compare for example *javul* 'improve', *javít* 'repair', *javasol* 'advise' with *jól* 'well', *jóság* 'goodness', *jósol* 'predict'. Cf. also *hónap* 'month', *havi* 'monthly', *havonta* 'each month' and *ó* 'antique', *avul* 'become antiquated'. In other cases relexicalization results in new, synchronically underived roots: cf. *só* 'salt', *sav* 'acid' and *hő* 'heat, temperature', *hév* 'heat, fervor'.

10 Alternatively, raising applies to /á/, obtained by the compensatory lengthening process. However, in that case a small number of underived roots ending in /á/ would have to be treated as exceptions.

final roots exhibit the alternation apparent in (13) effectively rules out both a general /v/ insertion and a general /v/ deletion analysis: cf. for example the noun *tű* 'needle', *tűnek*, *tűje*, and the verb *óv* 'caution', 3pl present *óvnak*, 1pl present *óvunk*.

For roots like *mű* we may assume a final C_E, preceded by a long vowel. In onset position, C_E predictably surfaces as /v/. In coda position, C_E is deleted (by C_E-DEL) and its mora is filled with (by V_E-INS). Interestingly, the long vowel that precedes V_E does not become extra long by the compensatory lengthening machinery. As discussed in Vago (1989), this consequence appears to be characteristic of all the compensatory lengthening phenomena of Hungarian. To account for this generalization, let compensatory lengthening develop normally even after long vowels. Then the resultant triple root long vowels are reduced to double roots by convention. The constraint against triple root long vowels (generalizable to consonants) is needed anyway to capture the generalization that Hungarian, like the great majority of languages, lacks overlength. For further details, cf. Vago (1989).

5. /CC_E/-final roots

Root final empty C units are suggested in postconsonantal morpheme final position as well. Two distinct patterns are countenanced. Firstly, the final segment of the following roots shows up as /v/ in syllable onset position, as long /Ú/ in syllable coda position:

(14)	*odú*	'hollow'	*odúnak*	*odva*
	tetű	'louse'	*tetűnek*	*tetve*

Once again, the fact that the above alternation pattern is not productive, for which cf. *betű* 'letter', *betűnek*, *betűje* on the one hand and *kedv* 'mood', *kedvnek*, *kedve* on the other, suggests that the roots in (14) need to be analyzed in some extraordinary terms. If we set up the alternating segment as an empty C root, then the fact that it is realized as /v/ in syllable onset contexts is an automatic consequence, given what we have already developed. As for syllable coda contexts, I suggest that the double roots of long /Ú/ are derived in two distinct ways, as follows.

Suppose that following the unveiling of extraprosodic consonants by the Peripherality Condition, C_E as a rule does not undergo coda syllabification if another coda consonant precedes. That is, a coda condition (cf. Itô 1988) prevents an empty C root from occupying the second coda slot of syllables. Rather, C_E remains unsyllabified and triggers the following epenthesis rule:

(15) /U/-Insertion (/U/-INS)

$$\emptyset \rightarrow \underset{\substack{| \\ \mathrm{U}}}{\mathrm{V}} \;/\; \_\_\; \mathrm{C_E}' \qquad (\mathrm{C}' = \text{unsyllabified C})$$

Following the application of /U/-INS, the empty C root will be preceded by a V root. As in the cases discussed previously, C_E is moraified and gathered into the first coda slot regularly.

The second V slot of long /Ú/ is derived by the now familiar manner: moraic C_E is erased by C_E-DEL and its mora is filled with a V root by V-INS. This empty V then joins up with the preceding /U/ melody via V-SPREAD.[11]

The second alternation pattern of what I take to be /CC_E/-final roots is presented in (16):[12]

(16)	*falu*	'village'	*falunak*	*falva*
	daru	'crane'	*darunak*	*darva*
	hamu	'ashes'	*hamunak*	*hamva*

No general rule can derive /v/ from /u/, or conversely, /u/ from /v/: cf. for example the nonalternating productive paradigms of *kapu* 'gate', *kapunak*, *kapuja*, and *adu* 'trump (card)', *adunak*, *aduja* on the one hand, and *nyelv* 'tongue, language', *nyelvnek*, *nyelve* and *elv* 'principle', *elvnek*, *elve* on the other.

The only difference between the two sets of roots in (14) and (16) is in the length of the vowel alternants. Let final C_E trigger /U/-INS in both cases. Then lengthening is suppressed for the roots in (16) by exceptionally preventing C_E from undergoing syllabification into the first coda slot. As a result, C stays unsyllabified and is later stray erased. That coda syllabification, unlike onset and nucleus syllabification, is not automatic is a well-established fact; cf. for example Itô (1988) and Hayes (1989).

11 The final /v/ of the root for 'pit' is realized only in onset position: cf. *mag*, *magnak*, *magva*. On the assumption that the underlying representation is /magv/, /v/ is subject to stray erasure in coda contexts, where it is unsyllabifiable due to the impossibility of /gv/ codas in Hungarian.

12 The noun *hamu* 'ashes' has the allomorph /hamv/ (instead of the expected vowel final variant) in the compound word *hamvveder* 'cinerary urn'.

6. /CCC$_E$/-final roots

In nearly a dozen nouns and adjectives morpheme final long /Ú/ occurs word finally and before C-initial suffixes but is missing before V-initial suffixes. In each of these roots, a consonant cluster precedes the observed morpheme final alternations. In (17a) I list the representative paradigms of the nouns, in (17b) I give the citation forms of the adjectives together with their comparative inflections and adverbial derivations:[13]

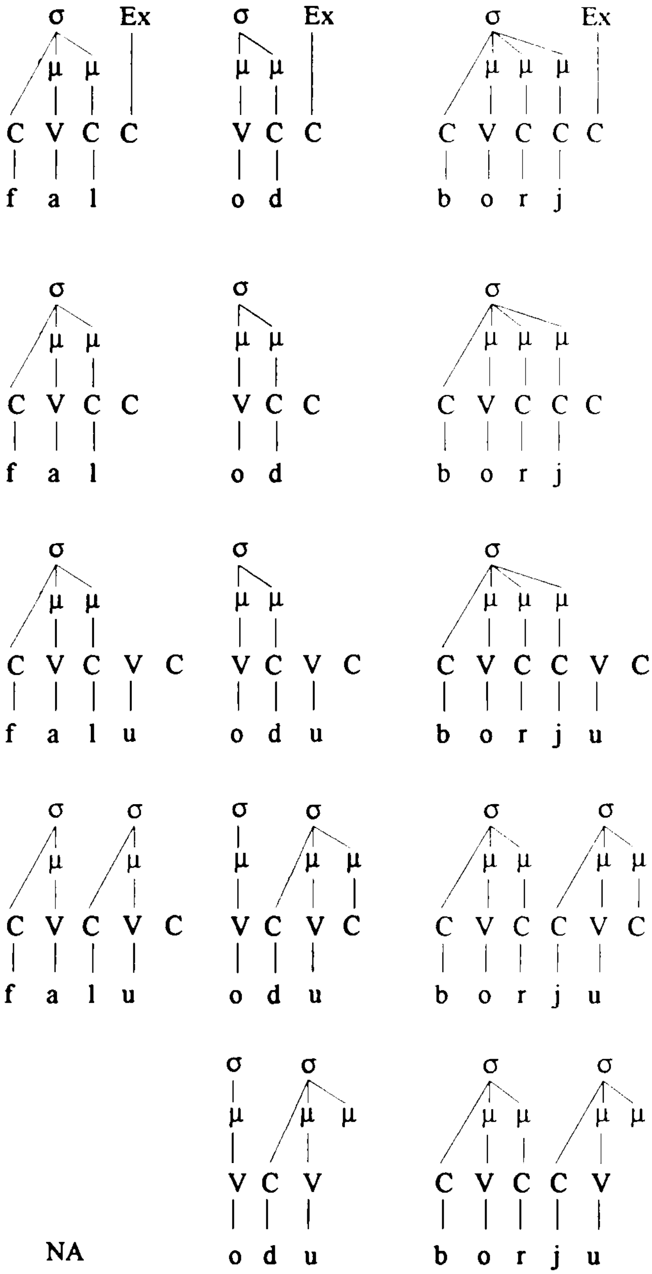
(17) (a)	*borjú*	'calf'	*borjúnak*	*borja*
	varjú	'crow'	*varjúnak*	*varja*
	gyapjú	'wool'	*gyapjúnak*	*gyapja*
	ifjú	'young man'	*ifjúnak*	*ifja*
	fattyú	'bastard'	*fattyúnak*	*fattya*
	sarjú	'rowen'	*sarjúnak*	*sarja*
(b)			Comparative	Adverbial
	könnyű	'easy'	*könnyebb*	*könnyen*
	lassú	'slow'	*lassabb*	*lassan*
	hosszú	'long'	*hosszabb*	*hosszan*
	ifjú	'young'	*ifjabb*	*ifjan*

It is not possible to assume a final long /Ú/ and delete it prevocalically: root final long /Ú/ generally does not delete. Note for instance *hattyú* 'swan', *hattyúnak*, *hattyúja* and *bosszú* 'revenge', *bosszúnak*, *bosszúja*. Likewise, long /Ú/ cannot as a rule be inserted following a consonant cluster: cf. for example *bors* 'black pepper', *borsnak*, *borsa*.

The final long vowels of the roots in (17) are obtained from a final C$_E$ exactly as outlined in the preceding section. The derivation of the vocalized variants of /CCC$_E$/-final roots and of the two varieties of /CC$_E$/-final roots may be perviewed in (18); annotations follow immediately.

[13] The adjectives, when used as nouns, appear in their vowel final allomorphs before possessive suffixes: e.g. *lassúja* 'his slow one', and so on.

(18)



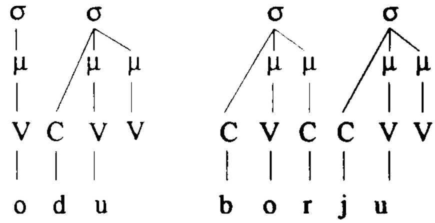
PC

/U/-INS (15)

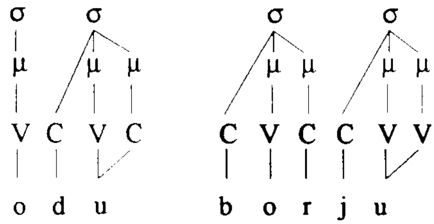
SYLL

C_E-DEL (5)

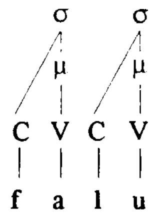
V-INS (6) NA



V-SPREAD (7) NA



STRAY ERASURE



NA NA

falu *odú* *borjú*

After the morpheme final empty C roots are unshackled by the Peripherality Condition at the word level, they become eligible for syllabic affiliation. However, as suggested above, on general account C_E cannot be gathered into the second coda slot of syllables. The syllabically unaffiliated C_E roots trigger /U/-INS; continuing previous practice, I have adjusted the output of /U/-INS for the effects of vowel harmony. The newly derived V root undergoes syllabification and attracts the preceding consonant into onset position. Note that the mora count of that consonant, which had previously been syllabified as a mora bearing coda, is lost as part of onset resyllabification; this is in line with Hyman's (1985) conceptualization of onset syllabification. The postvocalic empty C roots undergo syllabification into first coda position regularly, except in the case of *falu*, where coda syllabification is prevented by a lexical exception feature, as claimed above. The moraic C_E roots then serve as targets to C_E-DEL whose application triggers V-INS. As before, I disregard the temporary resyllabification of the newly derived V root. The long vowels of *odú* and *borjú* are obtained via V-SPREAD, while the prosodically unlicensed C_E root of *falu* is subject to stray erasure.

