

Vowel quantity distinction and temporal cues of accentuation: a comparative study of Czech and Hungarian

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English

Example

What happened? **The dog bit Peter in the garden.**

- agent: the dog
- action: bit
- patient: Peter
- location: in the garden

Discrete syntactical units (prefix, definite article).



English

Example

What happened? The dog bit Peter in the garden.

- agent: the dog
- action: bit
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Discrete syntactical units (prefix, definite article).



German

Example

What happened? **Der Hund hat Peter im Garten gebissen.**

- agent: der Hund (the dog)
- action: hat ... gebissen (did bite)
- patient: Peter
- location: im Garten (in+the garden)

Discrete syntactical units (prefix, case and gender by definite article).



German

Example

What happened? **Der Hund** hat **Peter** **im Garten** gebissen.

- agent: der Hund (the dog)
- action: hat ... gebissen (did bite)
- patient: Peter
- location: im Garten (in+the garden)

Discrete syntactical units (prefix, case and gender by definite article).



Czech

Example

What happened? **Pes pokousal Petra na zahradě.**

- agent: pes (dog)
- action: pokousal (bit)
- patient: Petra (Petr+accusative)
- location: na zahradě (on garden+locative)

Discrete syntactical units (prefix) + suffixes (case marker).



Czech

Example

What happened? **Pes** **pokousal** **Petra** **na** **zahrade**.

- agent: pes (dog)
- action: pokousal (bit)
- patient: Petra (Petr+accusative)
- location: na zahradě (on garden+locative)

Discrete syntactical units (prefix) + suffixes (case marker).



Estonian

Example

What happened? **Koer hammustas aias Peetrit.**

- agent: koer (dog)
- action: hammustas (bit)
- patient: Peetrit (Peeter+reduction+suffix+suffix)
- location: aias (aed+suffix+suffix)

Suffixes (case??? marker).



Estonian

Example

What happened? Koer hammustas aias Peetrit.

- agent: koer (dog)
- action: hammustas (bit)
- patient: Peetrit (Peeter+reduction+suffix+suffix)
- location: aias (aed+suffix+suffix)

Suffixes (case??? marker).



Hungarian

Example

What happened? *A kutya megharapta Pétert a kertben.*

- agent: a kutya (the dog)
- action: megharapta (prefix+bit)
- patient: Pétert (Péter+suffix)
- location: a kertben (the garden+suffix)

Discrete syntactical units (definite article) + suffixes (case??? marker).



Hungarian

Example

What happened? A kutya megharapta Pétert a kertben.

- agent: a kutya (the dog)
- action: megharapta (prefix+bit)
- patient: Pétert (Péter+suffix)
- location: a kertben (the garden+suffix)

Discrete syntactical units (definite article) + suffixes (case??? marker).



Thetic sentence (neutral word order)

What happened?

ENG:	The dog	bit	Peter	in the garden.	
GERM:	Der Hund	hat	Peter	im Garten	gebissen.
CZECH:	Pes	pokousal	Petra	na zahradě.	
HUNG:	A kutya	megharapta	Pétert	a kertben.	
EST:	Koer	hammustas	aia	Peetrit.	

Focusing on the agent

Who bit Peter?

ENG: The dog bit Peter in the garden.

GERM: Der Hund hat Peter im Garten gebissen.

Alternative: grammatical modifications.

- explicit focus: It was the dog who bit Peter in the garden.
- passivation: Peter wurde im Garten vom Hund gebissen.

Focusing on the agent

Who bit Peter?

CZECH:	Petra	pokousal	na zahradě	pes.
	Petra	na zahradě	pokousal	pes.
	Na zahradě	pokousal	Petra	pes.
	Na zahradě	Petra	pokousal	pes.

Focus marked by utterance-final position.

Focusing on the agent

Who bit Peter?

EST: Koer hammustas Peetrit aias.

Focusing on the agent

Who bit Peter?

HUNG:	A kutya	harapta	meg	Pétert	a kertben.
	A kutya	harapta	meg	a kertben	Pétert.
	A kertben	a kutya	harapta	meg	Pétert.
	Pétert	a kutya	harapta	meg	a kertben.
	A kertben	Pétert	a kutya	harapta	meg.
	Pétert	a kertben	a kutya	harapta	meg.

