Experimental investigations on the prosody of Hungarian exclamatives

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The notion of sentence type (Sadock and Zwicky 1985)

SENTENCE TYPE: “a coincidence of grammatical structure and conventional conversational use” (p. 155)

“An illustration: the combination of verb-subject word order and rising final intonation in the following English sentences:

(1)  a. Have they finished installing the furnace?
    b. Are you tired of plucking penguins?

is associated with one use, that of asking a YES-NO QUESTION (a request that the person you are addressing tell you whether the proposition you have supplied to him is true or not.” (p. 155)

The inventory of sentence types

“A cross-linguistically-useful definition of sentence types must . . . be based on formal criteria: the sentence types, or, more specifically, the formal properties characterizing those types should ideally form a system of alternative choices that are mutually exclusive such that each sentence token can be assigned to one type and no sentence token can be a member of more than one type (Sadock and Zwicky 1985:158)” (König and Siemund 2007: 278)

“. . .most languages are similar in presenting three basic sentence types with similar functions and often strikingly similar forms. These are the declarative, interrogative, and imperative.” (S & Z 1985:160)

Other sentence types (minor types)

- exclamations/exclamatory types (S & Z 1985), exclamatives (K & S 2007)
- imprecatives (expressing curses): *Fuck you!*
- optatives: *(May)* *God bless you!*
- prohibitives: *Don’t do that!*
- hortatives: *Let’s go!*
The interpretation of exclamatives according to K & S 2007

“. . . exclamations, the semantic counterpart of so-called ‘exclamative sentences’, are used for the performance of representative speech acts, i.e., for speech acts expressing a state of belief and making a claim about the world . . . the point of an exclamation is not really to inform the hearer(s) about some situation, but to express an affective response to what is taken to be a fact. More specifically, exclamations convey the speaker’s surprise that some present situation is remarkable and thus seem to be used as expressive speech acts of a type not included in Searle’s typology. Finally, exclamations relate to a scale or dimension and identify an extreme value.” (p. 316)
Formal structures/constructions expressing exclamations in English (K & S 2007)

(2) a. He is so stupid / such an idiot!
b. Isn’t this great! (negation, can have rising intonation)
c. How foolish he is!
d. The speed they drive on the freeway!
e. Man, is this kid intelligent!
f. I can’t believe how much he has grown!
The relation between exclamations and exclamatives, K & S 2007

- great variety of structures and constructions that can be used to express exclamations (which are not to be dismissed as indirect speech acts)
- highly problematic to list exclamatives as a 4th basic sentence type
- only common denominator: intonation (falling contour + focus on the ‘basic’ argument or the (scalar) predicate or on both)
- ‘exclamative sentences’: could be regarded as being the result of combining declarative or interrogative sentences with specific syntactic, semantic and pragmatic properties (cf. Rosengren 1992, 1997)

Altmann’s 1993 theory on (German) sentence types

Formal features distinguishing sentence types in German (a feature is included if it can distinguish between two sentence types):

- the presence of certain elements: finite/nonfinite verbs, complementisers, subject pronouns, modal particles, wh-expressions
- morphological features: finiteness/nonfiniteness of verb, [+/-IMP], [+/-IND]
- word order: position of the verb
- intonation: position of sentence stress, type of stress, melody, final pitch

Altmann treats exclamatives as representing a basic sentence type alongside declaratives, interrogatives and imperatives.

Rosengren’s 1992, 1994 theory on exclamatives

- based on Brandt et al.’s 1992 approach to sentence types
- argues strongly against intonation being a marker of clause or sentence types, primarily on the basis of the fact that it cannot be used to differentiate between embedded clause types
- all exclamative sentences belong either to the declarative or the interrogative form types
- their special interpretational feature is orthogonal to those features that distinguish between sentence types
- this interpretational feature: the expression of a specific expressive illocutionary type, which is directly connected to ‘emphatic stress’.

Károly 1964 on the exclamative in Hungarian

- one of the five sentence types, having equal status with declaratives, interrogatives, imperatives and optatives
- in order to be classified as an exclamative, a sentence has to satisfy the following four formal criteria: it must have a so-called ‘emotional’ intonation, and it may not possess the defining features of optatives, imperatives or interrogatives
- the ‘emotional’ intonation pattern (not specified closer) is not restricted to exclamatives, but can also appear on optatives, imperatives and interrogatives
- no specific intonation pattern characterising all exclamatives
- these assumptions are compatible with the possibility that the ‘emotional’ intonation patterns of structurally different subtypes of exclamatives are different in Hungarian.

Exclamatives according to Keszler 2000, 1

- an utterance fragment containing an interjection or an ‘interactional sentence-word’:

  (3) Jaj a cselszövőknek!
      oh the schemers.dat
      ‘Poor schemers!’