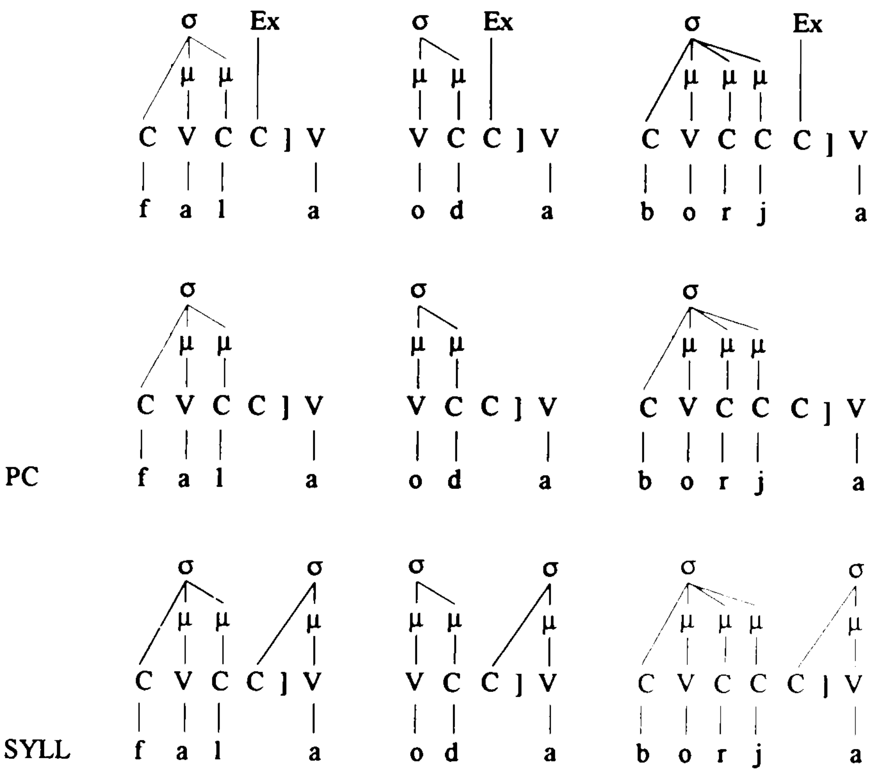
Turning now to the alternants of the /CCC$_E$/-final roots in (17) that appear before vowel initial suffixes, we note that C_E is not realized as /v/, as might be expected; rather, it is absent. The following rule is responsible for this fact:

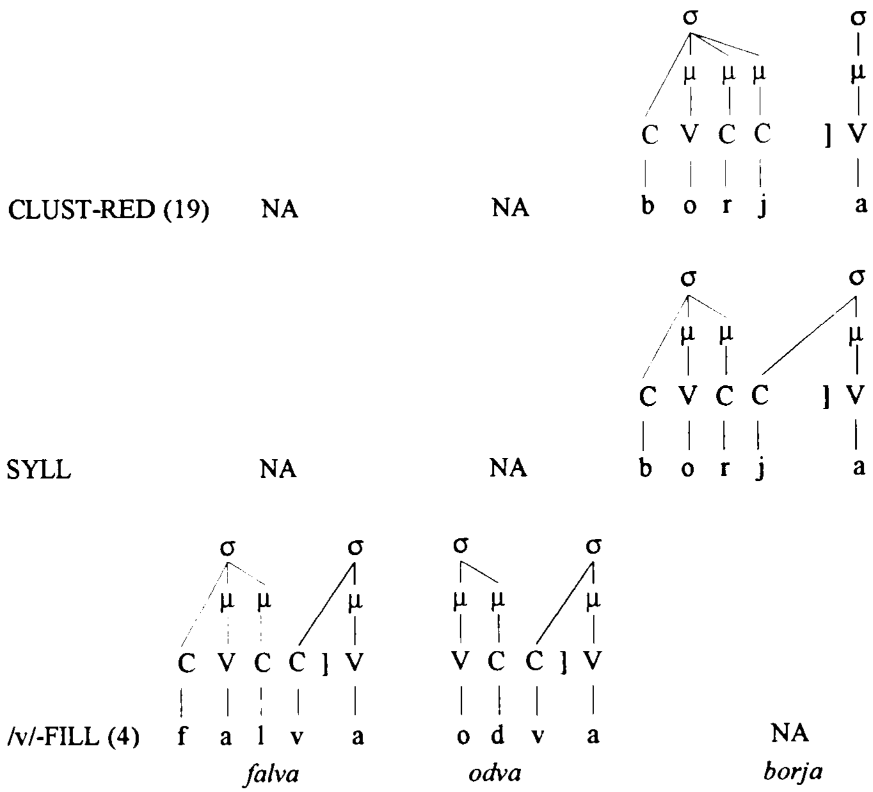
(19) **Cluster Reduction (CLUST-RED)**

$$C_E \rightarrow \emptyset \;\; \_\_ \;\; / \; C \; C \; \overset{\sigma}{\underline{\;|\;}} \;]_M$$

We thus arrive at the following typical derivations, again picking up the two representative /CC$_E$/-final roots:

(20)





7. /C_E/-initial suffixes

In the preceding sections we have examined root morphemes that have two alternants: alternant A in word final position and before consonant initial suffixes, and alternant B before vowel initial suffixes. Certain vowel initial suffixes systematically condition alternant A in these stems, instead of the expected alternant B. In this section I account for this apparently aberrant class of suffixes.

Consider the facts arrayed in (21), where *-ig* is the terminative suffix 'until' and *-ért* is the causal-final suffix 'for':

(21)

Root Alternation	Suffix	
___ #, C / ___ V	*-ig*	*-ért*
ló/lov-	*lóig*	*lóért*
tó/tav-	*tóig*	*tóért*
mű/műv-	*műig*	*műért*
falu/falv-	*faluig*	*faluért*
odú/odv-	*odúig*	*odúért*
borjú/borj-	*borjúig*	*borjúért*

Other suffixes that pattern with the two in (21) are the adjective forming derivational suffix *-i*, the pronominal possessive suffix *-é* 'that of X's', and the essive-modal suffix *-ul/ül* 'in the manner/means of'.[14]

What is noteworthy about the above suffixes is that they begin with a vowel, yet they condition those root alternants which appear word finally and before consonant initial suffixes. We have already seen that the distribution of these alternants is determined by syllabic structure: they occur if the morpheme final C root cannot be syllabified as the onset of a following syllable. The behavior of suffixes like those in (21) with respect to root allomorphy follows automatically if we prevent these suffixes from allowing a preceding C to be syllabified as an onset. The solution that naturally suggests itself is that onset position in these suffixes is occupied by a "ghost" consonant:

(22)

-CVC	-CVVCC	-CV	-CVV	-CVC
i g	e r t	i	e	U l
-ig	*-ért*	*-i*	*-é*	*-ul/ül*

Assuming the underlying structures in (22) provides an explanation for yet another piece of fact with respect to which these suffixes are superficially exceptional. By a general rule (cf. Vago 1980) a suffix initial vowel is truncated if the preceding morpheme ends in a vowel.[15] Contrast for instance the surface realizations of the suffixes in (23), where suffix initial /u/ and /o/ cannot be predicted by epenthesis:

[14] I omit from this list the superessive case suffix *-on/en/ön* 'on', which exhibits a more complex behavior: it patterns as V initial after some root shapes, as C initial after others. An adequate discussion would lead us far afield.

[15] Recall that the 3sg possessive suffix *-a/e* regularly conditions a /j/ epenthesis rule, so that this suffix is not subject to vowel truncation.

(23)

		1pl possess.	2pl possess.
dob	'drum'	*dobunk*	*dobotok*
zokni	'socks'	*zokninink*	*zoknitok*

Now consider the fact that the suffixes in (22) are not subject to vowel truncation: e.g. *zokniig*, *zokniért*, *zoknié*, etc. If we assume that the vowel truncation rule looks for two adacent V specifications on the root tier and that the suffixes in (22) begin with an empty C on this tier, then the empty C will shield the following V root from being the target of the vowel truncation rule.

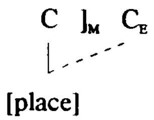
Initial C_E is suggested for two additional suffixes. The instrumental and translative-factive suffixes exhibit the following alternation: following a vowel they have an initial /v/, but following a consonant the /v/ is absent and instead the preceding consonant appears geminate. Examples are given in (24).

(24)

			Instr.	Translat.-Fact.
(a)	*kicsi*	'small'	*kicsivel*	*kicsivé*
	kapu	'gate'	*kapuval*	*kapuvá*
	szó	'word'	*szóval*	*szóvá*
(b)	*dob*	'drum'	*dobbal*	*dobbá*
	hét	'seven'	*héttel*	*hétté*
	sok	'any	*sokkal*	*sokká*
	más	'other'	*mással*	*mássá*
	öv	'belt'	*övvel*	*övvé*
	szem	'eye'	*szemmel*	*szemmé*
	szén	'coal'	*szénnel*	*szénné*
	por	'dust'	*porral*	*porrá*
	fal	'wall'	*fallal*	*fallá*
	máj	'liver'	*májjal*	*májjá*

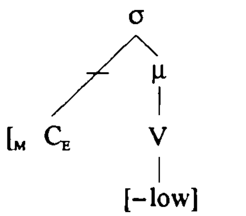
Setting up the underlying representations of the above suffixes as /-C_EAl/ and /-C_EÁ/ allows the /v/-initial variants in (24a) to be derived by the independently motivated /v/-INS rule. The lengthening process in (24b) is produced by the consonantal analogue of V-SPREAD:

(25) C-SPREAD



Finally, it will be observed that neither C-SPREAD nor /v/-INS may be allowed to apply to the initial C_E roots of the suffixes in (22). Deleting the phantom consonants of these suffixes prior to the application of C-SPREAD and /v/-INS (but following the rules accounting for root allomorphy) accomplishes just that. If so, care must be taken not to extend deletion to the initial C_E of the suffixes in (24). It is possible to define a phonological difference between the two sets of suffixes: the suffixes whose initial C_E deletes have either high or mid vowels (cf. 22), those whose initial C_E does not delete have low vowels (cf. 24). On this basis deletion is conditional on the nonlow quality of the suffix vowel:[16]

(26) GHOST DELETION



The restriction to morpheme initial position ensures that deletion will not overapply to the root classes discussed in the preceding sections; in these roots C_E is morpheme final.

8. Conclusion

In this article I have argued that a number of root alternation patterns in Hungarian are analyzable in terms of syllabification acting on consonantal root specifications that lack melodic structure. The putative empty C roots are restricted to peripheral positions: either morpheme finally (Sections **3–6**) or morpheme initially (Section **7**). The proposed morpheme final empty C roots have the full range of possible distributions, in that they occur after: a) short

[16] This analysis is essentially identical to the one proposed in Vago (1980).

vowels (/loC_E/ and /taC_E/); b) long vowels (/műC_E/); c) single consonants (/odC_E/ and /falC_E/); and d) consonant clusters (/borjC_E/).

To review, a morpheme initial empty C, which is always in syllable onset position, develops in one of three ways: it deletes before nonlow vowels (27a), it lengthens a preceding consonant (27b), it becomes /v/ after vowels (27c). On the other hand, the reflexes of a morpheme final empty C are sensitive to syllable structure. In onset position, a morpheme final empty C deletes if preceded by a consonant cluster (27d), becomes /v/ otherwise (27e). In coda position, a morpheme final empty C is extraprosodic postconsonantally and induces epenthesis (27f), changes to an empty V postvocalically. The empty V in turn lengthens a preceding short vowel (27g); it lengthens a preceding long vowel as well, but these eventually shorten, so that the net effect is zero (27h).

(27) (a) /+$C_E$ig/ $\longrightarrow$ *-ig* 'until', etc.
(b) /dob + C_EAl/$\longrightarrow$ *dobbal* 'with (the) drum', etc.
(c) /kapu + C_EAl/$\longrightarrow$ *kapuval* 'with (the) gate', etc.
(d) /borjC_E + A/$\longrightarrow$ *borja* 'his calf', etc.
(e) /loC_E + A/$\longrightarrow$ *lova* 'his horse', etc.
(f) /borjC_E/$\longrightarrow$ *borjú* 'calf', etc.
(g) /loC_E/$\longrightarrow$ *ló* 'horse', etc.
(h) /műC_E/$\longrightarrow$ *mű* 'oeuvre', etc.

I should like to emphasize that root morphemes ending in an empty C constitute a closed class: they are relatively few in number, they are historically old, they exhibit unproductive alternations, their number is narrowing through time (Károly 1970), and they are susceptible to analogical leveling. In other words, empty C root segments, their systematic patterning notwithstanding, are relegated to fringe sectors of the lexicon. It is therefore perfectly understandable, even expected, that alternative, "regularized" paradigms may develop, coexisting with the older ones.[17] These parallel paradigms are best analyzed in terms of variant underlying root shapes, one with a final empty C (producing the conservative paradigms), and one without, leading to reanalysis (producing the innovative paradigms). Consider as an example some

[17] In some cases the choice of alternants is based on semantic features. Note the following examples (Vago 1980, 132): *daruk* 'cranes [derricks]' (root /daru/) vs. *darvak* 'cranes [birds]' (root /darC_E/); *borjúja* 'his calf' (root /borjú/) vs. *borja* 'its [cow's] calf' (root /borjC_E/); *gyapjúja* 'his wool' (root /gyapjú/) vs. *gyapja* 'its [lamb's] wool' (root /gyapjC_E/).

representative inflections of the root *borjú* (morphological divisions are supplied):

(28)

	C V C C C	C V C C V V
	| | | |	| | | | |/
	/b o r j /	/b o r j ú /
'1sg possessive'	*borj-am*	*borjú-m*
'2sg possessive'	*borj-ad*	*borjú-d*
'3sg possessive'	*borj-a*	*borjú-ja*
'accusative'	*borj-at*	*borjú-t*
'plural'	*borj-ak*	*borjú-k*

If the analyses of the Hungarian data proposed here are on target, we may conclude that empty segmental root units, whose descriptive role in the regular (productive) phonology is generally well-acknowledged, are also instrumental in understanding subsystematic (unproductive) phonological behavior.

