

Rhythmic Stress Alternation in Hungarian

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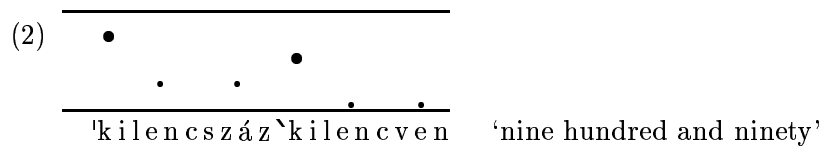
1 Stress in Hungarian

1.1 In its citation form, a Hungarian lexical word (*i.e.* non-function word) typically has one single primary stress, which falls on its first syllable, no matter whether the word is simple, *e.g.* `iskola 'school', or a derivative, *e.g.* `forrósodik 'grows hot', or a compound, *e.g.* `szénanátha 'hay fever'. There are two types of exception to this general stress rule. First, there is a marginal class of interjections which have one primary stress but it is not on the first syllable, *e.g.* a`há! 'I see!'. Second, there is a class of compound words (mostly but not exclusively numerals) which have primary stress on their first syllable (*i.e.* on the first syllable of their first element) and another primary stress on a later syllable (*i.e.* on the first syllable of their second element), as shown in (1):

- (1) a. 'tizen`egy 'eleven' 'huszon`egy 'twenty-one'
 'tizen`kettő 'twelve' 'harminc`kettő 'thirty-two'
 'tizen`három 'thirteen' 'negyven`négy 'forty-four'
 'tizen`négy 'fourteen' 'ötven`három 'fifty-three'
 'tizen`öt 'fifteen' 'hatvan`hét 'sixty-seven'
 'tizen`hat 'sixteen' 'hetven`öt 'seventy-five'
 'tizen`hét 'seventeen' 'kilencszáz`kilencven
 'tizen`nyolc 'eighteen' 'nine hundred and ninety'
 'tizen`kilenc 'nineteen' *etc.*
- b. 'ugyan`az 'the same'
 'ugyan`annyi 'the same amount'

In each example there is more than one stress-marked syllable. The syllable which is preceded by the stress mark ['] is primary-stressed and initiates a half-falling pitch contour, while the syllable preceded by the stress mark [˘] is primary stressed and initiates a fully falling pitch contour. The half fall and the full fall correspond to what Bolinger (1989:3) calls Profile A; the

only phonetic difference between the half fall and the full fall is that the latter, though not the former, reaches down to the base line of the speaker's voice, *cf.* (2):



1.2 The statement that certain compound words (as well as phrases and sentences) can have several primary stresses in Hungarian is probably surprising and needs a brief explanation. In my view, **a syllable is primary-stressed if it has some extra intensity and initiates a character tone**. By **character tones** I mean certain linguistically significant, recurring pitch contours, which are like Bolinger's pitch accents or profiles (1989). I divide the Hungarian character tones into two groups. In Group One we can find the "front-falling contours", *i.e.* the full fall, the half fall, the fall-rise), and the "end-falling contours" (*i.e.* the rise-fall, the high level-fall and the high descent-fall). Each of these character tones is initiated by a syllable which is primary-stressed by definition. If any syllable anywhere initiates (*i.e.* starts or carries) any of these character tones, the presence of that character tone is sufficient reason for regarding the initiating syllable as being primary-stressed because producing these contours is not possible without the initiating syllable having some extra intensity. The pitch contours in Group Two, however, are not so automatically identifiable as character tones. Group Two comprises the "sustained contours" (the high rise, the high level and the high descent); these contours are regarded as character tones only if they are initiated by a syllable which has perceptible extra intensity, in this case the initiating syllable will be regarded as primary-stressed. Otherwise, however, these contours will be regarded not as character tones but as high-pitched **introductory contours** and their first syllables will be analysed as unstressed. (For a detailed description of Hungarian character tones see Varga 1993:44-53; some of them have been described in English in Varga 1983).

So the first (or only) syllable within the string of syllables that carries a character tone is always **primary-stressed** (or main stressed), either because it initiates a particular contour (Group One) and concomitantly has extra intensity, or because it has perceptible extra intensity and initiates a particular contour (Group Two). When a syllable has perceptible

extra intensity but does not initiate any of the character tones, I will regard it as **secondary-stressed** (or minor stressed). All other syllables will be regarded as **unstressed** (or non-stressed). Both the secondary-stressed and the primary-stressed syllables have extra intensity as compared with the unstressed syllables. In addition to their extra intensity, the primary-stressed syllables are the initiators of character tones. But **the actual differences in the extra intensity of the secondary and primary-stressed syllables are ignored**, and thus **two primary-stressed syllables need not have identical intensity values**, nor is a primary-stressed syllable necessarily stronger in intensity than a secondary-stressed syllable. This three-degree stress system has been adopted in other works as well, *e.g.* in Vogel & Kenesei (1987).

There are other approaches to Hungarian stress too; Kálmán & Nádasdy (1994), for instance, do not recognise secondary stress, so their system consists of only two degrees: primary stress and non-stress. In their system, the stress-marked syllables in the examples of (1) are primary-stressed, just as in my system. On the other hand, É. Kiss (1987–88) proposes the cyclical application of the Hungarian version of the Nuclear Stress Rule and so in principle she recognises an infinite number of stress degrees. In her system, the first stress-marked syllable in each example of (1) receives [1stress] while the later stress-marked syllables receive [2stress], [3stress], *etc.*, depending on the level of embedding. We shall, however, regard all stress-marked syllables in the examples of (1) as primary-stressed, **independently of the actual intensity differences that may exist between them**, simply because they satisfy our definition of primary stress: they initiate character tones and have some extra intensity. The actual amount of extra intensity involved forms no part of our definition.