No other order than *a kutya harapta meg* possible.

Focusing on the patient

Whom did the dog bite?

ENG:	The dog	bit	Peter	in the garden.	
GERM:	Der Hund	hat	Peter	im Garten	gebissen.
	Der Hund	hat	im Garten	Peter	gebissen.
	Peter	hat	der Hund	im Garten	gebissen. (?)

Alternative: grammatical modifications.

- explicite focus: It was Peter whom the dog bit in the garden.
- passivation: Peter wurde im Garten vom Hund gebissen.

Focusing on the patient

Whom did the dog bite?

CZECH: Pes pokousal na zahradě Petra.
Na zahradě pes pokousal Petra.

Focusing on the patient

Whom did the dog bite?

EST:	Koer	hammustas	aias	Peetrit.
	Koer	hammustas	Peetrit	aias.
	Peetrit	hammustas	koer	aias. (literary)

Focusing on the patient

Whom did the dog bite?

HUNG:	Pétert	harapta	meg	a kutya	a kertben.
	Pétert	harapta	meg	a kertben	a kutya.
	A kertben	Pétert	harapta	meg	a kutya.
	A kertben	Pétert	harapta	meg	a kutya.
	A kutya	a kertben	Pétert	harapta	meg.
	A kertben	a kutya	Pétert	harapta	meg.

No other order than *Pétert harapta meg* possible.

Focusing on the location

Where did the dog bite Peter?

ENG:	The dog	bit	Peter	in the garden.	
GERM:	Der Hund	hat	Peter	im Garten	gebissen.
	Im Garten	hat	der Hund	Peter	gebissen.

Alternative: grammatical modifications.

- explicite focus: **It was in the garden** where/that the dog bit Peter.
- no passivation appropriate here.

Focusing on the location

Where did the dog bite Peter?

CZECH: Petra pokousal pes na zahradě.
Pes pokousal Petra na zahradě.

Focusing on the location

Where did the dog bite Peter?

EST: Koer hammustas Peetrit **aias**.
Koer hammustas **aias** Peetrit.
Aias hammustas koer Peetrit.

Focusing on the location

Where did the dog bite Peter?

HUNG: A kertben harapta meg Pétert a kutya.
A kertben harapta meg a kutya Pétert.
A kutya a kertben harapta meg Pétert.
Pétert a kertben harapta meg a kutya.
A kutya Pétert a kertben harapta meg.
Pétert a kutya a kertben harapta meg.

No other order than *a kertben harapta meg* possible.

Focusing on the action

What did the dog do with Peter?

ENG:	The dog	bit	Peter	in the garden.	
GERM:	Der Hund	hat	Peter	im Garten	gebissen.
	Gebissen	hat	der Hund	Peter	im Garten.

Focusing on the action

What did the dog do with Peter?

CZECH: Pes Petra na zahradě pokousal.
Na zahradě pes Petra pokousal.

Focusing on the action

What did the dog do with Peter?

EST: Koer **hammustas** Peetrit aias.
Koer **hammustas** aias Peetrit.

Focusing on the action

What did the dog do with Peter?

HUNG:	Megharapta	a kutya	Pétert	a kertben.
	Megharapta	a kertben	Pétert	a kutya.
	A kutya	megharapta	Pétert	a kertben.
	Pétert	megharapta	a kertben	a kutya.
	A kertben	megharapta	a kutya	Pétert.
	A kertben	a kutya	megharapta	Pétert.
	A kertben	a kutya	Pétert	megharapta.

...

All permutations (6×4) are possible.