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THE STYLIZED FALL IN HUNGARIAN

LÁSZLÓ VARGA

1. The terms "stylized fall" and "stylized tones" were first used by Robert Ladd (1978, 1980). Ladd found that from each "plain tone" of English intonation (the fall, the low rise and the high rise) a corresponding stylized tone could be derived, and that the meaning of stylization was 'routine'. Similar views were later expressed by Gussenhoven (1983, 1985), but he started out from a somewhat different set of plain tones (the fall, the rise and the fall-rise).

The contour which Ladd calls the stylized fall is probably the best known stylized tone of English: it is the intonation used for calling children home, e.g.:

(1) John— Din—
ny— ner—
(Ladd 1980, 169)

I claim that the stylized fall exists in Hungarian intonation too, and that it shows remarkable similarities with its English counterpart in both form and function. On the other hand, it seems unjustified to speak of other stylized tones in Hungarian.

2. The Hungarian stylized tone consists of two terraces: the first one is high, the second one lower but not low, it remains well above the baseline. (The baseline is the lower limit of the speaker's normal voice range.) The first—and only the first—syllable of the carrier phrase is heavily stressed. In the one-syllable variant of the contour both terraces are realized in one syllable:

(2) ⌐˪*Zsolt* Zso—
olt—
[a male first name] ————

(The symbol ⌐˪ stands for the stylized fall and also for the heavy stress on the syllable which initiates the contour. In the melodic diagram the letter *o* has been doubled to accomodate the stepdown between the two terraces; the dashes are meant to show the horizontality of the terraces; and the line below the diagram represents the baseline.)

In the two-syllable variant the first syllable accomodates the high terrace and the second the lower terrace:

(3) ⌝⌞*Mari!* Ma—
ri—
[informal for Mary] ————

In the three-or-more-syllable variant the high terrace ends on the penultimate syllable, while the low terrace occurs on the last syllable:

(4) ⌝⌞*Professzor úr!* Professzor—
úr—[1]
[professor sir] ————————
'Professor.'
1

When the stylized fall is utterance-final, its last syllable can be considerably lengthened, cf. (2), (3) and (4). If the penultimate syllable in the utterance-final stylized fall contains a long vowel, that syllable can also be lengthened with or without lengthening the last syllable.[2] Thus in (5), lengthening can occur on *né-* alone, or on *-ni* alone, or on both *né-* and *-ni*, or on neither *né-* nor *-ni*:

(5) ⌝⌞*Kati néni!* Kati né—
ni—
[Katie aunt] ——————
'Aunt Katie.'

[1] The phonetic descriptions of the two-syllable and the three-or-more-syllable variants could be conflated like this: "In the more-than-one-syllable variant the high terrace continues up to the last syllable and the low terrace occurs on the last syllable."

The reason why I have presented the three-or-more-syllable variant separately is that its English counterpart can be slightly different from the description given here for Hungarian. If the English contour contains a secondary stressed syllable, the second terrace will be realized not on the last syllable alone but on the sequence of syllables starting with the secondary stressed one, cf. Gussenhoven (1985, 123–4).

[2] As T. Szende points out, the impression of lengthening can be created by various means, including perhaps the kind of rhythmic regularity observed in *cantus planus*, a way of rendering medieval liturgy (personal communication).

The examples presented so far have been vocatives. Hungarian vocatives take the stylized fall if the person being addressed is not seen by the speaker, or if the speaker is not seen by the addressee. The contour is the same as the "vocative chant" of English descriptions (cf. Leben 1976; Liberman 1978).

Vocatives belong to a group of sentences that have a declarative form and an imperative force. I shall call such sentences **declarative imperatives**.[3] When vocatives are spoken with a stylized fall, they can be interpreted roughly as 'Don't hide.' or 'Take notice of me.'

Greetings with a stylized fall are also declarative imperatives and can be interpreted similarly to vocatives. For instance, if you enter your neighbour's home but you can't see anybody there, you may call:

(6) ⌐*Jó reggelt!* Jó reg—
gelt—

[good morning+acc.]
'Good morning.'

Or, if you see your friends walking in front of you in the street, you can call to them:

(7) ⌐*Sziasztok!* Sziasz—
tok—

[hello+2nd-plur.]
'Hi, folks.'

The stylized fall occurs in other subtypes of declarative imperatives as well. For instance, you can use (8) to let your family know that you are back home, while you are taking off your coat in the hall:

(8) ⌐*Megjöttem!* Megjöt—
tem—

[perf.+came+1st-sing.]
'I've come home.'

[3] There also exist **interrogative imperatives**, e.g. *Kölcsönadnád a könyvedet?* (= 'Would you lend me your book?'), but they have the characteristic intonation of Hungarian yes-or-no questions, the special Hungarian rise-fall (cf. Varga 1983, 124), e.g.:

Kölcsönadnád a köny$^{\text{ve}}$$_{\text{det}}$

Both declarative and interrogative imperatives are indirect speech acts (Searle 1975).

In a public place you can call for people's attention like this:

(9) *Figyelem!* Figye— lem—

[attention]
'Attention, please.'

You can use (10a) or (10b) to wake someone up:

(10) (a) *Ébresztő!* Ébresz— tő—

[waken+er]
'Wake up.'

(b) *Hét óra!* Hét ó— ra—

[seven o'clock]
'It's seven o'clock.'

The following utterances are warnings that the door has been left open and should be closed, the lights have been forgotten and should be switched off, or that the phone is ringing and should be answered:

(11) (a) *Ajtó!* Aj— tó—

[door]
'Close the door.'

(b) *Villany!* Vill— lany—

[electricity]
'Switch off the light.'

(c) *Telefon!* Tele— fon—

[telephone]
'The phone's ringing.'

The next two examples show ways of calling people to dinner:

(12) (a) ¬*Asztalhoz!*

Asztal—
hoz—

['Table+to']
'Come to the table.'

(b) ¬*Kész a* ¬*vacsora!*

Kész— vacso—
a— ra—

[ready the dinner]
'Dinner's ready.'

(Since the first stylized fall in (12b) is not utterance-final, no lengthening of syllables takes place in it.)

And this is how you can warn someone that their favourite TV-programme is starting:

(13) ¬*Kezdődik a* ¬*tévé!*

Kezdődik— té—
a— vé—

[starts the TV]
'The TV-programme is starting.'

(There is no lengthening of syllables in the first tone of (13) either.)

Examples (8)–(13) all announce that something is to be done immediately.

The stylized fall of declarative imperatives has a special variant, which may increase the imperative effect. In this variant the first terrace is replaced by a rising tone (cf. (14a), (14b)) or the last syllable of the first terrace steps up (14c). The symbol ⌐¬ will represent this variety:

(14) (a) ⌐¬*Zsolt!*

o
Zs olt—

(b) ⌐¬*Mari!*

a
M ri—

(c) ⌐¬*Professzor úr!*

szor
Profes úr—

3. But the Hungarian stylized fall can appear not only in declarative imperatives but also in the boasting utterances of small children:

(15) (a) ⌝*Én győztem!*

['I won+1st-sing.']
'I've won.'

```
Én győz—
         tem—
```

(b) ⌝*Új ruhám van!*

['new dress+my is']
'I have a new dress.'

```
Új ruhám—
          van—
```

(c) ⌝*Úgyse tudsz megfogni!*

[by no means can+2nd-sing. catch]
'You can't catch me.'

```
Úgyse tudsz megfog—
                    ni—
```

(d) *De* ⌝*igen!*

[but yes]
'Yes, I can.'

```
       i—
De       gen—
```

(e) ⌝*Első!*

[first]
'I'm the first.'

```
El—
   ső—
```

(f) ⌝*Indulunk* ⌝*Keszthelyre!*

[start+1st-plur. Keszthely+to]
'We're leaving for Keszthely.'

```
Indu—        Keszthely—
     lunk—             re—
```

Such utterances of boasting and oneupmanship are characteristic features of child language (or the imitation of child language). I shall refer to them as **infantile boasts**. Infantile boasts constitute the second area of Hungarian where the stylized fall is used. No such use of the English stylized fall is mentioned in the literature that I know.[4]

[4] Although it does exist, according to Professor Bolinger (personal communication), e.g.

```
Got—        (I won, I caught you.) You—
    cha—!                             lose—!
```

The stylized fall has a special variant in infantile boasts as well: the last (rightmost) stylized fall of the utterance can be replaced by a high monotone. (Syllables can be lengthened in the usual way.) For instance:

(16)	(a)	⌝*Nem érsz utol,* ˃*bee!* [not catch+2nd-sing. after interj.] 'You can't overtake me.'	Nem érsz u— bee— tol— ————————
	(b)	˃*Én győztem!* [cf. 15a]	Én győztem— ————————
	(c)	⌝*Indulunk* ˃*Keszthelyre!* [cf. 15f]	Indu— Keszthelyre— lunk— ————————
	(d)	*Én* ⌝*igen, de te* ˃*nem!* [I yes but you-sing. not] 'I do but you don't.'	igen de— nem— Én te— ————————

The final high monotone in the above examples may sharpen the boasting and may tinge it with an element of mockery. It is marked with the symbol ˃.

4. The Hungarian intonational literature has hardly anything to say about the stylized fall. Sporadic references to it include L. Deme's remark that the sentences *Beszállás!* (literally: 'getting in', meaning: 'All aboard') and *Leülni!* (literally: 'to sit down', meaning: 'Sit down.') and other sentences of imperative force without an imperative form can be pronounced with a high monotone followed by a downstep at the last syllable (Deme 1962, 514).

In Fónagy–Magdics (1967, 222) we find the following example:

(17) ⌝*Vasárnap van,* ⌝*szórakozzon a* ˃*gyerek is.*
[Sunday is let-him-have-a-good-time the child too]
'It's Sunday, let the child have a good time too.'

Vasárnap— szórakozzon— gyerek is—
van— a—
————————————————

This example is taken from child language and illustrates a mixture of boasting and mocking.

5. Let us now turn to the meaning of the stylized fall.

The English stylized fall is often associated with the physical distance between speaker and hearer or with lack of eye-contact between them and is thus often looked upon as a feature of loud calls (cf. e.g. Pike 1945, 187; Abe 1962, 520; Liberman 1978, 19). Gibbon (1976, 280–1) considers distance metaphorically and claims that the function of this contour is establishing contact between speaker and hearer. Ladd 1980, 172–9) does not think that distance (real or metaphorical) has a critical role to play, he claims that the function of the stylized fall in English is "to signal an element of predictability or stereotype in the message" (op. cit. 173). This element can be referred to as 'routine' (cf. Gussenhoven 1985, 123–5; Bolinger 1986, 226–34). 'Routine' is the cover term for natural, normal, everyday, predictable matters, which do not cause any excitement.

Physical distance is not crucial for the stylized fall in Hungarian, either. We can produce a stylized fall at normal (or even less than normal) volume, right into the ears of someone we want to wake up, for instance. This can be explained away by reference to metaphorical distance. When one is asleep, one is "a long way away".

Overcoming distance (creating contact) is undoubtedly a frequent motive for using the stylized fall at least in the case of declarative imperatives. But not in the case of infantile boasts. Infantile boasts need neither real nor metaphorical distance for them to be realized with a stylized fall: they can appear with a stylized fall right in the middle of a face-to-face conversation.

But if the aim of overcoming distance is not a common feature, what is common to the examples considered so far? What is the stable component of the meaning of the Hungarian stylized fall? I think the answer is: 'routine'. This will become clear if we consider a few utterance-pairs.

If we use the stylized fall for warning, there is hardly any serious danger. This is how a waiter carrying plates will probably warn people to get out of his way:

(18) ⌐ *Vigyázat!* Vigyá—
zat—
[care] ————————
'Be careful.'

When there is real danger (a car coming at high speed, for instance), we use a plain falling tone:

(19) ╲*Vigyázat!*

Vi
gyázat

(where the symbol ╲ represents the plain fall).

When we are waking someone at an hour which is considered usual or has been previously agreed on, we use a stylized fall:

(20) ⎺⎽*Gyerekek!* ⎺⎽*Hét óra!*
[children seven o'clock]
'It's seven o'clock, children.'

Gyere— Hét ó—
kek— ra—

But if someone ought to have got up at six and is still asleep at seven, we would prefer a plain fall:

(21) ╲*Gyerekek!* ╲*Hét óra!*

Gye Hét
rekek óra

And this is how I call my wife out of her room when her friend who lives next dooe pops in to see her about a recipe:

(22) ⎺⎽*Marika!* (*Az* ╲*Etus van itt.*)[5]
[Mary+dimin. the Etus is here]

'Mary. (Etus is here to see you.)'

Mari—
ka—

[5] The sentence *Az Etus van itt.* would sound impolite with a stylized fall (*Az* ⎺⎽*Etus van itt.*), because it would reveal to Etus that we considered her visit an insignificant little event. A plain fall is more tactful here.

But I would probably use a plain fall if it was the police who wanted to see her:

(23) ↘*Marika!* (*A* ↘*rendőrség van itt.*)
[the police is here]

Ma
rika

'Mary. (The police are here.)'

The stylized fall is all right in the next example because it is used for announcing an everyday domestic event:

(24) ⌝*Gyerekek!* ⌝*Kezdődik a* ⌝*tévé!*
[children starts the TV]
'The TV-programme is starting, children.'