- a full sentence (without an interjection) containing an intensifier particle (de, be) or a word having the role of a degree adverbial like olyan ‘so’, annyira ‘so much’, úgy ‘that way’:

  (4) Milyen jó zavartalanul olvasgatni!
      how good undisturbed read.inf
      ‘How good it is to read undisturbed!’

Exclamatives according to Keszler 2000, 2

- combinations of the two kinds of features above:

  (5)  Hű de szeretném ezt megkóstolni!

  oh but like.poss.1sg this.acc taste.inf
  ‘Oh, how much I would like to taste this!’

- sentences made exclamative only by means of the ‘emotional intonation’:

  (6)  Itt a nyár!

  here the summer
  ‘Summer is here!’
Lipták 2006 on Hungarian exclamatives

- *wh*-exclamatives:

(7) Mennyi könyvet elolvastál!
how.many book.acc pv.read.2sg
‘You read so many books!’

- *de*-exclamatives:

(8) De sok könyvet elolvastál!
but many book.acc pv.read.2sg
‘You read so many books!’

- relativised exclamatives:

(9) Amennyi könyvet te elolvastál!
rel.how.many book.acc you pv.read.2sg
‘The number of books you read!’
The classification and the proposals for the syntactic analysis relies significantly on observations made in Kálmán 2001 (by V. Trón).

Class 1: *wh*-exclamatives and interrogatives are necessarily string-identical

(10) Hova bújtak a gyerekek!
where hid.3pl the children
‘In what strange places the children hid!’

(11) Melyik könyvet vetted meg!
which book.acc bought.2sg pv
‘(I am surprised at) which book you bought!’

(12) *Melyik könyvet megvetted!
which book.acc bought.2sg pv
Intended: ‘(I am surprised at) which book you bought!’

Class 2: the exclamative can only occur with the non-inverted order

(13) Mennyire nőtt meg Éva?
how.much grew.3sg pv Éva
‘How much has Éva grown?’

(14) *Mennyire nőtt meg Éva!
how.much grew.3sg pv Éva
Intended: ‘How much Éva has grown!’

(15) Mennyire megnőtt Éva!
how.much pv.grew.3sg Éva
‘How much Éva has grown!’
**Class 3:** both word orders are possible

(16) Hány könyvet megvettél!
how.many book.acc pfx.bought.2sg
‘You bought so many books!’

(17) Hány könyvet vettél meg!
how.many book.acc bought.2sg pfx
‘You bought so many books!’

(18) Hány könyvet vettél meg?
how.many book.acc bought.2sg pfx
‘How many books did you buy?’

Lipták’s analysis

- exclamatives with inversion:
  \[
  \ldots [FocP \ ExclP \ V^0 \ [AspP \ pv \ \ldots]]
  \]

- exclamatives without inversion
  \[
  \ldots [manyP \ ExclP \ [AspP \ pfx-V \ [\ldots]]]
  \]

Lipták 2006 provides an exhaustive list of the *wh*-expressions that represent each of the above patterns.
Previous observations on the prosody of Hungarian root exclamatives

- Lipták 2006: the two syntactic classes of exclamatives have an identical prosodic form, consisting of a “stress on the E[xclamative]-phrase and falling intonation following it” (p. 345, fn. 3).

- Kálmán 2001: the prosody of wh-exclamatives consists of a “high tone followed by a slow descent” (p. 137).
The prosody of root *wh*-interrogatives in Hungarian

Assumptions about the prosody of root *wh*-interrogatives:

- They have an overall falling contour (Varga 2002).
- The *wh*-expression carries the strongest accent (É. Kiss 2002).
- The verb following the *wh*-expression is deaccented (Kálmán & Nádasdy 1994).
- *wh*-word carries a falling pitch accent and might be preceded by a high tone (Mycock 2010).

The prosody of root *wh*-exclamatives in Hungarian

It’s time to find out.
Production experiment

http://seas3.elte.hu/tmp/vlfs/gyuris-mady.html
Material: sentence types

   Milyen rosszul főz? Milyen rosszul főz!
   ‘How bad does (s)he cook?’ ‘How bad (s)he cooks!’
   Melyik játékot vette meg? Melyik játékot vette meg!
   ‘Which toy did (s)he buy?’ ‘Which toy (s)he bought!’
Material: sentence types

1 Class 1: obligatory string-identity.
Milyen rosszul főz? Milyen rosszul főz!
‘How bad does (s)he cook?’ ‘How bad (s)he cooks!’
Melyik játékot vette meg? Melyik játékot vette meg!
‘Which toy did (s)he buy?’ ‘Which toy (s)he bought!’

