

Experimental evidence for stress and accent assignment at morphological constituent boundaries in Hungarian

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Outline of the talk

I. Problems of prosodic constituency

- Prosodic phrases: cues to prosodic structure
- Mismatches between syntactic and prosodic structure
- Structural hierarchy vs. linearity of elements

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II. Prosodic boundaries within phonological phrases:

- the role of duration (temporal variation)
- the role of *F0* (tonal variation):
embedding, insertion, NP-formation
- the role of intensity

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III. Stress: its experimental manifestation

- primary stress
- secondary stress/accent

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IV. Conclusions

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I.1 Prosodic phrases: cues to prosodic structure

- The primary function of prosody: to divide the stream of speech into chunks/phrases
- means of division (boundary markers):
clear pause accompanied by a local *F0* fall or rise
subtle local slowing or pitch change

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- NB! Although IP boundaries must be audible, they are often hard to identify and hard to locate unambiguously (false positives, false negatives)

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- In addition to boundary markers, IPs are frequently assumed to have an internal prosodic structure—an intonational tune, a DTE (Designated Terminal Element), etc.
- These physical elements refer in a way to abstract objects (as sounds refer to phonemes) but lack the feature system of the latter

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1.2 Mismatches between syntactic and prosodic structure

- Chomsky and Halle (1968):

[[This is [the dog |that chased [the cat |that killed [the rat |that ate [the malt |that lay in [the house that Jack built]]]]]]]]

(assumption: this is the result of attempting

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1.3 Structural hierarchy vs. linearity of elements

(cf. an overview in Truckenbrodt 1999, 2007)

- Selkirk (1984): SLH (Strict Layer Hypothesis)

In a prosodic tree, any domain at a given level of hierarchy consists exclusively of domains at the next lower level of the hierarchy.

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II. Prosodic boundaries within phonological phrases

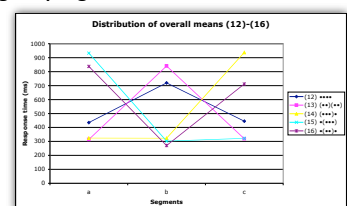
- the role of duration (temporal variation)

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2.1 The role of duration (temporal variation) in abstract grouping

2.1.1 The grouping of abstract visual elements

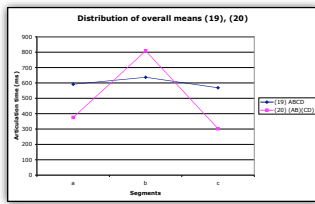
- (12) ●●●●
- (13) (●●)(●●)
- (14) (●●●)●
- (15) ●(●●●)
- (16) ●(●●)●



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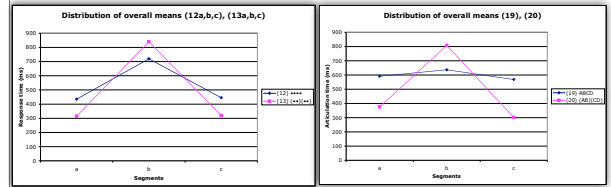
2.1.2 The grouping of abstract prosodic elements

(19) A B C D
(20) (AB) (CD)



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Grouping is inherent



(12) ●●●●
(13) (●●)(●●)

(19) A B C D
(20) (AB) (CD)

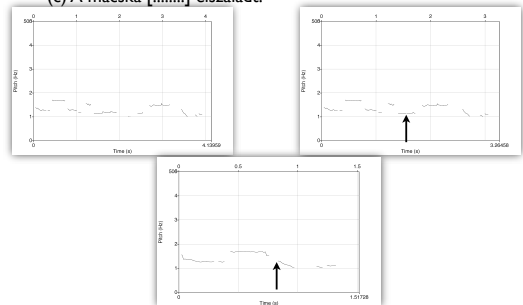
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- the role of *F0* (tonal variation):
embedding, insertion, NP-formation

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2.1.3. Embedding

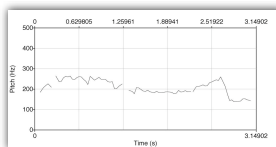
- (a) A macska, amit a kutya, ami megveszett, megharapott, elszaladt.
- (b) A macska, amit a kutya [.....] megharapott, elszaladt.
- (c) A macska [.....] elszaladt.



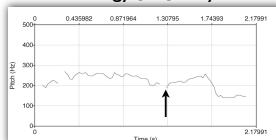
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2.1.4 Insertion and tonal continuity

- (a) Meg tudnád mondani, hogy - az én óráim megállt - hány óra van?
'Could you tell me – my watch has stopped – what time it is?



- (b) Meg tudnád mondani, hogy [.....] hány óra van?