Gyere— Kezdődik— té—
kek— a— vé—

But the same contour would be comic and grotesque in this utterance:

(25) * ⌝*Gyerekek!* ⌝*Felrobbant a* ⌝*tévé!*
[exploded+3rd-sing.]
'The TV-set has exploded, children.'

Gyere— Felrobbant— té—
* kek— a— vé—

The examples show that whenever a declarative imperative is uttered with a stylized fall, the utterance will say: 'This is routine.' But what about infantile boasts? After all, the object of boasting is something unusual, something extraordinary, something non-routine. Though this is true, when we choose a stylized fall for our boast, we pretend that the extraordinary thing we announce is merely routine for us. When a child says (26) to his mate, he wants to create the impression that in his family it is commonplace to get such expensive presents:

(26) *Villanyvasutat is kaptam!*
[electric+train+acc. too received+1st-sing.]
'I was given an electric train too.'

Villanyvasutat is kap—
tam—

With a plain fall the same announcement would sound serious and non-boasting:

(27) *Villanyvasutat is kaptam!*

Vil
lanyvasutat is kaptam

'Routine' (real or pretended) is undoubtedly part of the meaning of the stylized fall in Hungarian. (In addition to 'self-contained', which is the general meaning of all kinds of falls.) Ladd's statement about the meaning of the stylized fall (1978, 1980) is valid for Hungarian too and is probably of universal force.

But I do not think that 'routine' and 'self-contained' are the only components of the meaning of the Hungarian stylized fall. The contour also says that the speaker is expecting something from the hearer.[6] The speaker expects the hearer either to do something (as in the case of declarative imperatives) or to be impressed by what he says (as in the case of infantile boasts). Let us call this the 'mobilizing' meaning of the stylized fall.

And this is where the stylized falls of English and Hungarian seem to differ. The English stylized fall can be used in pure routine utterances, without any mobilizing taking place, e.g.:

[6] Note that all the Hungarian examples with the stylized fall have exclamation marks in writing.

(28) Daddy forgot his brief— [7]
case—
(Ladd 1980, 174)

The Hungarian stylized fall always has a mobilizing effect, it cannot express pure routine alone. For instance, (29) is a routine utterance, but at the same time it is either a declarative imperative (29a) or an infantile boast (29b):

(29) *Esik az eső!* Esik— e—
[falls the rain] az— ső—

'It's raining.'

(a) 'So let's go to the cinema: you've promised to take us to the cinema if it rains.'

(b) 'How clever of me! I knew it would rain and I told you so.'

The full meaning of the Hungarian stylized fall then seems to be: 'self-contained + routine + mobilizing'.

6. Finally, I would like to point out briefly why I consider the stylized fall (together with its variants) to be the only stylized tone of Hungarian.

It is commonly held that English intonation has not only stylized falls but also stylized rises and that their meaning is also 'routine' (in addition to the basic meaning of the rise), cf. Ladd 1980, 179–86), Gussenhoven 1985, 122–5; Bolinger 1986, 226–34. A stylized rise is a monotone above the baseline, e.g.:

[7] According to Professor Bolinger (personal communication) the 'mobilizing', 'alerting' effect may be present in (28) too, "particularly if the top level is preceded by a lower pitch (which itself does not have to be of any particular shape)", as in:

brief— case—!
Daddy forgot his

With this form "the implication would be so much 'Daddy is a klutz' as 'Daddy is going to be sorry when he gets to class and finds he's left his lecture behind'."

(30)

flour— sugar— butter—
Oh, nothing special you know— and and

and uh...

(Ladd 1980, 183)

Such a high monotone also exists in Hungarian:

(31) ˃ *Cigarettát?* Cigarettát[8]
[cigarette+acc.]

'Would you like a cigarette?'

A rise sounds tenser than a higher monotone:

(32) ⁄ *Cigarettát?* Cigarettát

On the other hand, a gradual descent sounds more routine than a high monotone:

(33) ‾ *Cigarettát?* Cigarettát

The meanings of these tones can be summed up as follows:

(34) (a) Rise: 'pointing forward + non-routine', cf. (32)
(b) High monotone: 'pointing forward', cf. (31)
(c) Descent: 'pointing forward + routine', cf. (33)

Consider the following examples:

[8] This melody coincides in shape and pitch height with the high monotone appearing as a variant of the stylized fall in infantile boasts, cf. (16). But it is different phonologically.

(35) (a) *És ha belehalt volna?*
[and if perf.+died+3rd-sing. would be]
'And if he had died of it?'

bele halt volna
És ha

(b) *És ha belehalt volna?*

belehalt volna
És ha

(c) *És ha belehalt volna?*

bele halt volna
És ha

The rising intonation of (35a) is adequate to the grave and unexpected verbal content of the utterance. The high monotone of (35b) is less dramatic but still satisfactory. The gradual descent of (35c), however, is in conflict with the words: its slightly bored, indifferent treatment of a person's death makes the utterance sound frivolous and phlegmatic.

It seems then that the high monotone is not to be regarded as the stylized version of the rise in Hungarian. On the contrary, the Hungarian high monotone is best looked upon as a basic contour from which both the rise and the descent are derived.[9]

[9] The descent presented in (33), (34c), (35c) certainly derives from the high monotone. However, there is another type of descent, with the same form but a very different meaning: 'self-contained + evalutive exclamatory', e.g.

Milyen szépen énekelí
[How nicely sings]
'How beautifully she singsΠ'

This second type of descent derives from the plain fall rather than from the high monotone.

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PROSODIC CONSTITUENTS IN HUNGARIAN*

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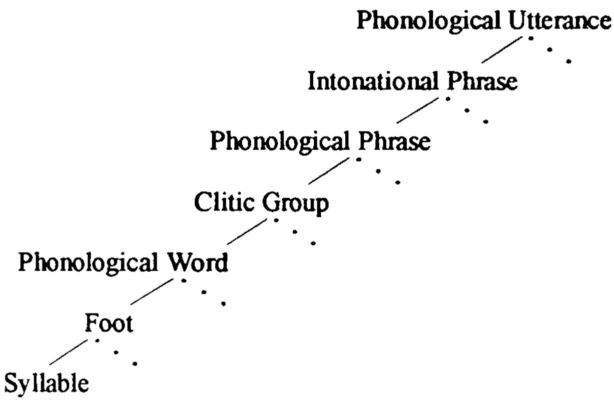
0. Introduction

External sandhi rules, those phonological rules operating; beyond the word level, have begun to receive a good deal of attention in recent years (cf. among others, Selkirk 1984; Kaisse 1985; Nespor–Vogel 1986). Since sandhi rules necessarily involve an interaction between phonology and syntax, the investigation of such rules depends on the syntactic analysis of a particular language as much as it does on the phonological analysis. To date, almost all of the work on the phonology–syntax interaction has dealt with languages which are syntactically configurational in nature, though in Vogel-Kenesei (1987) two phonological rules of Hungarian, a nonconfigurational language according to a number of linguists, are analyzed. The present paper examines Hungarian phonology further and addresses, in particular, the question of what evidence there might be in this language for the various prosodic constituents from the phonological word through the phonological utterance, as defined in Nespor–Vogel (1986) (henceforth N&V).

Since both the phonological and syntactic structures of a language are crucial in analyzing sandhi rules, it is necessary to make clear from the outset what these structures are taken to be in the present study. The model of phonology assumed is the prosodic phonology framework as developed in N&V, following earlier work by Selkirk (1978, 1980). According to this model, prosodic constituents are constructed on the basis of a mapping between the various components of a grammar and the phonology, the result being a hierarchically arranged structure consisting of several phonological units, as shown in (1).

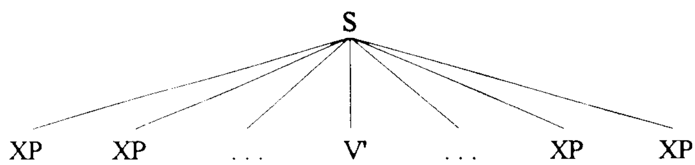
* I would like to thank András Kornai and László Marácz for their helpful discussion of various parts of this paper and István Kenesei and László Varga for reading the paper and providing insightful comments. An earlier version of this paper appeared in the proceedings of the Cortona Phonology Meeting held in Cortona, Italy, in April, 1987.

(1)



The syntactic model of Hungarian assumed here is one in which the constituents of a sentence are arranged in a "flat" type of structure as shown in (2), following proposals by Kenesei (1984, 1986) and Marácz (1986, 1987).

(2)



The verb is the only obligatory element of a sentence in Hungarian, and any other constituents are arranged in relation to it in a number of fields, as in (3).

(3)

Initial Field	Quantifier Field					Verb	Postverbal Field
XPs ('topics')	Even-	Neg	Uni-	only	XP	Neg+	XPs, Even-phrase
Existential Qs	phrase		versal		(focus)	V	No-phrases
Downgraded Uni-	No-		Qs		Wh-		Existential Qs
versal Qs	phrase				phrase		Universal Qs

In the remainder of this paper, each of the prosodic constituents, beginning with the Phonological Word, will be examined on the basis of Hungarian phonological rules in order to determine a) whether there is any evidence for the constituents in question and b) whether the way in which they are defined in N&V is adequate for Hungarian.

1. Phonological Word (PW)

It has already been demonstrated that the phonological word is a relevant constituent in Hungarian phonology, for example, by Booij (1984) and N&V. Typically, the PW is motivated on the basis of vowel harmony, which applies within a string consisting of a stem plus any derivational and/or inflectional suffixes, as illustrated in (4).

(4) (a) *kez- em- ben*
hand my in
'in my hand'

(b) *ház - am - ban*
house my in
'in my house'

Vowel harmony does not, however, apply between a (verb) stem and a preverbal element, or between two members of a compound as can be seen in (5) and (6), respectively.

(5) (a) *fel - darabol*
up cut
'cut up'

(b) *oda - küld*
there send
'dispatch'

(6) (a) *halál - büntetés*
death punishment
'death penalty'

(b) *épület - fa*
building wood
'timber'

It should be noted, further, that when suffixes are attached to a compound, they harmonize only with the rightmost member, even though they are morphologically and syntactically associated with the entire compound, as shown in (7).

(7) (a) *kerék – pár – ok*
wheel pair pl
'bicycles'

(b) *hang – verseny – ek – re*
sound competition pl to
'to concerts'

The constituent defined as the Phonological Word on the basis of Vowel Harmony is independently motivated on the basis of another rule, *n*-Palatalization, which applies in strings hat must be defined in precisely the same way. Specifically, this rule, which palatalizes an [n] before a [j], also applies between a stem and its suffixes, as seen in (8a), but not between a verb and preverbal element (cf. (8b)) or between the members of a compound (cf. (8c)).

(8) (a) *men – jen* ⟶ ...[ɲ]...
go Pe3 sg imp
'let him go'

(b) *agyon – jótékonykodta magát* ⟶ *...[ɲ]...
over donate oneself
'donate so much as to have nothing left'

(c) *kánon – jog* ⟶ *...[ɲ]...
canon law
'canonic law'

On the basis of such examples, we can formulate the *n*-Palatalization rule in prosodic terms as in (9), that is, as a span rule which operates throughout the domain of the phonological word.

(9) *n*-Palatalization
n ⟶ ɲ / [... ___ j ...]$_{PW}$

Thus, the Phonological Word, defined as a) a stem plus any suffixes, b) a preverbal element or c) the individual members of a compound (plus any adjacent suffixes), is a relevant prosodic constituent in Hungarian phonology.

2. Clitic Group

It is well known that primary word stress falls on the first syllable in Hungarian, regardless of the number of suffixes following a stem. Thus, primary stress is always on the first syllable in the words in (10).

(10) (a) *Amerika* 'America'
(b) *amerikai* 'American'
(c) *amerikaiak* 'Americans'
(d) *amerikaiakat* 'Americans + acc'

In compounds, the primary stress of the first member is retained as the primary stress of the entire compound. All other stresses are reduced, as shown in (11), where the vowel bearing the primary stress of the compound stands in bold face.[1]

(11) (a) *csónak* – *verseny* ⟶ *cs**ó**nakverseny*
boat competition
'boat race'

(b) *halál* – *büntetés* ⟶ *halálbüntetés*
death punishment
'death penalty'

In constructions consisting of a verb and a preverbal element, too, there is only one primary stress, the one on the preverbal element, as shown below.

(12) (a) *oda* – *küldenek* ⟶ *oda küldenek*
there send Pe3 pl
'they dispatch'

(b) *kenyeret* – *eszik* ⟶ *kenyeret eszik*
bread eat Pe3 sg
'he eats bread'

Furthermore, as the examples in (13) show, there is still only a single primary stress in constructions containing clitics, though this stress no longer necessar-

[1] As László Varga has pointed out to me, it is possible to have primary stress on the second member of a compound in order to indicate contrast or emphasis, as in a construction such as: 'I said boat race (*csónakverseny*) not boat store (*csónakház*)'.

ily falls on the first syllable. Instead, it falls on the first syllable of the nonclitic word.

