The effect of the suprasegmental structure of stimulus on word activation processes

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Introduction

Adequate suprasegmental structure is an indispensable prerequisite for linguistic units to fulfil their communicative functions.

Word prosody (e.g. word stress, tone) is represented in the mental lexicon → influences the word activation processes.
Introduction

The role of prosody in Hungarian
- fixed (first syllable) word stress
- intonation (opposed to tone languages)
  → neither melody/ tone nor stress
  has a distinctive function at the lexeme level

What are the effects
of the stimulus prosody
on word activation processes?
Hypothesis

In word association tests the suprasegmental pattern of the stimulus influences the word accessing processes involved and thereby the results.

Stimuli that are non-neutral in terms of suprasegmental properties would trigger non-typical processes in the subjects.
Subjects, material and method

30 university students in 3 groups
(10 people per group):

1. group: stimuli with **neutral** (non-emotional) suprasegmental structure

2. group: the same words with a **non-neutral** pattern (realized with a different melody, voice quality or intensity)

3. (control) group: **mixed** stimuli (both neutral and modified ones)
Subjects, material and method

Experiment conditions:
– the stimuli were played from digital record
– 30 seconds association time was allowed (all words that come to mind)
– the outputs were also recorded (minidisc)
# Subjects, material and method

<table>
<thead>
<tr>
<th>Stimuli</th>
<th>Neutral</th>
<th>Non-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>imperative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>csönd</td>
<td>‘silence’</td>
<td>‘be quiet/shut up!’</td>
</tr>
<tr>
<td>futás</td>
<td>‘running’</td>
<td>‘run!’</td>
</tr>
<tr>
<td>ebéd</td>
<td>‘lunch’</td>
<td>‘lunch is ready!’</td>
</tr>
<tr>
<td>segítség</td>
<td>‘help’ (noun)</td>
<td>‘help!’</td>
</tr>
<tr>
<td><strong>slang</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>király</td>
<td>‘king’</td>
<td>‘cool’</td>
</tr>
<tr>
<td>paraszt</td>
<td>‘peasant’</td>
<td>‘boor, uneducated’</td>
</tr>
<tr>
<td>cica</td>
<td>‘kitten’</td>
<td>‘sweet-heart, darling’</td>
</tr>
<tr>
<td>nyugalom</td>
<td>‘stillness’</td>
<td>‘don’t worry’</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>gentle</strong></td>
<td></td>
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</tbody>
</table>
Analysis

- reaction time
- number of items and words
- topics
- prosody of stimuli
Results:
Average reaction time (s)

- **homogeneous**
  - neutral: approximately 2.5
  - non-neutral: approximately 1.5

- **mixed**
  - neutral: approximately 3
  - non-neutral: approximately 2

- **total**
  - neutral: approximately 3
  - non-neutral: approximately 2
Results:
Average reaction time (s)

- csönd
- futás
- ebéd
- segítség
- király
- paraszt
- nyugalom
- cica

Neutral and non-neutral reactions.
Results:
Average number of items

<table>
<thead>
<tr>
<th></th>
<th>neutral</th>
<th>non-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>homogeneous</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>mixed</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>total</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Results:

Average number of items

- csőnd
- futás
- ebéd
- segítség
- király
- paraszt
- nyugalom
- cica

neutral vs. non-neutral
Results:
Average number of words per item

- Homogeneous: Neutral 1.0, Non-neutral 1.5
- Mixed: Neutral 1.0, Non-neutral 1.3
- Total: Neutral 1.0, Non-neutral 1.4
Results:
Average number of words per item

- csönd
- futás
- ebéd
- segítség
- király
- paraszt
- nyugalom
- cica

Legend:
- neutral
- non-neutral
Results: Topics

1. example: csönd

NEUTRAL 'silence'
- time 11%
- poetry 2%
- 98% = 100%
- 4% synonyms of 'silence'
- 11% antonyms
- 3% quality of silence
- 28% state of mind
- 16% physical state
- 25% environment
- 28% = 100%