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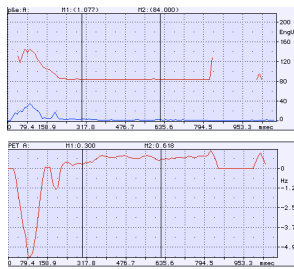
The phonetic property of stress: PET

PET = Pitch and Energy over Time
a waveform with a sequence of points:

Pitch_{norm t1} – Energy_{norm t1}, Pitch_{norm t1+l} – Energy_{norm t1+l}, ...
Pitch_{norm tn} – Energy_{norm tn}

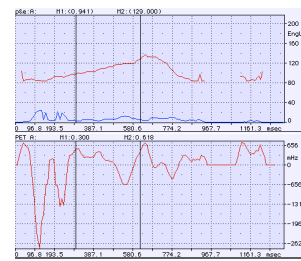
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The phonetic property of stress: PET



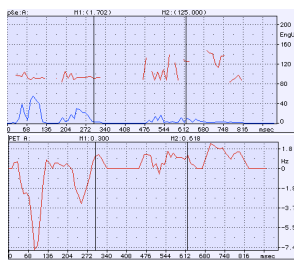
'Valamennyien eljöttek.
'All of them came.'

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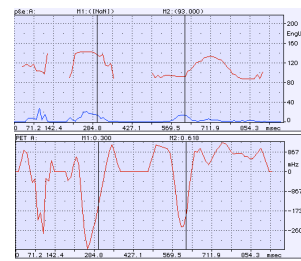
Valamennyien 'eljöttek.
'Some of them came.'

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'Akarsz valamit?
'Do you want something?'

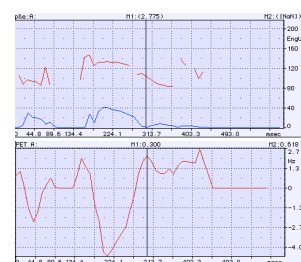
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'Akarsz 'valamit?
'You do want something?'

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Stress at morphological boundaries

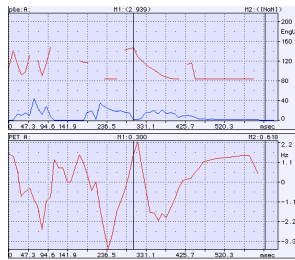


a karom
'my arm'

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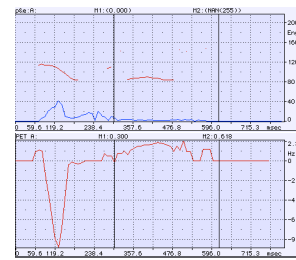
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Secondary stress



Akarom?
'Do I want it?'

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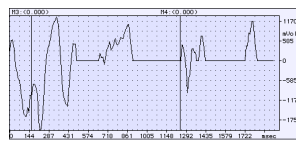


'halá,lian
'enormously' ("deadly")

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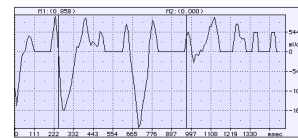


Amit **mondtát**, teljesen igaz.
'What you said is fully true.'

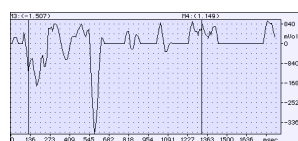


A **mondtott tál** felborult.
'The said bowl has fallen over.'

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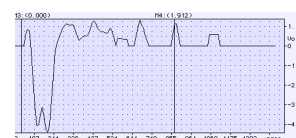
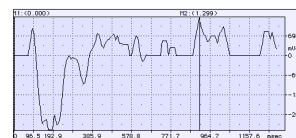
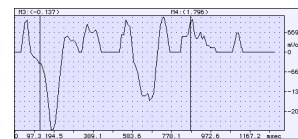


Száguldozhatok **nélküled**.
'I can rush without you.'

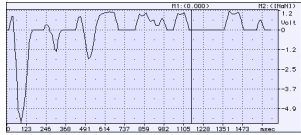


Száguldozhat **ok nélkül**.
'He can rush without reason.'

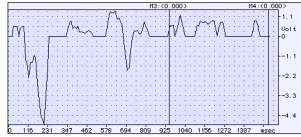
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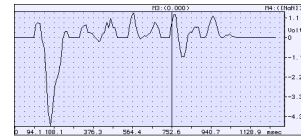
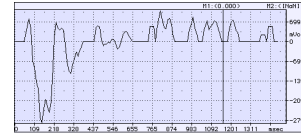


Érzelhető ez a hatás.
 'This effect is noticeable.'

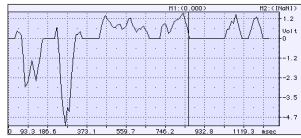


Kertészből hat ás.
 'For gardeners, six are digging.'

