Introduction

• Production experiments in German, Hungarian, and Japanese, three languages with different intonational systems
• Testing sentences consisting of:
  – Subject+Verb (SV) or Object + Verb (OV) in
  – Wide Focus (WF) and Narrow Focus (NF) contexts

Experiment
Stimuli

• 4 conditions (2 × 2 factorial design)
  – Argument types:
    • Subject (Subj) + Verb
    • Object (Obj) + Verb
  – Focus types:
    • Wide Focus (WF) on VP
    • Narrow Focus (NF) on the argument
• 6 sentences for each condition

Stimuli: German

• 15 female subjects

(1) a. Subj, WF: Opron [ S V ]f
    Q: ‘Why don’t I find the ball?’
    A: Nun, wahrscheinlich haben ihm [ die Kinder mitgenommen ],
        ‘Well, probably the children took it away.’

b. Subj, NF: Opron [ S 1f V ]f
    Q: ‘Who took the ball away?’
    A: Nun, wahrscheinlich haben sie [ den Ball mitgenommen ],
        ‘Well, probably they took the ball away.’

c. Obj, WF: Spron [ O V ]f
    Q: ‘What did the children do?’
    A: Nun, wahrscheinlich haben sie [ den Ball mitgenommen ],
        ‘Well, probably they took the ball away.’

d. Obj, NF: Spron [ O 1f V ]f
    Q: ‘What did the children take away?’
    A: Nun, wahrscheinlich haben sie [ den Ball ], mitgenommen.

(2) a. Subj, WF:
    Q: ‘Why don’t I find the ball?’
    A: Nun, wahrscheinlich haben ihm [ die Kinder mitgenommen ],
        ‘Well, probably the children took it away.’

b. Subj, NF:
    Q: ‘Who took the ball away?’
    A: Nun, wahrscheinlich haben sie [ den Ball mitgenommen ],
        ‘Well, probably they took the ball away.’

c. Obj, WF:
    Q: ‘What did the children do?’
    A: Nun, wahrscheinlich haben sie [ den Ball mitgenommen ],
        ‘Well, probably they took the ball away.’

d. Obj, NF:
    Q: ‘What did the children take away?’
    A: Nun, wahrscheinlich haben sie [ den Ball ], mitgenommen.
Stimuli: Hungarian

- 12 speakers (3 male, 9 female)

(3) a. Subj, WF: [Ptl-V S] F
   b. Subj, NF: [S] F V Ptl
   c. Obj, WF: [Ptl-V O] F
   d. Obj, NF: [O] F V Ptl

Stimuli: Hungarian

(4) a. Subj, WF:
   Q: ‘Why don’t I find the ball?’
   A: Valószínűleg elvitték a gyerekek.
   ‘Probably the children took it away.’

b. Subj, NF:
   Q: ‘Who took the ball away?’
   A: Valószínűleg a gyerekek elvitték.
   ‘Probably the children took it away.’

c. Obj, WF:
   Q: ‘What did the children do?’
   A: Valószínűleg elvitték a labdát.
   ‘Probably they took the ball away.’

d. Obj, NF:
   Q: ‘What did the children take away?’
   A: Valószínűleg a labdát, vitték el.
   ‘Probably they took the ball away.’

Stimuli: Japanese

- 12 speakers (7 male, 5 female)
- 3 recordings (in different randomized-order)

(5) a. Subj, WF: [S V] F
   b. Subj, NF: [S] F V
   c. Obj, WF: [O V] F
   d. Obj, NF: [O] F V
Stimuli: Japanese

(6)  

a. Subj, WF:
Q: ‘I wonder why there isn’t any beer in the fridge.’
A: tá̄bun [Náoya-ga nónda], n da yo
probably Naoya-Nom drank Comp Cop
‘Probably Naoya drank it.’

b. Subj, NF:
Q: ‘I wonder who drank the beer in the fridge.’
A: tá̄bun [Náoya-ga], nónda n da yo

Results

Results: German

• Existence / absence of pitch accent

<table>
<thead>
<tr>
<th></th>
<th>WF</th>
<th>NF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subj</td>
<td>N=90</td>
<td>N=90</td>
</tr>
<tr>
<td>51</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: No. of Accents on V

• Subj, WF:
  − Optional accent on V (57%)
• Subj, NF:
  − No Accent on V
• Obj, WF/NF:
  − No Accent on V
  − No WF/NF contrast
Results: German

• Existence / absence of pitch accent

Figure 1: Sample pitch contour for Subj, WF
Single accent on S (Left) and Accents on S and V (Right)

Results: German

• Differences between the argument types (Subj vs. Obj):
  - Pitch accent on the argument in all conditions.
  - No pitch accent on the verb in the object sentences (stress subordination)
  - The verb optionally bears a pitch accent in the subject sentences, but only in the wide context condition (51 times in 90 utterances, 57% of the time).