2 The facts of Rhythmic Stress Alternation in Hungarian

2.1 Since the compounds such as the ones in (1) contain two primary-stressed syllable, I will call them **double-stressed compounds**. They are either numerals (1a) or *ugyan*-words (1b). In this paper we will primarily examine how the stress patterns (internal prominence relations) of Hungarian double-stressed compounds change when they are embedded within phrases (or larger compounds). To the best of my knowledge, these questions have not been studied so far in Hungarian linguistics.

The stress patterns of double-stressed compounds, when they occur in their isolated or dictionary pronunciation, are like the stress patterns of phrases, *e.g.* the compound 'ötven`három 'fifty-three' is stressed like the phrase 'édes`álmom 'sweet dream'. This feature makes our double-stressed

compounds peculiar: the overwhelming majority of Hungarian compounds have just one initial primary stress.

The interesting thing about Hungarian double-stressed compounds is that, when they are embedded within a larger syntactic phrase (or a larger compound), their prominence relations may change in accordance with the nature of their linguistic environment. One or other of their primary stresses, *viz.* the one which is nearer to the primary stress of another word before or after them within the same phrase, can be systematically reduced to secondary stress or non-stress, to avoid a stress clash; see *e.g.* the stress behaviour of the word *tizenegy* in (3a), (3b) and (3c):

- (3) a. 'tizen`egy
 'eleven'
 b. 'tizenegy`kép
 eleven picture
 'eleven pictures'
 c. 'fél tizen`egy
 half eleven
 'half past ten'

The original primary–primary stress pattern of *tizenegy* in (3a) becomes primary–nonprimary in (3b) and nonprimary–primary in (3c), in accordance with the context. I will call these kinds of changes **Rhythmic Stress Alternation**. Rhythmic Stress Alternation creates different stress patterns for a double-stressed compound by reducing one of its primary stresses to secondary stress or non-stress. The primary stress to be reduced is the medial one in a sequence of three primary stresses in the phrase. Rhythmic Stress Alternation is never strictly obligatory but its likelihood is especially great when a primary-stressed syllable of a double-stressed compound is flanked by adjacent primary-stressed syllables on both sides. The reduction of the medial primary stress in this case, as shown in the (b) versions of the examples, is practically obligatory. The syntactic pattern can be [A [B C]] or [[B C] D], where [B C] stand for the two, originally primary-stressed elements of the compound.

- (4) a. 'pont `tíz `húsz
 exactly ten twenty
 'it's exactly 10:20'
 Pattern: [pont [tíz húsz]]
 [A [B C]]
- b. 'pont tíz `húsz

- (5) a. 'négy'öt `kérdés
 four five question
 'four or five questions'
 Pattern: [[négy-öt] kérdés]
 [[B C] D]
- b. 'négy-öt `kérdés

The process is also quite likely when one of the primary-stressed syllables of the double-stressed compound is separated from another primary-stressed syllable by one unstressed syllable on one side, while it is immediately adjacent to another primary-stressed syllable on the other side. Reduction of the medial primary stress as shown in the (b) versions of the following examples is quite likely. Examples (6–9) have the syntactic pattern [A [B C]], while examples (10–12) have [[B C] D].

- (6) a. 'száz'tizen`hat
 hundred sixteen
 '116'
 Pattern: [száz[tizen·hat]]
 [A [B C]]
- b. 'száztizen`hat
- (7) a. 'fél 'tizen`kettő
 half twelve
 'half past 11'
 Pattern: [fél [tizen·kettő]]
 [A [B C]]
- b. 'fél tizen`kettő
- (8) a. 'négy 'huszon`ötör
 four twenty-five+at
 'at 4:25'
 Pattern: [négy [huszon·ötör]]
 [A [B C]]
- b. 'négy huszon`ötör
- (9) a. 'pont 'ugyan`az
 exactly same
 'exactly the same'
 Pattern: [pont [ugyan·az]]
 [A [B C]]
- b. 'pont ugyan`az
- (10) a. 'tizen'hat `könyv
 sixteen book
 '16 books'
 Pattern: [[tizen·hat] könyv]
 [[B C] D]
- b. 'tizenhat `könyv

- (11) a. 'huszon'öt `ötvenért
 twenty-five fifty+for
 'for a price of 25.50'
 Pattern: [[huszon·öt] ötvenért]
 [[B C] D]

b. 'huszonöt `ötvenért

- (12) a. 'ugyan'az `tökben
 same marrow+in
 'it's twelve of one and a dozen of the other'
 Pattern: [[ugyan·az] tökben]
 [[B C] D]

b. 'ugyanaz `tökben

Rhythmic Stress Alternation is also quite normal when one primary-stressed syllable of a double-stressed compound is separated from the other primary-stressed syllables by one unstressed syllable on both sides, though perhaps less frequent than in the examples (4) to (12). Reduction of the medial primary stress is quite acceptable as you can judge from the (b) versions of (13–17). Examples (13–15) show the pattern [A [B C]], examples (16–17) display [[B C] D].