Accentuation patterns

Fixed word order + flexible accentuation patterns:

Accentuation patterns

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English

neutral	The dog	bit	Peter	in the garden.
	x	x	x	x x

Accentuation patterns

Flexible word order + fixed accentuation pattern:

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Flexible word order + fixed accentuation pattern:

Czech

neutral	Pes	pokousal	Petra	na zahradě.
	x	x	x	x x

Accentuation patterns

Flexible word order + fixed accentuation pattern:

Czech

neutral	Pes	pokousal	Petra	na zahradě.
	x	x	x	x x
patient	Pes	pokousal	na zahradě	Petra.
	x	x	x	x x

Accentuation patterns

Hungarian: flexible word order, restricted accentuation patterns:

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Hungarian: flexible word order, restricted accentuation patterns:

Neutral

A kutya	megharapta	Pétert	a kertben.
x	x	x	x
x	x	x	x

Accentuation patterns

Hungarian: flexible word order, restricted accentuation patterns:

Neutral

A kutya megharapta Pétert a kertben.

x x x x
x x x x

Megharapta a kutya a kertben Pétert.

x x x x
x x x x

All accents are equally strong!

Accentuation patterns

Hungarian: flexible word order, restricted accentuation patterns:

Focus on patient

(1)	A kutya	Pétert	harapta	meg	a kertben.
	x	x	x	x	x
		x			

Accentuation patterns

Hungarian: flexible word order, restricted accentuation patterns:

Focus on patient

- | | | | | | |
|-----|---------|--------|---------|-----|------------|
| (1) | A kutya | Pétert | harapta | meg | a kertben. |
| | x | x | x | x | x |
| | | x | | | |
| (2) | A kutya | Pétert | harapta | meg | a kertben. |
| | x | x | | | |
| | x | x | | | |

Post-Focal Deaccentuation: No primary stress after focus, secondary stresses are optional.

Accent and stress in Czech and Hungarian

- Accent is predictable on the basis of word order – few cases of ambiguity.

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- Accent is predictable on the basis of word order – few cases of ambiguity.
- Word stress is fixed to the first syllable (HUNG **szolárium**, CZECH **palačinka**).
- Distinctive vowel quantity (HUNG *kor* 'age' – *kór* 'sickness', CZECH *pata* 'heel' – *pátá* 'fifth').

Temporal cues of accentuation

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- Accentuation: segmental, temporal, dynamic and melodic cues (Ladd 1996, DiCristo 2004).
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- Lexical stress in Czech is not marked by temporal cues (Palková 1997).
- Lexical (?) stress is not necessarily marked by temporal cues in Hungarian (Fónagy 1958, Kassai 1979).

Research questions

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Research questions

- Lengthening effect of lexical stress on vowels and consonants in stressed syllables.
- Lengthening effect of sentence accent on vowels and consonants in stressed syllables.
- Role of quality distinction (short and long vowels with and without additional quality distinction).
- Is the primary (nuclear?) accent marked by lengthening in Czech and Hungarian?

Czech material

- **Subjects:** 5 speakers of Czech (2 females).
- **Material:** Read passage of 410 words.

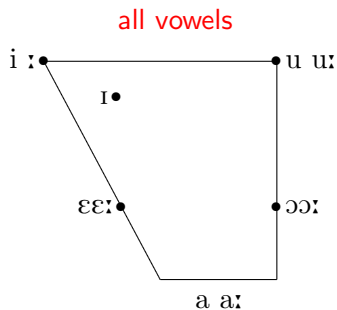
Altogether 2051 relevant tokens.

Hungarian material

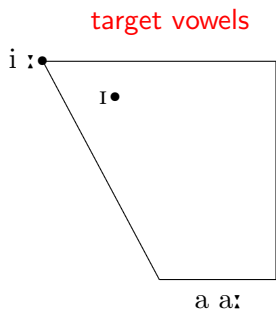
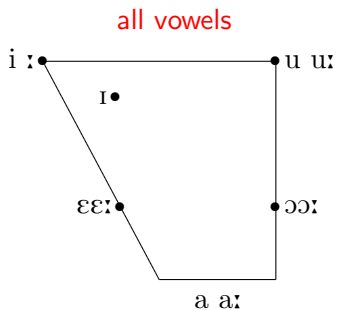
- **Subjects:** 10 speakers of Hungarian (6 females).
- **Material:** Read sentences of 16–18 syllables.
- **Targets for word stress:** 3 syllables (*tataroz*, *bemutat*).
- **Targets for sentence accent:** 3-syllabic words with primary, secondary and zero stress on first syllable.

Altogether 600 relevant tokens.