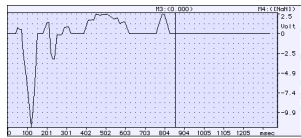
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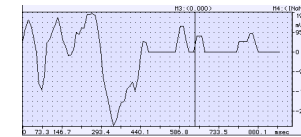
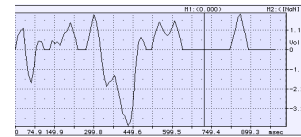


Ez a háza szép.
 'This house of his is beautiful.'

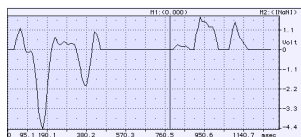


Ez a ház a szép.
 'This house is the beautiful one.'

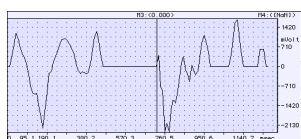
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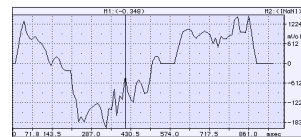


Jönnek a rabok.
 'The prisoners are coming.'

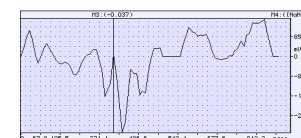


Jönnek arabok.
 'Arabs are coming.'

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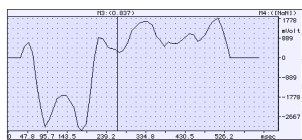
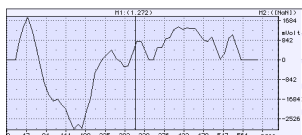


Jól egyél!
 'Eat well!'

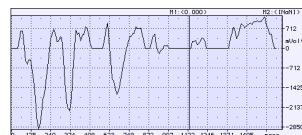


Jó legyél!
 'Be good!'

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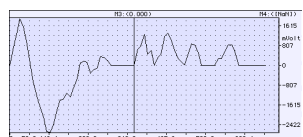
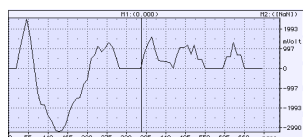


Olvastatgathatnál.
'You could frequently let (someone) read'

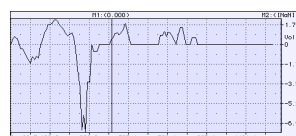


Olvastatgathatnál.
'You could let (someone) read frequently'

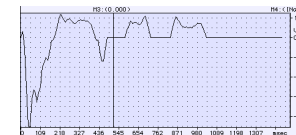
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Olvashatnál.
'You could read.'



Olvas 6-nál.
'He reads at (?) 6.'

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IV. Conclusions

- stress and duration to match morphological and prosodic structure
- mismatches between morphological and prosodic structure: limitations due to main stress assignment
- performance: desegmentation of phonological words can disambiguate

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References

Abecasis et al. 2005: Abecasis D., Brochard R., Granot R. and C. Drake. Differential brain response to metrical accents in isochronous auditory sequences. *Music Perception* 22, 3, 549-562.

Chomsky, Noam and Morris Halle (1968). *The Sound Pattern of English*. New York, Harper and Row

Cooper & Sorensen (1981): Fundamental frequency in sentence production. New York and Berlin, Springer

Clifton, Charles, Jr., Katy Carlson and Lynn Frazier (2002). Informative prosodic boundaries. *Language and Speech* 45, 2, 87-114

Hanser, Marc D., Noam Chomsky and W. Tecumseh Fitch (2002). The faculty of language: What is it, who has it, and how did it evolve? *Science* 298, 1569-1579.

Hayes, Bruce (1984). The phonology of rhythm in English. *Linguistic Inquiry* 15:3-74.

Hunyadi 2002: *Hungarian Sentence Prosody and Universal Grammar*. Peter Lang

Hunyadi 2006: Grouping, the cognitive basis of recursion in language. *Argumentum*, 2 (2006), Debrecen, 67-114.

Hunyadi 2007: Cognitive grouping and recursion in prosody. To appear in: Harry van der Hulst, *Recursion and Language*. Mouton, 2009

Ladd, D. Robert (1996). *Intonational Phonology*. Cambridge University Press

Lieberman, Mark and Alan Prince (1977). On stress and linguistic rhythm. *Linguistic Inquiry* 8:249-336.

Selkirk, Elisabeth (1984). *Phonology and Syntax: the relation between sound and structure*. Cambridge, MA, MIT Press

Truckenbrodt, Hubert (1999). On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30:219-255.

Truckenbrodt, Hubert (2007). The syntax-phonology interface. In *The Cambridge Handbook of Phonology*, Lacy P. de (ed.), 435-456.

Wagner, Michael (2007). Prosody and recursion in coordinate structures and beyond. Paper presented at the conference *Recursion in Human Languages in Normal, Illinois*

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