- (13) a. 'négy száz'ötven `kettő
 four hundred fifty-two
 '452'
 Pattern: [négy száz [ötven·kettő]]
 [A [B C]]
- b. 'négy százötven `kettő
- (14) a. 'negyed 'tizen `kettő
 quarter twelve
 'a quarter past eleven'
 Pattern: [negyed [tizen·kettő]]
 [A [B C]]
- b. 'negyed tizen `kettő
- (15) a. 'mindig 'ugyan `az
 always same
 'always the same'
 Pattern: [mindig [ugyan·az]]
 [A [B C]]
- b. 'mindig ugyan `az
- (16) a. a 'tizen'három `vértanú
 the thirteen martyr
 'the thirteen martyrs'
 Pattern: [[tizen·három] vértanú]
 [[B C] D]
- b. a 'tizenhárom `vértanú

- (17) a. 'ugyan'az a `kérdés
 same the question
 'the same question'
 Pattern: [[ugyan·az] a kérdés]
 [[B C] D]
- b. 'ugyanaz a `kérdés

It can happen that one primary-stressed syllable of the double-stressed compound is separated from the other primary stresses by more than one unstressed syllable on one or both sides. Rhythmic Stress Alternation, shown in the (b) versions, is less likely here than in the previous cases but is still possible.

- (18) a. 'kilencszáz'kilencven`három
 nine-hundred ninety-three
 '993'
 Pattern: [kilencszáz[kilencven·három]]
 [A [B C]]
- b. 'kilencszázkilencven`három
- (19) a. 'kilencven'három `szék
 ninety-three chair
 '93 chairs'
 Pattern: [[kilencven·három] szék]
 [[B C] D]
- b. 'kilencvenhárom `szék

2.2 Rhythmic Stress Alternation in Hungarian is not restricted to double-stressed compounds only. It seems that it can also apply to “double-stressed phrases”, in which one of the primary stresses falls on a lexical monosyllable at the beginning or end of the phrase, as in *e.g.* 'két `tojást 'two eggs'. For Rhythmic Stress Alternation to take place, these double-stressed phrases have to be embedded within larger phrases and immediately preceded or followed by a primary-stressed syllable. For instance:

- (20) a. 'végy 'két `tojást
 take two egg+ACC
 'take two eggs'
 Pattern: [végy [két tojást]]
 [A [B C]]
- b. 'végy két `tojást
- (21) a. egy 'nagy 'zöld `rét
 a big green meadow
 'a big green meadow'
 Pattern: egy [nagy [zöld rét]]
 [A [B C]]
- b. egy 'nagy zöld `rét

- (22) a. 'négy 'jó `évünk
 four good year+our
 'four good years of ours'
 Pattern: [négy [jó évünk]]
 [A [B C]]
- b. 'négy jó `évünk
- (23) a. a 'friss 'tej `szaga
 the fresh milk smell+its
 'the smell of fresh milk'
 Pattern: [[a friss tej] szaga]
 [[B C] D]
- b. a 'friss tej `szaga

2.3 We can sum up this section by saying that Rhythmic Stress Alternation abolishes the medial primary-stress in a phrase that underlyingly has three primary stresses, if the following conditions are met:

- (i) The medial primary stress is on the initial or final element of a double-stressed compound which is embedded in a phrase (or larger double-stressed compound); in this case it is immaterial how many unstressed syllables there are between the medial primary-stressed syllable and the outer primary-stressed syllables;
- (ii) The medial primary stress is on a lexical monosyllable which is part of a double-stressed phrase when this double-stressed phrase is embedded in an even larger phrase; in this case the medial primary-stressed syllable has to be adjacent to the outer primary-stressed syllables on both sides.

The medial primary stress is abolished by being reduced to secondary stress or non-stress.

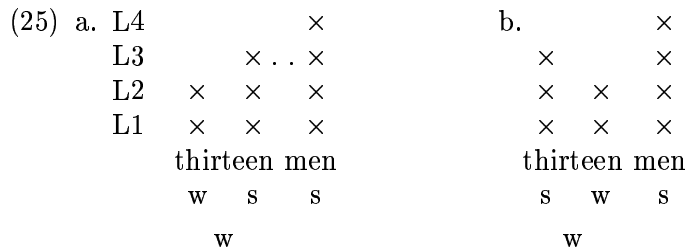
3 A grid-based account of Rhythmic Stress Alternation in Hungarian

3.1 The phenomenon of Rhythmic Stress Alternation in Hungarian clearly reminds us of a parallel phenomenon in English. For instance, the isolated or dictionary form ^o*thir`teen* of (24a) will be preserved in (24b), but will almost certainly change into ^o*thirteen* when it is embedded in the phrase *thirteen men*, as is shown in (24c). This is a well-known fact of English, cf. e.g. Gimson (1989:291).

- (24) a. ^o*thir`teen*
 b. ^o*just* ^o*thir`teen*
 c. ^o*thirteen* `men

In (24), I use the symbol [°] to indicate that the syllable which it precedes is secondary-stressed. (In many English descriptions we find the symbol ['] for secondary stress, but since I use that symbol for Hungarian primary-stressed syllables initiating a half fall, it cannot be used here.)