(13) (a) Proclitics

az *ablak*
the window
'the window'

egy *ablak*
a window (vs. **e**gy **a**blak 'one window')
'a window'

és *János*
and John
'and John'

hogy *elmész*
that away-go Pe2 sg
'that you'll leave'

és *ha írta*
and if wrote Pe3 sg
'and if he wrote'

(b) Enclitics

János *is*
John too
'John too'

Mari *meg*
Mary and
'and Mary'

élettanból *sem*
physiology-from neither
'neither in physiology'

These observations suggest that the domain of seress assignment might be the constituent above the PW in the prosodic hierarchy, namely the Clitic Group. That the domain is not some larger constituent can be seen by the fact that in a phrase each word (i.e. lexical category) typically bears its own primary stress, as in (14), where the stressed vowels stand in bold face.

(14) (a) *piros könyvek*
red books
'red books'

(b) *keservesen sír*
bitterly cries Pe3 sg
'he cries bitterly'

In order to determine whether the CG is, indeed, the domain of stress, let us consider the rules for its construction given by N&V (pp. 154–5).

(15) Clitic Group Formation

I. CG Domain
The domain of CG consists of a PW containing an independent (i.e. nonclitic) word plus any adjacent PWs containing
a) a DCL, or
b) a CL such that there is no possible host with which it shares more category memberships.
(CL = clitic; DCL = directional clitic)

II. CG Construction

Join into an n-ary branching CG all PWs included in a string delimited by the definition of the domain of CG.

As defined in (15 I), the CG comes close to accounting for the domain of stress assignment in Hungarian, in that it accounts for individual words (cf. (10)) and words preceded or followed by clitics (cf. (13)). Problems arise, however, in relation to compounds and verbs with preverbal elements (cf. (11) and (12), respectively). In both of these cases, the above definition does not allow us to form a single constituent since it states that a CG consists of a single independent word, whereas compounds and verbs with preverbal elements contain more than one such word. At this point, two conclusions seem possible: a) the domain of stress is not the CG or b) the definition of CG is not correct. As far as preverb + verb constructions are concerned, it seems, that what accounts for the single stress is, in fact, a phenomenon whose domain is not the CG, a point that will be discussed further in Section 4. As far as compounds are concerned, however, it seems that the right conclusion is the second one. That is, in Hungarian, instead of allowing a CG to contain only one nonclitic word, we must allow it to contain more than one such word in the case of compounds, a possibility that can easily be incorporated into the CG formation rule in (15). In fact, (15) is ambiguous with respect to the meaning of "(nonclitic) word", and it appears that this is precisely the point at issue here. In the case of compounds there is more than one node in the syntactic tree that may be taken to be a "word" in the relevant sense (i.e. a lexical category labeled X), as illustrated in (16).

(16)

$$\begin{array}{ccc} & X^{\circ}\ (=N) & \\ X^{\circ}\ (=N) & & X^{\circ}\ (=N) \\ \text{back} & & \text{pack} \end{array}$$

In (15), it is intended that "X" refer to the lowest instance of "X" in a tree, however, if we parametrize "X" and allow it to range over the lowest or the highest "X", instead, we can account for the Hungarian compounds. That is, all that is needed is to revise (15 I) as in (17).

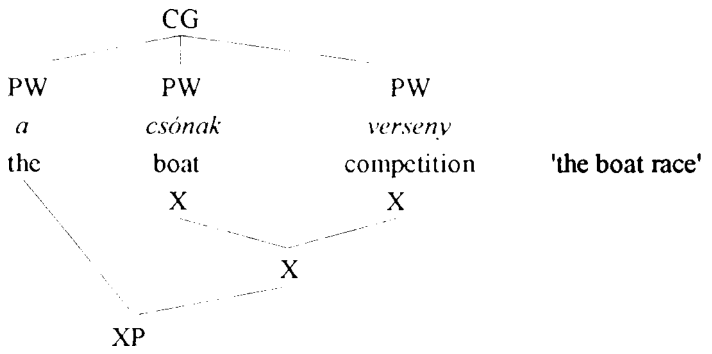
(17) Clitic Group Domain (revised)

The domain of CG consists of a PW or PWs containing any independent word(s) dominated by the $\left\{\begin{array}{c}\text{highest}\\ \text{highest}\end{array}\right\}$ X node plus any adjacent PWs containing...

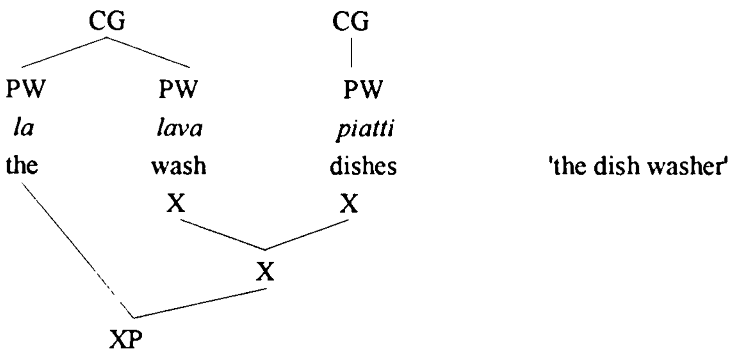
We can thus distinguish between two types of prosodic treatments of compounds on the basis of whether the relevant "X" node is the highest or lowest in the syntactic tree. For example, in Hungarian the crucial node is the highest one, while in Italian it is the lowest one, as exemplified in (18a) and (18b), respectively.[2]

[2] According to Hans Basbøll (personal communication), there is evidence that Swedish sets the parameter for CG formation in the same way that Hungarian does. That is, in order to account for the accent patterns in compounds, the members of a compound must constitute a single CG rather than separate ones.

(18) (a)



(b)



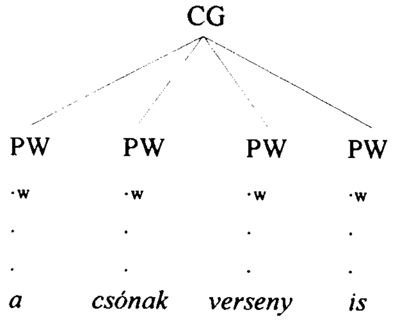
Thus, an entire compound constitutes a single CG in Hungarian, while in Italian each word of a compound constitutes a CG on its own. It should be noted that, following the revision of the CG formation rule, it is also necessary to revise part of the CG Relative Prominence rule. To reflect the introduction of the parameter in (18), option 1 of the relative prominence rule, given in (19), can be revised as in (20).

(19) Relative Prominence
The nonclitic member of CG is strong (s); all sister nodes are weak (w). (Option 1)

(20) Relative Prominence (revised)
The $\left\{\begin{array}{l}\text{first}\\ \text{last}\end{array}\right\}$ nonclitic member of CG is strong; all sister nodes are weak.

Hungarian sets the parameter in (20) so that *s* is assigned to the first nonclitic member of CG, in keeping with the overall pattern of primary stress on the leftmost syllable of a word, as illustrated in (21).

(21)



Presumably in languages with stress assigned in relation to the rightmost edge of a word, when there is more than one nonclitic word in a CG, the other value of the parameter (i.e. last) will be chosen.

3. Phonological Phrase (PP)

Although the Hungarian sentence structure is flat, as seen in (2), within any XP, the structure is configurational. Thus, at the level of the phonological phrase, the fact that Hungarian is a nonconfigurational language should not distinguish it from configurational languages. In order to construct the PP, it is necessary to know that the recursive side with respect to a head in Hungarian is the left side. The PP construction rule in (22) will thus group the modifiers in (23) with their respective heads on the left.

(22) Phonological Phrase (N&V, 186)
The domain of the phonological phrase consists of a CG which contains a lexical head (X) and all CGs on its nonrecursive side up to the CG that contains another head outside of the maximal projection of X.

(23) (a) *a kapu mögött*[3]
the gate behind
'behind the gate'

[3] Following N&V, only N, V and A are considered lexical heads. Thus, the postposition

(b) *a* *ház* *alól*
the house from-under
'from under the house'

Thus far, no phonological rules have been found that crucially refer to the PP, however, this unit appears to coincide closely with what Varga (1984) identifies as certain types of "complementary blocks", equivalent to major sentence constituents.[4] We must thus use the somewhat vaguer criterion of constituting a tone group in order to identify the phonological phrase until a segmental rule is found that applies in relation to this domain. According to the definition in (22), we have three PPs in a sentence such as the following, and these PPs, in fact, would constitute complementary blocks Varga's system.

(24) [a kapu mögött]$_{PP}$ [a nagy kertben]$_{PP}$ [játszanak]$_{PP}$
the gate behind the big garden-in they are playing
'they are playing in the big garden behind the gate'

A problem arises, however, when complements appear within a phrase to the left of the head, that is, on the recursive side. In (25a), there is a complement to the left of the head *könyveket* 'books-acc.' and in (25b) and (25c), there is a complement to the left of the head *gyerekeit* 'children-acc.'.

(25) (a) *vittem* *sárga* *könyveket* *Debrecenbe*
took Pel sg yellow books-acc. Debrecen-to
'I have taken yellow books to Debrecen'

(b) *elvittem* *a* *szomszéd* *gyerekeit* *Debrecenbe*
the neighbor children-acc.
'I took the neighbor's children to Debrecen'

(c) *elvittem* *a* *nagyon* *kedves* *szomszéd* *gyerekeit* *Debrecenbe*
the very nice
'I took the very nice neighbor's children to Debrecen'

---

mögött 'behind' does not form the nucleus of a separate PP. It should be noted, furthermore, that in certain cases *mögött* and other postpositions, may be stressless. In such cases, they join with the noun to their left as a clitic and form a single clitic group with it, rather than a phonological phrase.

[4] Such "complementary blocks" include the F(ocus)-V(erb)-complex, T(opic)-constituent, Q(uantor)-constituent, N (=postverbal)-constituent (cf. Varga 1984, 215–7).

On the basis of the division of such sentences into complementary blocks, however, it seems that the complements should, in fact, join into a single PP with the head. In N&V, other cases are discussed in which complements are joined into a PP by a restructuring rule. In some languages such as Italian, this rule applies only to nonbranching complements, while in others such as Chimwi:ni (cf. Hayes, to appear) and Kimatuumbi (cf. Odden 1980), it also applies to branching complements. Hungarian fits the latter pattern, allowing restructuring to apply to branching complements as well as nonbranching ones, as illustrated in (26). In fact, this restructuring seems to be obligatory, as it is in Chimwi:ni and Kimatuumbi. Thus, the sentences seen in (25) are all divided into three PPs, irrespective of the length of the complement to the left of the head in the middle PP.

(26) (a) [a kapu mögött]$_{PP}$ [a nagy kertben]$_{PP}$ [játszanak]$_{PP}$

(b) [elvittem]$_{PP}$ [a szomszéd gyerekeit]$_{PP}$ [Debrecenbe]$_{PP}$

(c) [elvittem]$_{PP}$ [a nagyon kedves szomszéd gyerekeit]$_{PP}$ [Debrecenbe]$_{PP}$

Hungarian, furthermore, a ears to conform to the general constraint on restructuring observed in other languages that allow restructuring. That is, only the first complement of a head may be joined into a PP with the head; any other complements form PPs on their own. Thus, the two possible readings of the ambiguous sentence in (27) are distinguished prosodically, as shown in (28).

(27)	*egy*	*fekete*	*kalapos*	*nő*
	a	black	hat-provided-with	woman

a) 'a black woman wearing a hat'
b) 'a woman wearing a black hat'

(28) (a) [egy fekete]$_{PP}$ [kalapos nő]$_{PP}$

(b) [egy fekete kalapos nő]$_{PP}$

In both cases, restructuring groups the complement adjacent to the head 'woman' into a PP with it. The difference is that in (28a) *fekete* 'black' and *kalapos* 'hat-wearing' are two distinct complements both referring to *nő*, while in (28b), they constitute a single complement that refers to *nő*.

Thus, the general definition of the phonological phrase proposed in N&V provides us with an independent way of delimiting the units Varga refers to as complementary blocks. Furthermore, Hungarian provides evidence for the PP restructuring rule, specifically allowing it to apply to branching as well as nonbranching complements of a head. Finally, it appears that this restructuring may be obligatory, but this could be determined more definitively if an additional PP domain rule is found.

4. Intonational Phrase (IP)

Evidence for the IP as a constituent of the prosodic hierarchy of Hungarian is provided on the basis of two phonological rules, *l*-Palatalization and Stress Reduction in Vogel–Kenesei (1987). Essentially, it is demonstrated that the domain of application of both rules is most insightfully defined in terms of the IP, however, only if the rule for constructing this constituent is modified with respect to that proposed by N&V so as to allow Logical Form to play a role in the definition.

Let us consider *l*-Palatalization (LP) first. This rule changes [l] to [j) before [j] within and across words throughout an IP. It can be formulated as an IP span rule as in (29). The matter of how the IP is defined will be taken up shortly.