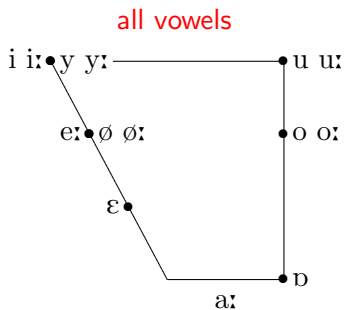
Vowel system of Czech



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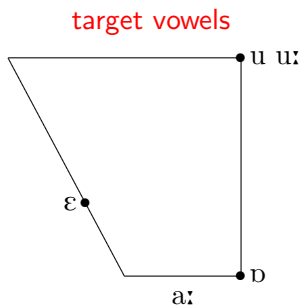
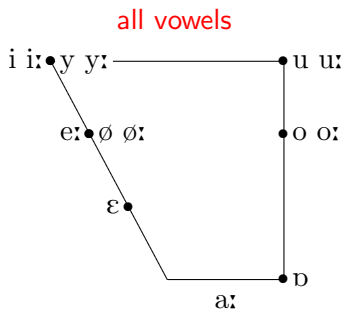


Vowel system of Hungarian

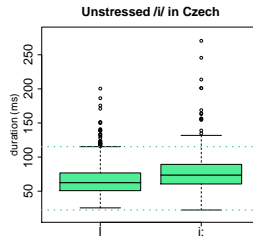
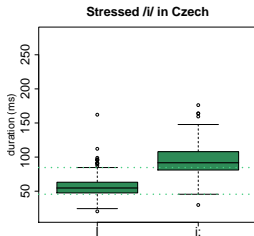
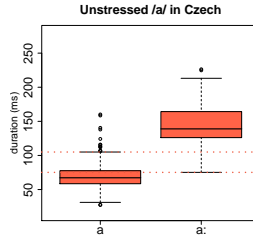
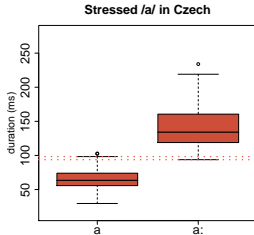


target vowels

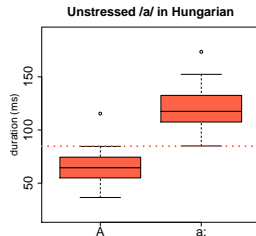
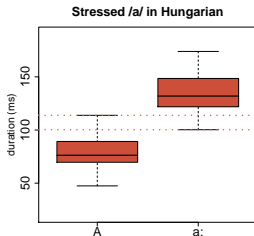
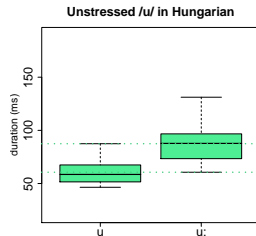
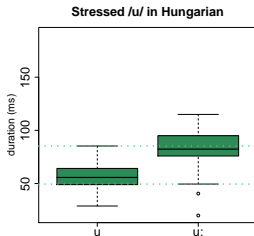
Vowel system of Hungarian



Vowel duration under stress: Czech

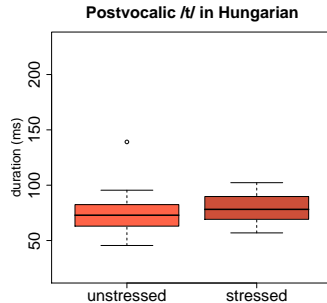
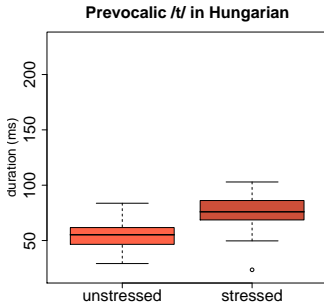


Vowel duration under stress: Hungarian



Consonant duration under stress: Hungarian

In target syllable *tat*



Differences are significant (repeated measures ANOVA).

Interaction of quantity, quality, and stress

- Czech makes use of quantity OR quality distinction → prototypical quantity language.

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- Czech: significant lengthening due to stress in /i:/, significant **shortening** in /i/ and /a/, no change in /a:/ (Kruskal-Wallis test).