The variation illustrated in (24c) is the result of a process which Liberman & Prince call “Iambic Reversal” (1977:319), because an iambic (weak–strong) pattern turns into a trochaic one (strong–weak). In this process the originally weak–strong prominence pattern of a word changes into a strong–weak prominence pattern when the word is followed by an initially-stressed word in a phrase:



The tree-diagram of (25a) specifies the circumstance in which the English language grants permission for such a change to occur. But the motivation for the change cannot be seen in this tree. The motivation that actually triggers the change can only be represented in the **metrical grid** that you can see in the upper half of (25). The motivation is provided by the clash between two grid marks on Level 3. (They are connected by a dotted line in the diagram.) Two grid marks are clashing if they are adjacent at a grid level and their counterparts on the next lower level are also adjacent. The clash will lead to a reversal of the w and s nodes in the tree and eventually to a re-construction of the grid. The new tree and grid can be seen in (25b).

Iambic Reversal is the English counterpart of Hungarian Rhythmic Stress Alternation. It is not obligatory (*cf.* Hogg & McCully 1987:134). Nevertheless, since (25b) is more euphonious than (25a), it is very likely that the speaker’s subconscious eurhythmic considerations will lead him or her to choose the derived pattern (25b) rather than the more basic (25a).

In English, this reversal of weak and strong prominence is not restricted to numeral adjectives; a large number of simple words as well as derivatives, compounds and phrases embedded in larger phrases may also undergo the process, see *e.g.* °pontoon `bridge, °Dundee `marmalade,

° *academic* \ *discipline*, ° *good-looking* \ *tutor*, ° *three red* \ *shirts*, etc. (cf. Hogg & McCully 1987: 129-153).

Iambic Reversal has a vast literature in English linguistics. In addition to Liberman & Prince's tree-and-grid based account there are a large number of accounts proposed by other phonologists. These include *e.g.* Kiparsky's tree-based "Rhythm Rule" (1979: 424), Prince's grid-based "move x" (1983: 33), Selkirk's grid-based "Beat Movement" (1984: 168), as well as proposals by Hayes (1984), Giegerich (1985), and others.

On the basis of Selkirk (1984)'s grid-constructing rules (or Text-to-Grid Alignment Rules), the grid representations for (24a), (24b) and (24c) will be (26a), (26b) and (26c), respectively. However, (26c) cannot remain so, because it contains a grid clash, and so one of the Grid Euphony rules, *viz.* the rule that Selkirk calls Beat Movement will turn (26c) into (26c'):

(26) a.	$\begin{array}{cc} & \times \\ \times & \times \\ \times & \times \\ \text{thirteen} & \end{array}$	b.	$\begin{array}{ccc} & & \times \\ & \times & \times \\ \times & \times & \times \\ \times & \times & \times \\ \text{just thirteen} & & \end{array}$
c.	$\begin{array}{ccc} & & \times \\ & \otimes & \dots \times \\ \times & \times & \times \\ \times & \times & \times \\ \text{thirteen men} & & \end{array}$	→	c'. $\begin{array}{ccc} & & \times \\ & \times & \times \\ \times & \times & \times \\ \times & \times & \times \\ \text{thirteen men} & & \end{array}$

The clash is eliminated by "Beat Movement", which moves the offending grid mark (the one circled in the diagram) to the left, to produce the neatly alternating pattern of (26c').

Selkirk (1984: 168) defines "Beat Movement" for English as (27):

(27) **English Beat Movement**

$$\begin{array}{ccccc} & \underline{\times} & \times & & \underline{\times} & & \times \\ \times & \underline{\times} & \times & \rightarrow & \underline{\times} & \times & \times \end{array}$$

Condition: $\underline{\underline{\times}}$ is a weak beat (*i.e.* there is no \times over it)

In Selkirk's account there is no need for the metrical tree, the clash defined on the grid does not alter the tree first as in Liberman & Prince's account, but will alter the grid directly.

3.2 Now I wish to demonstrate that a particular version of Selkirk's universal theory of rhythmic patterns (1984: 53) provides a fairly good account of Hungarian Rhythmic Stress Alternation.

Let us first see how we can build grids for Hungarian utterances, on the basis of Selkirk's theory. Grid construction is primarily the job of Selkirk's universal Text-to-Grid Alignment Rules, but they have to be used in their special versions which are suitable for Hungarian. As a first step, each syllable of the utterance is aligned with a demibeat, *i.e.* aligned with a grid mark (×) on the bottom level (Level 1 or L1). This is the universal rule of **Demibeat Alignment** (DBA). In addition, junctural time units, *i.e.* "silent demibeats" are interpolated between certain syllables, also on L1. On the basis of Selkirk (1984: 314) we can formulate **Silent Demibeat Addition** (SDA) as (28):

(28) **Silent Demibeat Addition**

- Add a silent demibeat at the end of the metrical grid aligned with
- a. a word (this part of the rule is optional),
 - b. a word that is the head of a nonadjunct constituent,
 - c. a phrase (if it is not a single word),
 - d. a daughter phrase of sentence.

Since Hungarian shows a relative constancy in the duration of syllables in the utterance and a relative lack of vowel reduction, it can be regarded as a syllable-timed language. Consequently, when building rhythmic grids for Hungarian utterances, each syllable should be aligned not only with a demibeat on the bottom level (L1) but also with a basic beat on Level 2 (*cf.* Selkirk 1984: 41). The name that I will use for this process of aligning each syllable with a basic beat is **General Basic Beat Alignment** (GBBA). If we followed Selkirk's proposal and had a separate level for GBBA, then every syllable in every Hungarian grid would have at least two ×-es over it (as opposed to an English grid, where an unstressed syllable would have only one ×). This would unnecessarily increase the height of our grids. So instead of having a separate level for GBBA, we will telescope the level of DBA and the level of GBBA into one level: our Level 1. Our L1 then will contain grid marks which are simultaneously demibeats and basic beats, associated with the syllables of the Hungarian utterance, and it will also contain silent demibeats between some syllables.