(29) $\mathrm{l} \longrightarrow \mathrm{j} \,/\, [\,\ldots \;\_\_\; \mathrm{j} \ldots\,]_{\mathrm{IP}}$

Thus, (29) applies between a stem and a suffix in (30a), a preverbal element and a verb in (30b), the two members of a compound in (30c) and an adjective and a noun within a syntactic phrase in (30d). It also applies across various types of phrasal constituents, as illustrated in (31).

(30) (a) *cél* – *juk* ⟶ cé[jj]uk
aim their
'their aim'

(b) *fel* – *jár* ⟶ fe[jj]ár
up goes
'goes up (repeatedly)'

(c) *fél* – *jegy* ⟶ fé[jj]egy
half ticket
'half price'

(d) [az angol játék]$_{XP}$ ⟶ az ango[jj]áték
the English toy
'the English toy'

(31) (a) [csak]$_{XP}$ [Pál]$_{XP}$ (jár]$_{V}$ ⟶ ... Pá[jj]ár
only Paul walks
'only Paul walks'

(b) [Pál]$_{XP}$ [bottal]$_{XP}$ [jár]$_{V}$ [be]$_{XP}$ [az iskolába]$_{XP}$
Paul stick-with walks in the school-into
'Paul walks with a stick into the school'
⟶ ... botta[jj]ár...

(c) [a legkisebb angol]$_{XP}$ [jött]$_{V}$ [be]$_{XP}$ [a szobába]$_{XP}$
the smallest Englishman came in the room-into
'The smallest Englishman came into the room'
⟶ ... ango[jj]ött...

(d) [tegnap]$_{XP}$ [beszélgetett]$_{V}$ [Pál]$_{XP}$ [Jánossal]$_{XP}$
yesterday spoke Paul John-with
'Yesterday Paul spoke with John'
⟶ ... Pá[jj]ánossal

LP does not apply across all phrase boundaries, however, as the examples in (32) show.

(32) (a) [Pál]$_{XP}$ [Jánost]$_{XP}$ [látta]$_{V}$ ⟶ *Pá[jj]ánost...
Paul John-acc saw
'Paul saw John'

(b) [fel]$_{XP}$ [Jánossal]$_{XP}$ [mentem]$_{V}$ ⟶ *fe[jj]ánossal...
up John-with I went
'I went up with John'

(c) [Mari]$_{XP}$ [visszaél]$_{V}$ [János]$_{XP}$ [türelmével]$_{XP}$
Mary abuses John patience-with
'Mary takes advantage of John's patience'
⟶ *... visszaé[jj]ános...

(d) [Pál]$_{XP}$ [jól tudod]$_{S}$ [beteg]$_{XP}$ ⟶ *Pá[jj]ól...
Paul well you know sick
'Paul, as you know, is sick'

In fact, a clue as to what is going on in relation to the application of LP across some, but not other, phrase boundaries can be found in the comparison (33a) and (33b), where, despite the structural similarity of the of sentences, LP applies only in the second case.

(33) (a) $[\text{Pál}]_{XP}$ $[\text{fél}]_{V}$ $[\text{Jánostól}]_{XP}$ $\longrightarrow$ *...fé[jj]ánostól
Paul fears John-from
'Paul is afraid of John'

(b) $[\text{Pál}]_{XP}$ $[\text{fél}]_{V}$ $[\text{Jánostól}]_{XP}$ $\longrightarrow$ ...fé[jj]ánostól
'It is Paul that is afraid of John'

What is crucial in distinguishing the case in which LP applies from that in which it does not apply is a matter, not of the syntactic, but rather of the semantic, structure of the sentences. It is assumed here that in the Logical Form (LF) component of the grammar operator status and scope are assigned to items by rules such as those in (34) (cf. Vogel–Kenesei 1987).

(34) (a) Assign [+OS]: Operator status is assigned in LF to appropriate categories on the basis of lexical specifications of their content.

(b) Assign [+SC]: The widest scope is assigned in LF to the leftmost element marked [+OS].

If we apply [+OS) and [+SC] markings to Hungarian sentences according to (34), what we find is that LP applies across constituents to the right of [+SC]; if no element is marked [+SC], LP may not apply across constituents. Given this generalization, we can incorporate the information supplied by LF into the IP construction rule as in (35) so that it adequately defines the domain within which LP applies.

(35) (a) Intonational Phrase Construction (Vogel–Kenesei 1987)

Group the PP containing an element marked [+SC] with all PPs to its right until either another constituent with a logical function (marked [+OS]), or the end of the sentence, is reached; each remaining PP forms an IP on its own.

(b) Intonational Phrase Relative Prominence: s/w*

(w* = any number of weak PPs)

Thus, a series of PPs will be grouped into IPs in different ways depending on the presence and location of any constituents marked [+SC], as illustrated schematically in (36).

(36) (a) $[[\ ]_{PP}]_{IP}\ [[+SC\ ]_{PP}\ [\ ]_{PP}\ [\ ]_{PP}]_{IP}$

(b) $[[\ ]_{PP}]_{IP}[[\ ]_{PP}]_{IP}\ [[+SC]_{PP}\ [\ ]_{PP}]_{IP}$

(c) $[[\ ]_{PP}]_{IP}[[\ ]_{PP}]_{IP}\ [[\ ]_{PP}]_{IP}\ [[\ ]_{PP}]_{IP}$

If we now apply the relevant scope markings and intonational phrase bracketings to the sentences in (33) it becomes clear why LP applies in the second, but not the first, case. As can be seen in (37a), the [l] and [j] do not form part of the same IP, and therefore LP cannot apply. In (37b), however, they do form part of a single IP and LP does apply.

(37) (a) $[[\text{Pál}]_{PP}]_{IP}\ [[\text{fél}]_{PP}]_{IP}\ [[\text{Jánostól}]_{PP}]_{IP}$

(b) $[\underset{+SC}{[\text{Pál}]_{PP}}\ [\text{fél}]_{PP}\ [\text{Jánostól}]_{PP}]_{IP}$

Stress Reduction (SR) also applies in relation to the Intonational Phrase. Specifically, it causes any primary word stress to the right of the first one in an IP to undergo reduction. There are two different physical manifestations of SR, depending on the nature and position of the words involved, as stated in (38).

(38) (a) If the word immediately following the first stress is a finite verb, destress it completely.

(b) Reduce any other primary stresses to secondary stresses.

We thus get the following stress patterns for the sentences seen in (33) and again in (37).

(39) (a) "Pál "fél "Jánostól.
(b) "Pál fél 'Jánostól.

Notice that in (39b), the finite verb *fél* has zero stress while the following word does have some stress, though it is weaker than the usual primary word stress.

We can now return to the problem raised earlier in relation to the single stress on sequences of preverbal element + verb (cf. (12)). Given our rules for scope assignment and IP construction, these cases are handled automatically by the rule of SR just proposed. That is, the preverbal element always bears [+SC], and the following finite verb must, therefore, be totally destressed, as shown in (40).

(40) (a) $[\,[\text{oda}]_{PP}\ [\text{küldenek}]_{PP}]_{IP}$ ⟶ ˈoda küldenek
+SC
there send Pe3 pl
'they dispatch'

(b) [[kenyeret] [eszik]] ⟶ "kenyeret eszik
+SC
bread eat Pe3 sg
'he eats bread'

Thus, the IP, as redefined in (35) to take into consideration information from LF, not only allows us to specify the domains of application of two phonological rules of Hungarian, it also accounts for why preverbal element + verb sequences have the same stress pattern as compounds, though they cannot be considered compounds on other grounds.

5. Phonological Utterance (PU)

Hungarian also provides evidence for the largest phonological constituent, the PU. This constituent consists of all the IPs dominated by the highest node in a given syntactic trees (X^n), and in cases of restructuring, of the IPs dominated by more than one such X. The rule of Obstruent Assimilation (OA) applies within words and across any type of phrase boundary within a sentence, causing an obstruent to take on the same feature value for voicing as that of an immediately following obstruent, as shown in (41).

(41)	(a)	*kút*	'well'	[t]
		kútban	'in the well'	[d]
	(b)	*zseb*	'pocket'	[b]
		zsebkés	'pocket knife'	[p]

(c)	*unalmas*	'boring'	[ʃ]
	az unalmas beszéd	'the boring speech'	[ʒ]
(d)	*alig*	'hardly'	[g]
	alig kezdik el...	'they just begin...'	[k]

The indication that OA is indeed a PU domain rule, and specificall a PU span rule, is the fact that it can apply across sentences when they are related in such a way as to allow restructuring (cf. N&V), as illustrated in (42).

(42) *János* 'John' [ʃ]

Itt van János. Beszéljük meg azt a dolgot most rögtön. [ʒ]
'Here's John. Let's discuss this thing now.'

We can thus formulate the rule of OA as in (43).

(43) Obstruent Assimilation

$$[-\text{son}] \longrightarrow [\alpha\,\text{voice}] \;/\; [\ldots \;\_\_\; \left\{ \begin{matrix} -\text{son} \\ \alpha\,\text{voice} \end{matrix} \right\} \ldots]_{PU}$$

As this rule states, OA will apply whenever two obstruents are adjacent any place in a string that is defined as constituting a PU.

6. Conclusions

What the present investigation of Hungarian has demonstrated is that there is evidence for each of the five prosodic constituents from the Phonological Word through the PU. In two cases, however, those of the CG and the IP, the Hungarian data required modification of the original definitions given in N&V. Specifically, in the first case, it was proposed here that a parameter must be added to the rule for constructing the CG to allow languages to choose whether a) all the words composing a compound form a single CG together, or b) each member is in a separate CG. Hungarian was shown to be a language that takes option **a**. As far as the IP is concerned, it was demonstrated, following the arguments developed in Vogel–Kenesei (1987), that in order to account for two rules that apply within this domain it is necessary to modify the definition of the IP so that it takes information from the LF component of the grammar into consideration. Specifically, it is necessary to make use of the notions of operator status and scope in building the IP constituent of the prosodic hierarchy, at least for Hungarian, and possibly for nonconfigurational languages more generally.

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THE FORMATION OF DIMINUTIVE NAMES IN HUNGARIAN

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0. Introduction*

In many languages personal names can occur in an 'official' and a 'diminutive' version. The latter may serve as a nickname or pet name, or simply as the name by which one is normally addressed. Often such diminutivizations show interesting morphophonological properties.

The formation of diminutive names (or 'hypocoristics') in Hungarian is highly productive, though not very well documented, and, as I shall argue, inadequately analysed. Therefore it represents a prime target for investigation. We illustrate the phenomenon in (1):[1]

	official name:	diminutive name:
(1)		
	Ferenc	– *Feri*
	József	– *Józsi*
	Katalin	– *Kati*
	Zsuzsanna	– *Zsuzsi*

In our discussion we will focus on the formation of diminutive names that end in *-i*. While the most productive diminutive for nouns in general in Hungarian is *-ka/-ke* (variants selected according to vowel harmony), for

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[1] Examples are presented in standard Hungarian orthography, that is, <s c cs zs> indicate /ʃ ts tʃ ʒ/, respectively. The acute accent indicates length of the vowel. Stress in Hungarian is invariably on the first syllable.

names the normal procedure is to form the *-i* version first, the output of which may be subsequently diminutivized by *-ka/-ke* (e.g. *Ferike*). Diminutive names in other endings, such as *-csa*, *-us*, and *-kó*, also occur, as illustrated in (2):

(2) Borcsa (<Borbála), Julcsa (<Júlia)
Emmus (<Emma), Katus (<Katalin)
Ferkó (<Ferenc), Jankó (<János)

However, these other endings are found less often; moreover, they often occur side by side with forms that end in *-i* (that is, *Juli, Kati*, etc.). The formation of diminutive names in *-i* appears to be most productive, and we will therefore from now on ignore diminutives other than those in *-i*. A research project of a wider scope than the present one will have to determine whether these categories are governed by the same principles as those in *-i*. It is also the case that a number of names does not take an *-i* diminutive at all. Biblical names (*Ábrahám, Márkus*), for instance, fall into this category, which we will not explore here.

In this paper we examine the formal phonological relationship between the official ('base') name and the diminutive ('target') name. After a brief note on methodology, in section **2** we review the available analysis on the subject, which is given by Vago (1980). We shall see that this analysis fails on both empirical grounds and on considerations of a more general nature. In section **3** we arrive at a competing analysis, cast in the framework of 'templatic morphology' developed by, among others, McCarthy–Prince (1986, to appear). We present the basics of this approach in section **3.1**, and then argue for an analysis in which the phonemes of the base name are associated onto a template, which in the case of Hungarian consists of a prosodic unit, namely a metrical foot. The mapping procedure accounts for the attested targets better than Vago's analysis, and does so in a more principled way. Finally, in section **4**, we discuss some issues that were sidestepped in the general analysis, such as the preservation of length, the treatment of medial geminates, and the diminutive formation of vowel-initial names.