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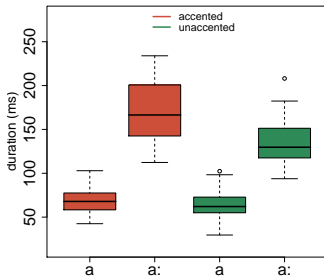
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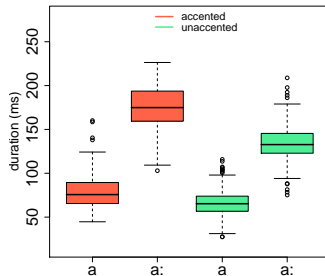
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- Czech: significant lengthening due to stress in /i:/, significant **shortening** in /i/ and /a/, no change in /a:/ (Kruskal-Wallis test).
- Hungarian: significant lengthening due to stress in /a/, /a:/, no significant change in /u/ and /u:/ (ANOVA or Kruskal-Wallis test).
- Durational effect of stress is not obvious in Czech, lengthening of stressed vowels in Hungarian only if quantity distinction is present.

Accent and stress: Czech

Accentuation of stressed /a/

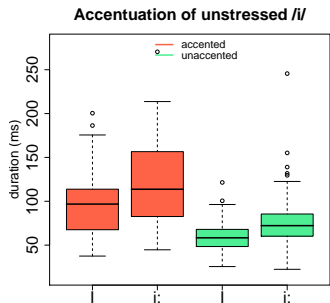
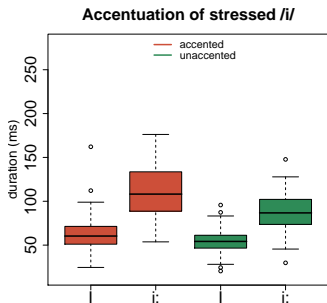


Accentuation of unstressed /a/



Lengthening due to accent significant for all vowel pairs.

Accent and stress: Czech



Lengthening due to accent significant for all vowel pairs.

Hungarian material

Example

A polgármester MEGhívta a tótokat a falunapra.
The mayor invited the Slovaks to the village fête.

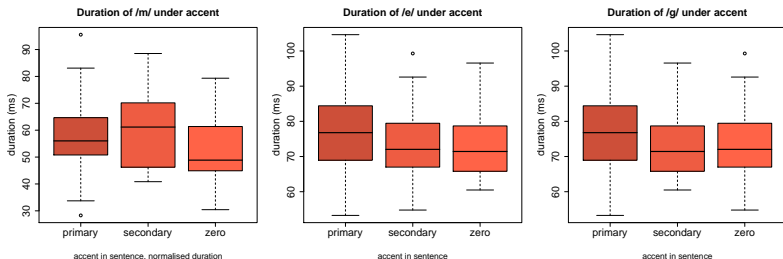
Neutral accentuation → primary stress on *meg(hívta)*.

Example

A kiállításmegnyitóra **Anitát** is MEGhívták.
Anita was also invited to the viewing.

A(nita) is focused → secondary or zero stress on *meg(hívták)*.

Segment durations and accent: Hungarian



Significant difference for /g/ duration under primary and secondary accent.

Summary

Behaviour of Czech and Hungarian regarding:

- quantity vs. quality distinction: Czech is typical, Hungarian atypical (losing quantity distinction?).

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Behaviour of Czech and Hungarian regarding:

- quantity vs. quality distinction: Czech is typical, Hungarian atypical (losing quantity distinction?).
- stress prominence by duration: present only in Hungarian if quantity distinction is realised.
- accent marking by duration: obvious tendency in Czech, enhanced by final lengthening, only slight tendency in Hungarian.

Conclusions and future work

- Temporal cues are not essential for stress marking in Czech (and Hungarian).

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Conclusions and future work

- Temporal cues are not essential for stress marking in Czech (and Hungarian).
- Temporal cues are not essential for accent marking in Hungarian.
- A careful evaluation of other cues is necessary, and
- comparable material for Czech and Hungarian (and English) is highly desirable.

Thanks to:

Beáta Gyuris, Budapest

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