2 Class 2: no string-identity.
Mennyire nőtt meg Hanna? Mennyire megnőtt Hanna!
‘How tall has Hannah become?’ ‘How tall Hanna has become!’
Material: sentence types

   Milyen rosszul főz? Milyen rosszul főz!
   ‘How bad does (s)he cook?’ ‘How bad (s)he cooks!’
   Melyik játékot vette meg? Melyik játékot vette meg!
   ‘Which toy did (s)he buy?’ ‘Which toy (s)he bought!’

2. Class 2: no string-identity.
   Mennyire nőtt meg Hanna? Mennyire megnőtt Hanna!
   ‘How tall has Hannah become?’ ‘How tall Hanna has become!’

   Hány ember jött el? Hány ember eljött! / Hány ember jött el!
   ‘How many people came?’ ‘How many people came!’
Reading task

Context: all sentences were embedded in a context text-finally.

*wh*-interrogative:
Azt mondod, Béla nem egy jó szakács. Meséld már el részletesebben!
**Milyen rosszul főz?**
‘They say Béla is not a great cook. Tell me more about it!’
**How badly does he cook?**

*wh*-exclamative:
Tegnap a barátnőm anyja meghívott ebédre. Azt a mindenit!
**Milyen rosszul főz!**
‘My girlfriend’s mother invited me for lunch yesterday. Gee!
**How badly she cooks!**’
Recordings

- 5 items within each sentence type $\rightarrow$ 45 sentences,
- 2 repetitions,
- 5 speakers (3 females),
- recording by a head-mounted microphone connected to a laptop via an external sound card in a silent environment.

$\Rightarrow$ altogether 450 stimuli.
Analysis of tonal categories

Labelling according to ToBI, but reflecting real f0 movements:

- pitch accent type,
- phrase-initial boundary tone (%H, %M, %L),
- phrase-final boundary tone (H%, M%, L%).

In most languages, no phrase-initial boundary tone and no M(id) boundary tone is assumed – but their relevance has to be tested for each language.
Analysis of f0 parameters

- F0 maximum, f0 minimum and f0 range within the initial CVC-sequence of the \(wh\)-expression regardless of its syllable structure,
- sentence-initial f0,
- sentence-final f0.

Statistical method: repeated-measures multivariate analysis of variance.
Significance level: \(p < 0.05\).
An example

Left: interrogative, right: exclamative, by the same speaker.
High and falling pitch accents for interrogatives, mainly rising pitch accents for exclamatives.
Phrase-final boundary tones

L(ow) boundary tones for interrogatives, M(id) tones for exclamatives. %M tones are interpreted as %0 tones in some frameworks.
Phrase-initial boundary tones

Relevance of phrase-initial boundary tones not stated for Hungarian.

H(igh) boundary tones for interrogatives, non-high tones for exclamatives.
F0 maximum and minimum

The sentences contained only one pitch accent (high, falling or rising). In exclamatives, the f0 peak was often located after the pitch-accented wh-word.

![Graph showing overall f0 maximum and f0 minimum in accented CVC](image)

Significantly higher f0 maximum in interrogatives. F0 minimum and range are not reliable due to differences in wh-expression length (milyen vs. hol).
Phrase-initial and -final f0

Significantly higher initial f0 in interrogatives. Difference between final f0 non-significant ($p > 0.1$) ↔ categorical boundary tones.
Sentence types

- Tendencies are the same in all sentence types.
- No systematic difference in Class 3 sentences, where inversion for exclamatives is optional.
- ⇒ The (non)-identity of strings has no impact on the degree of prosodic distinction between \(wh\)-interrogatives and \(wh\)-exclamatives.
Discussion I

Wh-interrogatives and exclamatives are distinguished by the following prosodic features:

- **Accent on wh-word:** high and falling accents for interrogatives, rising accents for exclamatives. F0 is higher for interrogatives.

- **Phrase-final boundaries:** difference in boundary tone labels (Low vs. Mid), but actual f0 values differ only by 0.24 semitones.

- **Phrase-initial boundaries:** high boundaries for interrogatives, non-high ones for exclamatives. F0 difference: 6 semitones.
Discussion I

- Higher f0 maximum in interrogatives is possibly a by-product of the high phrase-initial boundary tone.
- Is the difference between the pitch accent patterns due to different phrase-initial boundary tones?
- Is the divergence between the categorical perception of phrase-final boundary tones and the actual f0 values connected to the prosodic differences sentence-initially?
Perception experiment
Goals

What is the relevant prosodic category for distinguishing between *wh*-interrogatives and *wh*-exclamatives?

1. by their phrase-initial boundary tone, i.e. sentence-initial f0,
2. by their pitch accent pattern,
3. by their phrase-final boundary tone, i.e. sentence-final f0.
Target sentences

- 11 pairs of target sentences,
- 1 pair = interrogative + root exclamative.

(21) \[\text{DM}_1 \ \text{DM}_2 \ \text{Wh-expression} \ V \ pv\]
(22) Na de akkor MIlyen későn kelt fel?
so but then how late got.up.3sg pv
'But then how late was it when he got up?