1. Methodology

The data that this study draws on were gathered first of all by means of a search through the large Országh (1983) dictionary. On the basis of the pairs thus collected, a questionnaire was drawn up to see whether native speakers of Hungarian felt these pairs to be part of current Hungarian usage. Also, in the questionnaire a number of names was presented of which the Országh dictionary did not give a diminutive, and the informants were asked to supply a diminutive if they found one was proper. Thirdly, a number of diminutives was presented of which the official version was not listed by Országh. Informants were asked to supply this official name if one was available. Finally, the informants were asked to comment on the spelling of the names provided. In all, the judgements of sixteen native speakers were collected. It is interesting to note that a considerable amount of variation in diminutive-name giving appears to exist across speakers. In spite of this, it was possible to put together a tentative list of pairs such as those presented in (1), consisting of exactly a hundred pairs at present. In our view, they may be considered representative of current Hungarian usage. For purposes of reference, the list is given in full in the Appendix.

2. Previous analysis

Vago (1980) presents a short description of diminutive name formation (henceforth DNF) with the object of showing that vowels that are neutral with respect to vowel harmony are underlyingly front. He gives the following informal analysis of diminutive formation: "it is formed by adding the suffix *-i* to the initial syllable and the initial consonant of the second syllable. The truncated representations are, properly speaking, pet names" (pp. 12–3). Although this statement more or less describes the data, it is not adequate.

In the first place, the description of DNF provided by Vago does not account for a set of diminutives in which, unexpectedly perhaps under Vago's solution, the first consonant of the second syllable does not appear to copy (the lowered dot in (3) indicates the syllable boundary):

(3) Ág.nes – Ági (*Ágni)
Im.re – Imi (*Imri)
Ist.ván – Isti (*Istvi)
Vik.tória – Viki (*Vikti)

Note that all the asterisked forms in (3) would be well-formed Hungarian words. Cases like *Gabriella–Gabi*, in which the syllable boundary is not obvious, are discussed below (cf. (15)).

The second objection is that it is unclear what the phonological content of the (morphological) operation of DNF would be under Vago's analysis. The notion 'initial syllable and the initial consonant of the second syllable' is not a phonological notion in that it does not form a **constituent** in either the base or the target. Consider the regular pairs in (4), in which the copied material stands in italics:

(4)	*Esz.t*er	– *Esz.t*i
	*Fe.r*enc	– *Fe.r*i
	*Ló.r*ánt	– *Ló.r*i
	*Zsu.zs*an.na	– *Zsu.zs*i

Although the consonants that appear in the output form a sequence, Vago's characterization of DNF seems arbitrary. If it were correct, we might also expect, with some imagination, morphological operations (whether name formations, reduplications, or others) which took the initial syllable and the **second** consonant of the second syllable of the base, and suffixed an /i/, or even the second syllable and the initial consonant of the initial syllable. Needless to say, such operations are not attested, and therefore Vago's solution is not delectable. Clearly we are in need of an empirically more adequate and phonologically more insightful analysis.

3. A new analysis

3.1. Templatic morphology

In this section we sketch a theory of morphology which was developed in response to such papers like Marantz (1982). First we shall illustrate Marantz's proposals with regard to reduplication. Then we shall examine a new approach developed by McCarthy–Prince (1986, to appear), which departs from standard nonlinear theory by **not** recognizing timing units like the familiar C/V- or X-slots. We will adduce some additional evidence provided by Hayes (1989) for the idea that these timing units are not adequate units of representation.

Marantz (1982) developed a theory of reduplication within the framework of CV-Phonology (Clements–Keyser 1981, 1983), which was developing at that time. Marantz's objection was to the 'transformational' rule type (as postulated by Chomsky–Halle 1968), which had up to then been used to deal with reduplication. Marantz proposed to characterize reduplication processes as the prefixation of a number of C and V timing slots. Consider the following case of reduplication in the Philippine language Agta (Healey 1960) (data from Marantz):

(5) Agta reduplication

bari	'body'	– BARbari-k kid-in	'my whole body'
mag-saddu	'leak (v)'	– mag-SADsaddu	'leak in many places'
na-wakay	'lost'	– na-WAKwakay	'many things lost'
takki	'leg'	– TAKtakki	'legs'

Marantz points out that in this case "reduplication copies material which does not form a constituent of the word being reduplicated" (p. 439). He takes this as evidence for characterizing reduplication as the affixation of C- and V-points; in this case a CVC prefix. The root phonemes copy onto the C- and V-points from left to right, in a one-to-one fashion. In (6) this is exemplified:

(6) (a) CVC + CVCV → /barbari/

/b a r i/ + /b a r i/

(b) CVC + CVCVC → /na-wakwakay/

/na/ + /w a k a y/ + /w a k a y/

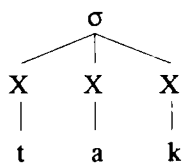
McCarthy–Prince (1986) argue that the description of reduplication as the prefixation of C- and V-slots has a number of undesirable consequences. Particularly if the later suggestion is adopted that C and V notation is redundant in view of the internal structure of the syllable, and that therefore a skeleton composed of X's should be adopted (Levin 1985), the restriction of descriptive power that Marantz sought to achieve is largely nullified. For instance, in a language with a fairly standard sort of syllable structure, prefixation of XXX would result in the following reduplication forms (from McCarthy–Prince 1986, 3):

(7) (a) *badupi* – BADbadupi
(b) *bladupi* – BLAbladupi
(c) *adupi* – ADUadupi

Cases like this, in which a light syllable like BLA is treated on a par with a closed (and therefore typically heavy) syllable like BAD and with bisyllabic ADU, are not found. Consequently, reduplication must be expressed differently. Prefixation of bare C/V- or X-slots obscures the nature of a phenomenon like Agta reduplication. Below we shall see a different way of dealing with cases like these.

Hayes (1989) shows that also a different phenomenon, namely that of compensatory lengthening, can be better expressed by **not** using timing slots. Here, too, the argument is one of restrictiveness: a theory which uses X's predicts that a number of cases of compensatory lengthening is going to occur which in actuality does not occur. Consider the syllable /tak/, with its timing structure according to X-Phonology:

(8)



At first sight, compensatory lengthening, that is, the absorption of the length of a deleted segment by a neighbouring segment, is as likely after deletion of the initial consonant, i.e. /t/, as after deletion of the final consonant, i.e. /k/:

(9)

deletion from onset
CL: */a:k/
(not attested)

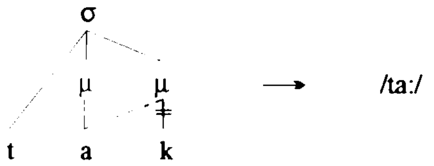
deletion from coda
CL: /ta:/

However, deletion from the onset never appears to result in compensatory lengthening.[2] This is understandable if we assume that not X-elements are the attaching nodes for segmental structure, but that this is directly linked to prosodic structure, that is, moras and syllables. A representation like the following of /tak/ makes it clear that deletion from the onset can never result

[2] With a few notable exceptions, such as the one given by De Chene–Anderson (1979, fn. 4 and ref. cit.): in the Modern Greek dialect of Samothraki /r/ is lost in all positions except finally. In certain cases, the loss is accompanied by lengthening: thus, /antras/ > [ada:] 'man', /prasinos/ > [pa:ʃnus] 'green', /rota/ > [o:ta] 'ask-imp.', etc. (stress omitted). See Hayes (1989, 281ff.) for discussion.

in CL, as deletion of the initial /t/ does not free a weight unit, i.e. a mora. Deletion of the final /k/, as is illustrated, does free the mora, which links up with the vowel to form a long vowel, preserving the weight of the syllable:[3]

(10)

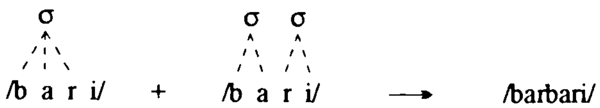


The mora representation in (10) also expresses the fact that the segmental composition of the onset does not have any effect on the weight of the syllable as a whole. Thus, cross-linguistically the assignment of stress is never dependent on the content of the onset, whereas it **can** be dependent on the weight of the coda.

The result of the discussion so far is that many phenomena had better be represented without taking resort to timing units like C/V's or X's. Occam's razor commits us to the position that they do not exist, so that an analysis which does not refer to them is more highly valued than one that does.

We now return to the analysis of the Agta reduplication facts given in (5) above. McCarthy–Prince propose that the prefix in cases like these is not CVC, but actually a **syllable template**, to which the phonemes of the root associate. Association is 'exhaustive', that is, as many phonemes as possible are mapped onto the template, so that the **maximal** syllable of the language is formed. Consider the example in (11):

(11)



As many phonemes as possible are mapped onto the template so as to form the prefix syllable /bar/. Mapping of the /r/ must take place, because of the exhaustiveness condition. Mapping of the /i/ cannot take place, as this would produce a bisyllabic prefix. In this way we explain why the reduplicative prefix is /bar/, even though it does not form a constituent in the stem.

[3] It is irrelevant for the observation to be accounted for whether the onset consonant in (10) is attached to the syllable node or to the first mora unit. Both representations are found in the literature.

3.2. Hungarian diminutive name formation

Having seen the example from Agta, it is not difficult to see what the correct analysis of Hungarian DNF should be.[4] The DNF template is the same as in the case of Agta, except that after mapping an invariant /i/ phoneme is attached, deriving a bisyllabic output. Other endings, such as *-us* in *Emmus, Katus* could be attached to the same template, but these will not be explored here. The template is given in (12):

(12) σ

—— + /i/

Mapping takes place against the bare syllable node, i.e. without reference to the intervening moraic level (cf. (10) above). Cases in which the moraic level plays a role are considered below (sections **4.1** and **4.2**). In (13) we give some regular derivations (Res. = resyllabification):

(13) (a) σ

/f e r e n c/ + /i/ Res. ⟶ /feri/ *Feri*

(b) σ

/a n d r e a/ + /i/ Res. ⟶ /andi/ *Andi*

(c) σ

/e r ʒ e: b e t/ + /i/ Res. ⟶ /erʒi/ *Erzsi*

In (13a) the syllable /fer/ is associated to the template. As in the case of Agta, the **maximal** syllable allowed by the syllabification rules of the language is created. In *Andrea–Andi*, we map /and/ and not /andr/ (which would produce unattested **Andri*), because /-ndr/ is not a permissible Hungarian coda.

[4] Compare also Dressler (1987) and Dressler–Siptár (1989). Neither paper was available to me at the time when I wrote this.

In example (13c), the syllable /erʒ/ is mapped, which makes us expect that /-rʒ/ is a good Hungarian coda. As it appears, only two words have this coda, namely *törzs* 'trunk; tribe', and *torzs* 'stubble'.[5] As both are native Hungarian words, we have no trouble accepting these as evidence that /-rʒ/ is indeed a permissible coda.

Thus, all forms that were counterexamples to Vago's analysis above (3) are accounted for: in all cases they would give rise to an impermissible coda at the time when mapping onto the first syllable of the template takes place:

(14)		impermissible coda:
	Ág.nes – Ági	/-gn/
	Im.re – Imi	/-mr/
	Ist.ván – Isti	/-stv/
	Vik.tória – Viki	/-kt/

It is important to stress that the notion '(im)permissible Hungarian coda' here may not be part of synchronic Hungarian phonology. Consider the following cases:

(15) Kálmán – Káli
Vilmos – Vili

In both cases mapping of /-lm/ is disallowed, which suggests that there is a restriction on this coda. However, in present-day Hungarian there is no such constraint, as the recent loan *film* 'film', is perfectly acceptable: there is no tendency to simplify or break up the final cluster in any way. However, the case of diminutive names provides interesting evidence what, then, the diachronic situation must have been with regard to the notion 'impermissible Hungarian coda'. Compare in this respect also *Oszkár–Oszi*: the coda /-sk/ seems to be allowed, but it only appears in recent loans like *groteszk* 'grotesque', etc.

As the prosodic solution developed here only refers to the notion 'coda' it does not depend on word-internal syllabification, which may not be obvious. To see this, consider the following cases:

(16) Gabriella – Gabi
Miklóș – Miki

[5] Thanks to Miklós Törkenczy for providing these examples.

The question is what the correct syllabification of the base word is here. There are two possibilities, it seems to us:

(17) (a) Ga.briella, Mi.klós
(b) Gab.riella, Mik.lós

An argument for the syllabification in (17a) is the 'maximal onset principle' (Kahn 1976): if it is correct, these cases are not counterexamples to Vago's 'initial syllable and initial consonant of the second syllable' analysis (cf. (3) above). An argument for the syllabification in (17b) is the—not synchronically active—constraint on branching onsets in Hungarian (Törkenczy in this volume). If it is correct, they **are** counterexamples to Vago's analysis. Such a constraint could well be thought to play a role in this process, but we have no direct evidence that bears on the question. The templatic approach makes the same predictions regardless of what the syllabification analysis should be: in both cases only the first consonant of the cluster can be mapped, as both /-kl/ and /-br/ are impermissible codas.