After each syllable has been aligned with a grid mark on L1, we can create Level 2 (L2). This is the level of the **Initial Basic Beat Rule** (IBBR). The IBBR says that the first syllable of each word-root has to be aligned with a grid position on this level (*cf.* Selkirk 1984: 84). Then also on L2

Beat Addition (BA) takes place, which may affect not only sequences of beats but also sequences of silent demibeats (the latter optionally). Beat Addition is not a Text-to-Grid Alignment Rule but a Grid Euphony Rule: its task is to prevent longer sequences of unchanged prominence. The special Hungarian version of Beat Addition is right-dominant, proceeding from left to right. It can be formulated as (29):

(29) **Hungarian Beat Addition**

$$\begin{array}{ccccccc} & & & & & \times & \\ \times & \times & (\times) & \rightarrow & \times & \times & (\times) \\ \text{Right-dominant, L-R} & & & & & & \end{array}$$

(The English version is left-dominant and proceeds from right to left, *cf.* Selkirk 1984:87.) Level 3 (L3) is the level of Hungarian word stress: the Hungarian **Main Stress Rule** (MSR) will create a beat on L3 within the domain of each lexical word and this L3 beat will be aligned with the leftmost syllable of the word which has a beat associated with it on L2. (The English Main Stress Rule works in the opposite direction: it will promote that syllable of the lexical word which is aligned with the rightmost beat on the next lower level, see *op.cit.*:65–66.) And if the utterance is a phrase, then on Level 4 (L4) the Hungarian version of the **Nuclear Stress Rule** (NSR) will provide a beat for the main stressed syllable of the lexical word which is leftmost within the phrase. (Here again the English counterpart of the rule works in the opposite way: the English Nuclear Stress Rule will promote the rightmost constituent of the phrase.) Higher levels are also available; they are for the cyclical applications of phrase level rules.

So the grid for the phrase *csodálatos kopogtató* ‘wonderful door-knocker’, for instance, can be constructed in the following steps. (The underlined grid mark is a silent demibeat.)

- (30) a. DBA, SDA, GBBA: $\begin{array}{cccccccc} \times & \times & \times & \times & \underline{\times} & \times & \times & \times & \times \\ \text{csodálatos} & & & & & \text{kopogtató} & & & \end{array}$
- b. IBBR, BA: $\begin{array}{cccc} \times & \times & \times & \times \\ \text{DBA, SDA, GBBA:} & \times & \times & \times & \underline{\times} & \times & \times & \times & \times \\ \text{csodálatos} & & & & & \text{kopogtató} & & & \end{array}$
- c. MSR: $\begin{array}{cccc} \times & & \times & \\ \text{IBBR, BA:} & \times & \times & \times & \times \\ \text{DBA, SDA, GBBA:} & \times & \times & \times & \underline{\times} & \times & \times & \times & \times \\ \text{csodálatos} & & & & & \text{kopogtató} & & & \end{array}$

d. NSR:	×			
MSR:	×		×	
IBBR, BA:	×	×	×	×
DBA, SDA, GBBA:	×	×	×	×
	×	×	×	×
	csodálatos		kopogtató	

Double-stressed compounds have a peculiar status: with regard to their stressing they count as phrases and are subject to the NSR, but with regard to their silent demibeat requirement they behave like words, *i.e.* will have just one silent demibeat after them.

So the grid for *tizenhárom képeslap* ‘thirteen picture postcards’ will be (31):

(31)	×			
NSR:	×		×	
MSR:	×	×	×	
IBBR, BA:	×	×	×	×
DBA, SDA, GBBA:	×	×	×	×
	×	×	×	×
	tizenhárom		képeslap	

Here the prominence of *ké-* has been raised to L4 to make it equal with the prominence of *ti-* because, though *tizenhárom* is stressed like a phrase, it is still a word, with which the word *képeslap* must have equal status. When this promotion of *képeslap* has been done, the NSR will apply again, this time to the entire phrase *tizenhárom képeslap*.

Let us construct the grid for the phrase *egy magyar orvos sikere* ‘the success of a Hungarian doctor’ (where the words are: *egy* ‘a(n)’, *magyar* ‘Hungarian’, *orvos* ‘physician’, *sikere* ‘success+his’).

(32)	×				
NSR:	×				×
MSR:	×		×		×
IBBR, BA:	×		×	×	×
DBA, SDA, GBBA:	×	×	×	×	×
	×	×	×	×	×
	egy magyar		orvos		sikere

In (32), the silent demibeat after *magyar* is due to clause (a) of Silent Demibeat Addition (28), and the silent demibeats after *orvos* are due to clauses (a), (b), and (c) of Silent Demibeat Addition (28). The silent demibeat on L2 is created by Beat Addition (29).

Whenever a syllable is associated with a grid mark on the level of the Main Stress Rule (our L3), that syllable will start a character tone

and is, according to our definition, primary stressed. In (30) there are two primary stressed syllables and the primary stress on the left is stronger than the primary stress on the right: 'csodálatos `kopogtató. In (31) and (32) there are three primary stresses; the first is the strongest, the second the weakest, and the third the second strongest: 'tizen'három `képeslap, egy 'magyar 'orvos `sikere.