NON-NEUTRAL 'shut up'
- 100% = 100%
- 10% synonyms of 'shut up'
- 15% answers for imperative
- 24% situations in which it occurs
- 24% = 100%
- 5% quality of voice or speaker
- 3%
Results: Topics
2. example: segítség

NEUTRAL ‘help’ (N)
- 84 = 100%
- 83% abstract
- 10% water accidents
- 7% ski accidents

NON-NEUTRAL ‘help!’
- 120 = 100%
- 12% song
- 16% crime
- 9% street accidents
- 4% fire
- 3% outsider
- 39% actual situation
- 10% speaker’s point of view
- 11% helper’s point of view
- 8% speaker’s state
- 10% speech mode, voice quality
Results: Topics

3. example: *paraszt*

- NEUTRAL 'peasant'
  - characteristics 8%
  - literature 5%
  - family 9%
  - actual politics 2%
- work, agriculture 37%
  - synonym/definition of 'peasant' 5%
  - synonyms of 'uneducated' 9%
  - history 11%
- evaluation of speaker and speech mode 48%
- 1% chess
- 2% synonym/definition of 'peasant'
- 3% place, environment
- 18% synonyms of 'uneducated'
- 14% history
- 13% place, environment
- 107 = 100%
Results: Topics
4. example: *nyugalom*

**NEUTRAL**
‘stillness’

- **89%** places 6%
- **11%** time 2%
- **48%** typical activities and circumstances
  - **24%** state of mind 10%
  - **10%** personal relationships 6%
- **100%**

**NON-NEUTRAL**
‘don’t worry’

- **100%**
  - **17%** synonyms of ‘don’t worry’
  - **12%** situations in which it occurs
  - **4%** opinions about stillness and personality traits

**100%**
Suprasegmental analysis: 

\textit{csönd}

‘silence’ 

‘shut up’
Suprasegmental analysis: *segítség*

‘help’ (N)  📈  ‘help!’  📈
Suprasegmental analysis: *paraszt*

‘peasant’ ♪

‘uneducated’ ♪
Suprasegmental analysis: *nyugalom*

‘stillness’  

‘don’t worry’
Conclusions: Reaction time

1. it is shorter if the suprasegmental structure of the stimulus is non-neutral ⇐ symbol of a situation
2. the only exception is cica ‘darling’ ⇐ "personal"
3. the difference between neutral and non-neutral stimuli disappears in the "mixed" group ⇐ effects of the context
Conclusions:
Number of items and words

1. it is greater in non-neutral cases
   ⇔ situational memory activation
2. differences are balanced or turned over
   in the "mixed" group
   ⇔ effects of the context
Conclusions: Suprasegmental structure

- There is no evident correlation between the "degree" of suprasegmental difference of (neutral and non-neutral) stimuli and responses

- The most affective factors are
  1. The common pragmatic meaning of the segmental and suprasegmental structure
  2. The distance between the meaning of the neutral and non-neutral units
Conclusions:

Topics and categories

1. the thematic sets of responses depend on the stimulus
   ⇐ specific (pragmatic) meanings of the neutral and non-neutral realization

2. non-neutral stimuli: strict adherence to the original/neutral meaning vs. the associations conform to the non-neutral pragmatic meaning
   ⇐ the subjects’ perceptual threshold for the suprasegmental features, instinctiveness and empathy

3. common features in the non-neutral responses: concrete situations (experiences, speaker, answers, etc.)
Summary

- stimuli with neutral and non-neutral suprasegmental structure gave different results
- the meaning is situational in non-neutral cases and lexical in neutral ones
- the results depend on
  - the integrated meaning of segmental and stereotypical suprasegmental structure
  - the perceptual threshold of the subject
  - the context of the stimulus
Further questions

- In those cases where the modified suprasegmental structure creates a new meaning, is the segmental and suprasegmental structure stored as one unit in the mental lexicon, or does the perception process the segmental and suprasegmental structure separately?
- What results would emotional (sad, happy, etc.) prosody bring?
- Etc.
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