Association onto the first syllable of the template is therefore subject to inspection by the coda restrictions of the language. There seem to be some unexpected cases, though: in the case of *Zoltán*, for instance, both Vago's analysis and the one developed here predict *Zolti* (/-lt/ is a well-formed coda), which occurs marginally, side by side with *Zoli*. We have no explanation for this particular problem, but would like to note that exceptions to the template analysis are of only one type: less phonemes are copied than is predicted (cf. also *Oszkár–Oszi* above). Formally, the mapping procedure does not fully maximize association of melody to template. There are no exceptions like hypothetical *Ágnes–*Ágni*, where **more** is copied than the analysis predicts. Such idiosyncracies of mapping are fairly common in systems of nicknames or hypocoristics, as John McCarthy and Alan Prince (p.c.) point out to me.

In the next section we will discuss some more aspects of the analysis. While the mapping analysis accounts for the basic facts of DNF in a principled way, some interesting matters remain to be discussed. These concern the vowel length in base and target, medial geminates, and the treatment of vowel-initial names.

4. Side issues

4.1. Vowel length

As can be observed in the list given in the Appendix, in most cases the length of the vowel in the initial syllable in the base is the same as in the output. Either both are short (18a), or both are long (18b). For example:

(18) (a)	Aladár	– Ali	(b)	Bódog	– Bódi
	Eszter	– Eszti		Éva	– Évi
	Jenő	– Jenci		József	– Józsi
	Tibor	– Tibi		Lóránt	– Lóri
	Zsuzsanna	– Zsuzsi		Nándor	– Nándi

However, there is also a fair number of cases in which the official name and the diminutive name differ in this respect. Leaving aside the obsolete case of *Adorján–Dóri*, all cases of a short vowel becoming long are listed in (19a), and a sample of shortening cases (there are sixteen in total in the Appendix) in (19b):

(19) (a)	Hedvig	– Hédi	(b)	Dániel	– Dani
	Sarolta	– Sári		Gábor	– Gabi
				János	– Jani
				László	– Laci
				Péter	– Peti

First of all, we observe that shortening (b) is far more common than lengthening (a). Besides, the items in (a) may be accounted for individually. *Hedvig* and *Hédi* may both have been borrowed from German separately, while *Sári* may properly derive from *Sára*, which has long /a:/.

For the shortening cases we must ask ourselves what the regular situation is in Hungarian. In the present database (cf. the Appendix) there are fifteen cases like *József–Józsi, Márta–Márti*, etc., in which the long vowel remains, and sixteen cases in which the long vowel becomes short. The difference in vowel length raises an interesting theoretical issue, as it is not clear at first sight how a long vowel in the base is mapped against our target template. Consider the case of *József–Józsi*. The long vowel is represented as a single melodic matrix associated to two length positions:

(20) μ μ

$$\begin{bmatrix} +\text{back} \\ -\text{high} \\ -\text{low} \\ +\text{rnd} \end{bmatrix}$$

So far we have assumed (cf. (13) above) that phonemes, i.e. segmental units, map onto the template. It is an empirical question whether the **timing** structure is associated alongside the segmental material. Hungarian presents an interesting case, as it has both distinctively long vowels as well as distinctively long consonants (cf. below). For cases like *József–Józsi*, we must assume that long vowels map **as** long vowels, i.e. together with their moraic structure. For the shortening cases, then, we assume that mapping takes place strictly phonemically, i.e. without taking the moraic structure along. For example:

(21) σ

/d a n i e l/ + /i/ Res. ⟶ /dani/ *Dani*

(μ μ)

The fact that mapping can apparently take place with or without taking the timing structure along, accounts for the fact that while a long vowel may become short, the opposite is not regularly attested: the only cases of this were idiosyncratic (19a). As mapping cannot of course **create** the moras needed for a long vowel, this is exactly what we expect under the templatic approach, though it remains a mystery under a linear analysis. Note that neither analysis can claim that shortening is predictable for certain names: there is no phonological explanation why *Sándor* should shorten to *Sandi* while *Nándor* preserves its long vowel.

4.2. Medial geminates

A number of base names have medial geminates, or long consonants. In this section we examine how names with geminates in the relevant position fare under the mapping analysis.

In a sense geminate consonants are just like long vowels in that they are consonants with prosodic structure attached to them. While Hayes (1989) represents a consonant of normal length, say /n/, as in (22a), a geminate consonant /n:/ is represented as in (22b):

(22) (a) /n/ (b) $\begin{array}{c} /\mathrm{n}/ \\ | \\ \mu \end{array}$

Hungarian is well known for its allowing geminate consonants in hetero-syllabic as well as final position (even after long vowels, though recessively so). Compare, for instance, *új* 'new' with *ujj* 'finger, toe'. All names with geminates in a position relevant to mapping are listed in (23):

(23)	Anna	– Anni, Ani
	Anna	– Panni
	Attila	– Atti, Ati[6]
	Emma	– Emmi, Emi
	Lilla	– Lili
	Ottó	– Otti

It is interesting to observe that, again, there seems to be variation with regard to mapping **with** or **without** prosodic structure. Thus, the variation between *Anni* and *Ani* may be formally expressed as mapping of phonemes plus moraic structure versus strictly phonemic mapping.

The tendency to map strictly phonemically may be especially strong for /l:/ in *Lilla–Lili*, as there is a synchronic constraint prohibiting this geminate in coda position. For example, both *száll* 'to fly' and *szál* 'thread' are

[6] This case is irregular, as both Péter Siptár (p.c.) and Miklós Törkenczy (p.c.) point out to me: the /t/ in *Attila* is short, in spite of what the spelling suggests, while the /l/ is long. The single or double *t* in the output forms is therefore without significance.

pronounced [sa:l] (Törkenczy 1989), although the former provably has a geminate in underlying representation (it appears on the phonetic surface under suffixation).[7]

Again we should like to note that the variation in mapping is the correct way of expressing the length variation: while it allows for geminate consonants becoming short under mapping, the opposite is not allowed, and indeed there are no instances of names with normal-length consonants which become geminated in the diminutive.

4.3. Vowel-initial names

It is often the case in reduplication systems that special provisos must be made for bases that start with a vowel. Although many languages allow syllable parsings like [V][CV..], in association procedures this sequence seems somehow marked in comparison to syllable combinations like [CV][CV..]. In this section we show how Hungarian DNF behaves in this respect.

Again we note that most vowel-initial names behave regularly: for example, *Árpád–Árpi, Eszter–Eszti*. There are 21 of such pairs in our database. However, in a number of cases the initial vowel seems to be skipped, or other strategies are employed to arive at the desired consonant-initial target. Often these occur side by side with regular targets (*Alfi* ~ *Frédi, Évi* ~ *Vica*, etc.). Note that consonant-initial targets are more likely to be obsolete or rare, so that these may reflect a historical constraint that has become laxed. In (24) we list all the irregular cases:

[7] It is also possible to account for the normal-length consonant here if we consider *Lili* not to be a case of regular association to the DNF template (12), but as a 'twin syllable echo name', like *Lajos–Lala, Zoltán–Zozo, Gellért–Gigi*. All of these were sporadically given by native speaker informants as alternatives to the *-i* diminutives in the questionnaire. We tentatively analyze these forms formally as the mapping of the base phonemes onto a **light syllable** template, given in (i):

(i) Echo template

$$\begin{array}{c}\sigma\\ |\\ \mu\\ \text{—}\end{array}$$

The syllable thus formed is copied, again resulting in a bisyllabic output. The medial consonants in *Zoltán*, etc., make the syllable heavy, and therefore cannot be associated. This analysis predicts that 'echo name formation' cannot preserve the long vowel of a long-vowel base. While this prediction is borne out for the cases known to me, more data are necessary to determine the exact status of (i) in Hungarian phonology.

(24)

Adorján	– Dóri (obs.)	Elek	– Lexi (obs.)
Albert	– Berci	Endre	– Bandi
Alfréd	– Frédi	Éva	– Vica
András	– Bandi	Ilona	– Lonci
Anna	– Panni	István	– Pisti, Pista
Antal	– Tóni	Ödön	– Dönci

We have noted above (section **3.1**) that 'segment' is nowadays a hazardous notion. Descriptions of reduplication and compensatory lengthening are more highly valued if reference to it can be avoided. Saying that in this case the initial **vowel** is skipped makes us expect cases in which the first **consonant** is skipped. However, this never seems to happen. A closer look at the data in (24) reveals that it is not the first segment, but in fact the entire first **syllable** that is skipped, e.g. in *Albert* and *Alfréd*. Again, therefore, reference to the segment can be avoided.

Additional evidence for 'syllable skipping' comes from the following cases:

(25) Margit – Gitta
Pongrác – Gráci
Zsófia – Fifi[8] (besides Zsófi)

Syllable skipping in these cases serves a pragmatic goal: in the case of *Margit*, regular DNF would produce *Mari*, which is already a diminutive of *Mária*. For *Pongrác*, syllable skipping avoids *Poni* (cf. *póni* 'pony, nag'), while regular *Pongi* is marginally attested here.

There are some more interesting cases in (24), which we will only briefly deal with here. Both for *Panni* and *Pisti*, *Pista* a /p/ is supplied, and for *Bandi* (from either *András* or *Endre*) it is a /b/. The diminutive *Tóni* obviously comes from earlier *Antónius*.

5. Conclusion

The analysis of diminutive name formation developed here provides unequivocal evidence that the shape of the diminutive-name morpheme is best defined in terms of a prosodic constituent. We have seen that mapping of the phonemes onto a foot template, the second syllable of which consisted of an invariant /i/, correctly derives the diminutive names of a set of base names that were

[8] After 'syllable skipping' this form is input to the 'echo name' template (cf. footnote 7).

problematic to an earlier analysis (Vago 1980). In our analysis no reference need be made to arbitrary sequences of phonemes.

In Hungarian mapping could take place in two ways: either segmental material is mapped together with its moraic structure, which accounts for preservation of long vowels and consonants. Strictly phonemic mapping results in shortening of these long segments. The variation in mapping correctly rules out a third logical possiblity, namely that of short vowels and consonants becoming long.

Finally, we saw that in a number of names starting with a vowel the first syllable was skipped in the association procedure, to result in a more favoured initial [CV] syllable. 'Syllable skipping' also appeared to serve some pragmatic ends. Hence, the particular analysis developed does not hinge on the notion 'segment', but provides ample evidence for the notion 'syllable'.

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Appendix

A preliminary list of pairs of names

Ádám	– Ádi
Adorján	– Dóri (obs.)
Ágnes	– Ági
Aladár	– Ali
Albert	– Berci
Alfréd	– Alfi
Alfréd	– Frédi
András	– Andi
András	– Bandi
Andrea	– Andi
Anna	– Anni, Ani
Anna	– Panni
Antal	– Tóni
Árpád	– Árpi
Attila	– Atti, Ati
Balázs	– Bazsi
Béla	– Béci (rare)
Bódog	– Bódi
Boldizsár	– Boldi
Csaba	– Csabi
Dániel	– Dani
Dénes	– Dini
Elek	– Lexi (obs.)
Emma	– Emmi, Emi
Endre	– Endi
Endre	– Bandi
Erzsébet	– Erzsi
Eszter	– Eszti
Éva	– Évi
Éva	– Vica
Ferenc	– Feri

Frigyes	– Frici
Gábor	– Gabi
Gabriella	– Gabi
Gáspár	– Gazsi
Gizella	– Gizi
Gusztáv	– Guszti
György	– Gyuri
Gyula	– Gyuszi
Hedvig	– Hédi
Ildikó	– Ildi
Ilona	– Ili
Ilona	– Lonci (rare)
Imre	– Imi
István	– Isti
István	– Pisti, Pista
János	– Jani
Jenő	– Jenci
József	– Józsi
Judit	– Juci
Júlia	– Juli
Kálmán	– Káli
Károly	– Karcsi
Katalin	– Kati
Krisztina	– Kriszti
László	– Laci
Lajos	– Laji (rare)
Lajos	– Lajcsi
Lídia	– Lidi
Lipót	– Lipi (obs.)
Lóránt	– Lóri
Lujza	– Lujzi
Margit	– Manci
Margit	– Gitta
Mária	– Mari
Márta	– Márti
Márton	– Marci
Mátyás	– Matyi
Mihály	– Misi
Miklós	– Miki

Nándor	– Nándi
Ödön	– Ödi
Ödön	– Dönci (rare)
Olivér	– Oli (rare)
Oszkár	– Oszi
Ottó	– Otti
Pál	– Pali
Péter	– Peti
Piroska	– Piri
Pongrác	– Gráci
Richárd	– Ricsi
Róbert	– Robi
Rudolf	– Rudi
Sándor	– Sandi (rare)
Sára	– Sári
Sarolta	– Sári
Sebestyén	– Sebi
Stefánia	– Stefi
Tamás	– Tomi
Teréz	– Teri
Tibor	– Tibi
Tivadar	– Tivi (rare)
Tünde	– Tündi
Viktória	– Viki
Vilmos	– Vili
Zoltán	– Zoli
Zsófia	– Zsófi
Zsolt	– Zsolti
Zsuzsa	– Zsuzsi
Zsuzsanna	– Zsuzsi

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(1) (a)	A	sólymaid	elszálltak
	the	falcon-gen-pl-2sg	away-flew-3pl
	‘Your falcons have flown away.’		

Examples can be referred to in the text as (1a), (1a–d), etc.

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