When the highest grid mark associated with a syllable is on the level of the Initial Basic Beat Rule and Beat Addition (*i.e.* on our L2), the syllable is secondary stressed. And when a syllable is associated only with a grid mark on the General Basic Beat Alignment Rule (*i.e.* on our L1), the syllable is unstressed.

3.3 We can account for all cases of Hungarian Rhythmic Stress Alternation if we allow two Grid Euphony rules to apply to the Hungarian grid. These are the Hungarian version of Beat Movement, given as (33), and the Hungarian version of Beat Deletion, given as (34). Both rules are Grid Euphony rules and both of them are optional.

(33) **Hungarian Beat Movement**

$$\begin{array}{ccccccc} \times & \underline{\underline{\times}} & & & \times & & \underline{\underline{\times}} \\ \times & \underline{\underline{\times}} & \times & \rightarrow & \times & \times & \underline{\underline{\times}} \end{array}$$

Condition: $\underline{\underline{\times}}$ is a weak beat (*i.e.* there is no \times over it)

(34) **Hungarian Beat Deletion**

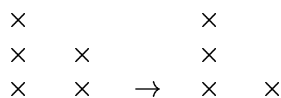
$$\begin{array}{ccccccc} & & \times & & & & \times \\ \times & & \times & & & & \times \\ \times & & \times & \rightarrow & \times & & \times \\ 1 (. . .) 2 & & & & 1 (. . .) 2 & & \end{array}$$

Conditions: a. 1 is the first syllable of the initial or final member of a double-stressed compound,
b. 1 is a lexical monosyllable and the syllable before it is represented at L3 or higher.

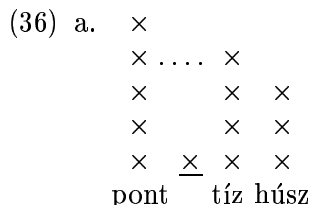
It has to be noted that these conditions, though necessary, make the Hungarian Beat Deletion Rule somewhat peculiar. In Selkirk's view, grid euphony rules, including Beat Deletion, "are defined solely in terms of the grid, make no reference to the properties of the text" (1984:56). Hungarian Beat Deletion does seem to need information outside the grid. This is obviously because Rhythmic Stress Alternation in Hungarian is much more restricted lexically than its English counterpart, Iambic Reversal.

Both (33) and (34) are the mirror images of their English counterparts. The Hungarian Beat Movement Rule cancels a grid clash by moving a grid mark to the right, its English counterpart (27) does the same by moving a grid mark to the left. The Hungarian Beat Deletion Rule deletes a beat on the left, whereas its English counterpart deletes a beat on the right. Selkirk (1984:56, 69) defines English Beat Deletion as (35):

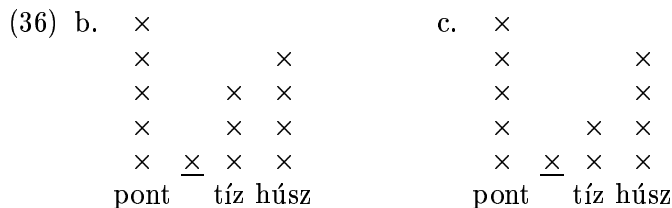
(35) **English Beat Deletion**



3.4 Hungarian Beat Movement (33) and Beat Deletion (34) are both needed for the production of Rhythmic Stress Alternation in phrases of the pattern [A [B C]]. Let us demonstrate the work of these two rules on a few examples. The first example is the phrase *pont tíz húsz* ‘exactly ten twenty’ (where *pont* means ‘exactly’, *tíz* means ‘ten’ and *húsz* means ‘twenty’). Underlyingly, the grid is (36a), containing a clash:



Now Beat Movement will cancel the clash and turn (36a) into (36b) and then Beat Deletion will turn (36b) into (36c):



Simplification is possible by “verticality reduction”, *i.e.* by removing excess verticality in (36c). Though Selkirk mentions this process (1984:106–107), she does not specify it. I will define it as the reduction of the weakest primary stress to a column of three \times -es and simultaneously shortening the columns of the other primary stresses so that their relative strengths are preserved in the representation. The simplified version is (36d), which is

susceptible to Beat Deletion, to produce (36e). This is stressed as: 'pont tíz`húsz.

(36) d.	$\begin{array}{cccc} \times & & & \\ \times & & & \times \\ \times & & \times & \times \\ \times & \underline{\times} & \times & \times \\ \text{pont} & \text{tíz} & \text{húsz} & \end{array}$	e.	$\begin{array}{cccc} \times & & & \\ \times & & & \times \\ \times & & & \times \\ \times & \underline{\times} & \times & \times \\ \text{pont} & \text{tíz} & \text{húsz} & \end{array}$
---------	--	----	---

Let us now build the underlying grid for *fél tizenegy* 'half past ten' (where *fél* means 'half' and *tizenegy* means 'eleven'). Again, there is a clash, which has to be resolved.

(37) a.	$\begin{array}{cccc} \times & & & \\ \times & \dots & \times & \\ \times & \times & \times & \\ \times & \times & \times & \\ \times & \underline{\times} & \times & \times & \times \\ \text{fél} & \text{tizenegy, stressed as: 'fél 'tizen`egy.} & & & \\ [\text{A} & [\text{B} & \text{C}]] & & \end{array}$
---------	--

If (37a) is submitted to Beat Movement, it will become (37b), which may then be submitted to Beat Deletion, and we will get (37c), which, after verticality reduction, will become (37d). This is stressed as 'fél °tizen`egy. ([°] indicates secondary stress.)