(23) De hogy végül MIlyen későn kelt fel!
so that finally how late got.3sg up
'But eventually how late it was by the time he got up!'
Target stimuli

- Target sentences were spoken by a male speaker.
- Problem: it is not possible to have identical particles for interrogatives and exclamatives → segmental and intensity cues were eliminated.
  - $f_0$ movements due to micro prosodic changes were corrected
  - entire sentence was synthesised into a human-like scwha-sound ("hum")
Target stimuli

- 3 segments were cut from the sound files
  - **ini**: initial 3 syllables of the discourse markers,
  - **med**: the *wh*-element,
  - **fin**: the final 2 syllables that had a relatively flat f0 curve.
Stimuli

The targets were analysed in terms of the f0 in exclamative and interrogative sentences.

<table>
<thead>
<tr>
<th></th>
<th>initial</th>
<th>final</th>
<th>f0 maximum</th>
<th>peak range</th>
<th>position</th>
</tr>
</thead>
<tbody>
<tr>
<td>excl</td>
<td>125</td>
<td>117</td>
<td>176</td>
<td>74</td>
<td>0.77</td>
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<tr>
<td>interr</td>
<td>150</td>
<td>130</td>
<td>213</td>
<td>97</td>
<td>0.33</td>
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<tr>
<td>p-value</td>
<td>0.0009</td>
<td>0.033</td>
<td>0.0001</td>
<td>0.009</td>
<td>0.0011</td>
</tr>
</tbody>
</table>
Target sound: interrogative contour
Target sound: exclamative contour
24 participants (7 females, 17 males, mean age: 42).
Stimulus sound and two minimal pairs were presented (visually).
The 3 chunks were presented independently: 6 presentations for each sentence pair.
Task: binary forced choice task
  - chunks heard were indicated visually,
  - participants had to identify which sentence these came from,
  - individually randomised order.
Main task was preceded by a training session.
Task

Melyik mondatba illik ez a részlet?

Na és végül milyen bútorokat dobtak ki?

Na de aztán milyen bútorokat kidobtak!
Task

Melyik mondatba illik ez a részlet?

Jaj hogy aztán milyen ritkán ment haza!

Na és aztán milyen ritkán ment haza?

újra
Task

Melyik mondatba illik ez a részlet?

Na de aztán miket vettek meg!

Na és végül miket vettek meg?

újra
Results

Analysis: based on the distribution of correctly identified utterances over sentence types and the position of the chunks.

- **ini**: correlated with phrase-initial boundary tone.
- **med**: always identical with the *wh*-expressions.
- **fin**: correlated with phase-final boundary tones.

Differences between sentence types: $\chi^2$ test.

Differences between the number of correct identifications for each participant: repeated measures ANOVA.
Results: correct responses

Correctly identified sentence types

<table>
<thead>
<tr>
<th>chunk position</th>
<th>ini</th>
<th>med</th>
<th>fin</th>
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<tbody>
<tr>
<td>interr</td>
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<td>excl</td>
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Ratio of correct identifications:

- ini: 0.7
- med: 0.6
- fin: 0.5
Results

Chunk position: impact on the number of correct identifications

- Investigated for each subject separately: repeated measures ANOVA
  - No. of correct identifications: dependent variable,
  - positions: within-subject factor.
- Results: highly significant difference
  - interrogatives: $p < 0.0001$
  - exclamatives: $p = 0.003$
Sentence-initial f0, the f0 pattern of the pitch accent and the sentence-final f0 contribute to the identification of exclamatives and interrogatives.

Sentence-initial f0: most reliable; 60% correct identifications in both cases.

The unaccented left-edge of the sentence carries more relevant information with regard to sentence type than the the pitch accent or the sentence-final f0.
Relevance for research on prosody

- ‘Emotional plus’: emphasis is not necessarily expressed by higher f0 but alternatively by peak delay (Gussenhoven 2004).
- ’Emotional plus’: the interplay of the non-high boundary tone and the delayed pitch accent might contribute to the overall perception of higher pitch.
- General finding: reliable identification based on phrase-initial chunks: an argument for the presence of phrase-initial boundary tones in Hungarian (see also Mycock 2010).

Relevance for research on sentence types

- We have argued that the prosodic features of the two syntactic types of root *wh*-exclamatives discussed in Lipták 2006 do not differ significantly and that they are significantly different from the prosodic features of root *wh*-interrogatives.

- Should the relevant prosodic features be taken to contribute to the characterization of the relevant form types (*wh*-interrogative vs. *wh*-imperatives)?

- Preliminary evidence suggests that the relevant prosodic distinctions are not present in embedded *wh* interrogatives/imperatives.

- Suggestion: the prosodic features associated with root *wh*-exclamatives characterize **exclamation acts**.
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