(37) b.	$\begin{array}{cccc} \times & & & \\ \times & & & \times \\ \times & \times & \times & \\ \times & \times & \times & \\ \times & \underline{\times} & \times & \times & \times \\ \text{fél} & \text{tizenegy} & & & \end{array}$	c.	$\begin{array}{cccc} \times & & & \\ \times & & & \times \\ \times & & & \times \\ \times & \times & \times & \\ \times & \underline{\times} & \times & \times & \times \\ \text{fél} & \text{tizenegy} & & & \end{array}$	d.	$\begin{array}{cccc} \times & & & \\ \times & & & \times \\ \times & \times & \times & \\ \times & \times & \times & \\ \times & \underline{\times} & \times & \times & \times \\ \text{fél} & \text{tizenegy} & & & \end{array}$
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To illustrate the case where the syllable to be destressed is flanked by one unstressed syllable on both sides, take the phrase *negyed tizenegy* 'a quarter past ten' (where *negyed* means 'quarter' and *tizenegy* means 'eleven'). The underlying grid is (38a), containing a clash:

(38) a. ×
 × ×
 × × ×
 × × ×
 × × × × × ×
 negyed tizenegy, stressed as: 'negyed 'tizen`egy
 [A [B C]]

When Beat Movement has operated on (38a), we get (38b). This may then be submitted to Beat Deletion and the result will be (38c):

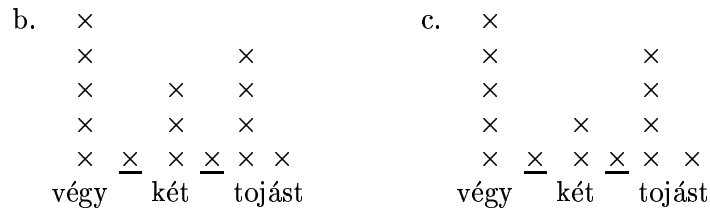
<p>(38) b. × × × × × × × × × × × <u>×</u> × × × negyed tizenegy</p>	<p>c. × × × × × × × × × × <u>×</u> × × × negyed tizenegy</p>
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If we remove excessive verticality, we get (38d):

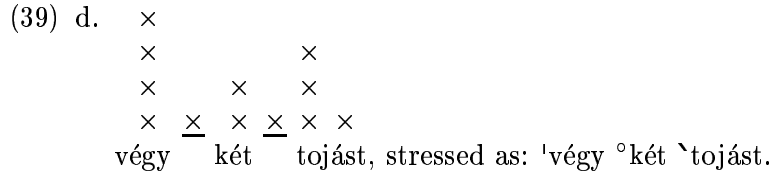
(38) d. ×
 × ×
 × × ×
 × × × × × ×
 negyed tizenegy, stressed as: 'negyed °tizen`egy

Now let us construct the grid for *végy két tojást* 'take two eggs'. In the initial grid (39a) there will be a clash, which will be cancelled by Beat Movement, so that (39b) will arise. Beat Deletion is possible (Condition b of (34) is met) and will reduce the medial primary stress (39c):

(39) a. ×
 × . . . ×
 × × ×
 × × ×
 × × × × × × ×
 végy két tojást, stressed as: 'végy 'két `tojást.
 [A [B C]]

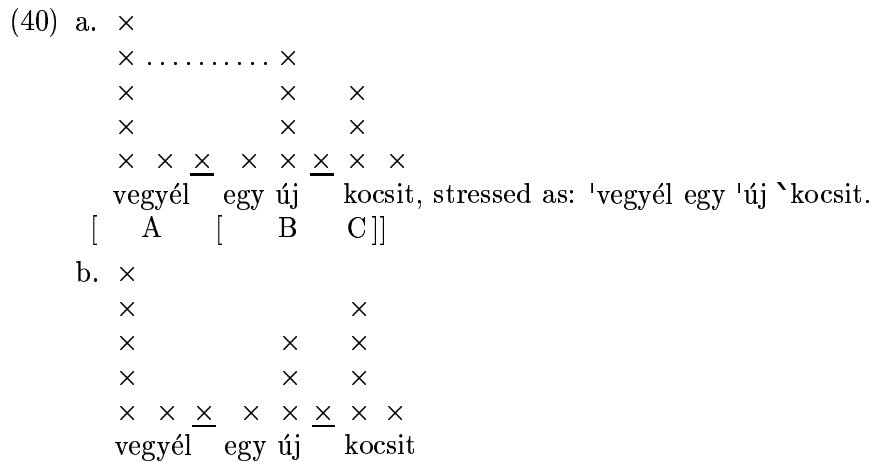


After verticality reduction the result will be (39d):



However, the silent demibeats in (39d) are not obligatory. If they are not there, *két* can become unstressed through another application of Beat Deletion: 'végy két `tojást.

Now, if we take the phrase *vegyél egy új kocsit* 'buy a new car' (where *vegyél* means 'buy', *egy* means 'a(n)', *új* means 'new' and *kocsit* means 'car+ACC. '), the initial representation will be: (40a). After Beat Movement we get (40b):



But (40b) cannot be submitted to Beat Deletion because it does not meet Condition b of the Hungarian Beat Deletion Rule (34). So it remains stressed as 'vegyél egy 'új `kocsit, even though the primary stress on *új* is now less strong than it was in (40a), and the primary stress on *kocsit* is now stronger than it was in (40a).

3.5 And now, let us construct grids for phrases with the pattern [[B C] D]. In these, Hungarian Beat Deletion (34) alone is responsible for Rhythmic Stress Alternation. The first example will be the phrase *tizenegy kép* ‘eleven pictures’. The word *tizenegy* ‘eleven’ is a double-stressed compound and so it is stressed like a phrase but takes only one (optional) silent demibeat after it, as a word does. The clash in the underlying grid (41a) cannot be resolved by Beat Movement. However, Beat Deletion can take place and the result is (41b):

- (41) a. \times
 \times \times
 \times \times \times
 \times \times \times
 \times \times \times $\underline{\times}$ \times
 tizenegy kép, stressed as: 'tizen'egy `kép.
 [[B C] D]
- b. \times
 \times \times
 \times \times
 \times \times \times
 \times \times \times $\underline{\times}$ \times
 tizenegy kép

Simplification of (41b) is possible by removing excess verticality. The simplified version is (41c):

- (41) c. \times
 \times \times
 \times \times \times
 \times \times \times $\underline{\times}$ \times
 tizenegy kép, stressed as: 'tizen^oegy `kép.

When the optional silent demibeat in (41c) is not present, the syllable *egy* may become unstressed, through another application of the Beat Deletion Rule: 'tizenegy `kép.

The next example will contain the lexical monosyllable *nő* ‘woman’, in the phrase *egy finn nő élete* ‘the life of a Finnish woman’ (where *egy* means ‘a(n)’, *finn* means ‘Finnish’ and *élete* means ‘life+her’).

(42) a.

×									×
	×								×
		×	×						×
		×	×	<u>×</u>			×	×	
×	×	<u>×</u>	×	<u>×</u>	<u>×</u>	<u>×</u>	×	×	×
egy	finn	nő					é	lete,	stressed as: egy 'finn 'nő `élete.
[[B	C]				D]	

In (42a), the silent demibeat after *finn* is due to clause (a) of Silent Demibeat Addition (28), and the silent demibeats after *nő* are due to clauses (a–c) of Silent Demibeat Addition (28). The silent demibeat on L2 is optionally created by Beat Addition (29). If this extra silent demibeat on L2 is present, Beat Deletion cannot take place, but if it is not present, Beat Deletion turns (42a) into (42b), which may in turn be submitted to simplification by removing excessive verticality to produce (42c), stressed as: *egy 'finn °nő `élete*.

(42) b.

×									×
	×								×
		×	×					×	×
×	×	<u>×</u>	×	<u>×</u>	<u>×</u>	<u>×</u>	×	×	×
egy	finn	nő					é	lete	

c.

×									×
	×								×
		×	×					×	×
×	×	<u>×</u>	×	<u>×</u>	<u>×</u>	<u>×</u>	×	×	×
egy	finn	nő					é	lete	

It seems that with our rules of Beat Movement and Beat Deletion we can adequately explain the cases in which Rhythmic Stress Alternation occurs. In addition, with these rules we can give a fairly good account of when and why Rhythmic Stress Alternation does not occur. For instance, Rhythmic Stress Alternation is not possible in (43) (*cf.* (32)):

(43)

×									×		
	×								×		
		×		×					×		
		×		×		<u>×</u>		×	×		
×	×	×	<u>×</u>	×	×	<u>×</u>	<u>×</u>	<u>×</u>	×	×	×
egy	magyar			orvos				sikere			
[[B	C				D]]

In (43) the word *orvos* is not a lexical monosyllable, besides the syllable before it is not represented on L3 or higher, so Condition b of the Hungarian Beat Deletion Rule (34) is not met, even if the optional silent demibeat on L2 (which can get there by Beat Addition) is not actually there. Consequently Beat Deletion is blocked and the syllable *or-* cannot lose its primary stress: *egy 'magyar 'orvos `sikere*.

If the Hungarian Beat Deletion Rule (34) were not constrained by Conditions a and b, the syllable *or-* could lose its primary stress, because the silent demibeat on L2, being optional, would not necessarily prevent Beat Deletion from taking place. However, the result (*egy 'magyar °orvos `sikere*) would not be a neutral stressing for the phrase.

4 Summary

In this paper I have examined the stress behaviour of double-stressed constituents in Hungarian (*i.e.* double-stressed compounds, *e.g.* *'tizen`hat* 'sixteen'; and double-stressed phrases containing a lexical monosyllable, *e.g.* *'friss `tej* 'fresh milk'), when they are embedded within larger phrases, as *e.g.* in (44):

- (44) a. *'tizen°hat `szék* 'sixteen chairs'
 b. *'mind a °tizen `hat* 'all sixteen'
 c. a *'friss tej `szaga* 'the smell of fresh milk'
 d. *'van friss `tej* 'there is some fresh milk'

When such double-stressed constituents are embedded within larger phrases, they may lose their primary stress which is nearer to the primary stress of another word before or after them within the matrix phrase. The result is Rhythmic Stress Alternation. For the analysis of Rhythmic Stress Alternation in Hungarian I have adopted Selkirk's grid-only model (1984) and found that Beat Movement, Beat Deletion and Beat Addition in Hungarian work in the opposite direction to their English counterparts, and that Beat Deletion in Hungarian is not an automatic Grid Euphony rule but a rule which has to be constrained. The grid-only analysis has proved successful, but we do not know whether or not it is superior to other possible analyses (tree-only or tree-and-grid). This question requires further research.

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