Results: German

• Differences between the focus types (WF vs. NF):
  - In the subject sentences, the subject is scaled higher in the narrow focus context than in the wide focus context.
  - Also in the subject sentences, the verb is scaled significantly higher in the wide focus context than in the narrow focus context. This difference is due to the fact that the pitch accent on the verb in 57% of the cases has the effect of raising considerably the average F0 of this constituent.
  - In the object sentences, there is no significant difference between the pitch accent heights in the narrow and the wide contexts.
Result: Hungarian

Word order:

<table>
<thead>
<tr>
<th></th>
<th>Word1</th>
<th>Word2</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF</td>
<td>Ptl-V</td>
<td></td>
</tr>
<tr>
<td>NF</td>
<td>S/O</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Mean normalized F0 (with 95% CI)

Results: Hungarian

• No difference between the argument types (Subj vs. Obj)

• Differences between the focus types (WF vs. NF):
  – Larger f0-span of the argument in narrow focus (the S/O is higher than the initial verb in wide focus, and the end of S/O is lower)
  – The beginning of the verb is lower in narrow focus than the beginning of S/O in wide focus
  – Highest pitch of the second word does not change.

Results: Japanese

Figure 4: Sample pitch contours for WF (Left) and NF (Right)

Figure 5: Mean normalized F0 (with 95% CI)
Results: Japanese

Figure 6: Sample pitch contour for WF (Left) and NF (Right)

Results: Japanese

• No difference between the argument types (Subj vs. Obj)
• Differences between the focus types (WF vs. NF):
  – F0-peak on V is lower in NF.
  – F0-peak on S/O is higher in narrow focus in some speakers’ data.

Results: Summary

• Any prosodic contrast observed?

<table>
<thead>
<tr>
<th></th>
<th>German</th>
<th>Hungarian</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subj / Obj</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>(Subj: Optional accent on V)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WF / NF</td>
<td>Subj: YES</td>
<td>YES (higher F0 on S)</td>
<td>YES (higher F0 on Arg)</td>
</tr>
<tr>
<td></td>
<td>(higher F0 on V, deaccenting on V)</td>
<td>(lower F0 on V)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obj: NO</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

Analysis
Analysis

• Prosodic differences as a consequence of:
  1. Syntactic structure (Prosodic phrasing)
  2. Information structure (Relative prominence)
  3. Language specific properties

Analysis

1. Syntactic structure (prosodic phrasing)
   – Syntactic structure is mapped onto prosodic phrasing:
     • AlignXP (Chen 1987, Selkirk 1986, Selkirk & Tateishi 1991)
     • Prosody by phase (Kratzer and Selkirk 2007, Ishihara 2007)
   – Syntax-prosody mapping principle in Gr/Hu/Jp:
     • German: phonological-phrase (φ)
     • Hungarian: intonation phrase (ip)
     • Japanese: Major Phrase, MaP (= ip)
   – Subj-Obj asymmetry:
     • German: Asymmetric positions for Subj and Obj
     • Hungarian/Japanese: Symmetric syntax

Analysis

2. Information structure (Relative prominence)
   – IS modifies the relative prominence between the pitch accent on the NF and the following ones.
   (7) a. WF b. NF
       ×          ×
       ( A )_A ( B )_B
   – Relative prominence is realized differently from language to language:
     • German: H-raising on NF, Postnuclear deaccenting of V
     • Hungarian: F0-expansion on the NF
     • Japanese: Post-focal compression on V

Analysis: German

• Syntax (prosodic phrasing)
   – Asymmetric syntactic positions for Subj and Obj
     • Subjects (optionally) move to Spec,TP.
     • Objects stay within vP.
   (8) a. Subj, WF/NF
       [TP O_postS tAux [tP tS tO V]]
   b. Obj, WF/NF
       [TP S_post tAux [tP tS O V]]
Analysis: German

• Syntax (prosodic phrasing)
  – Mapping principle inserts a φ-boundary at the vP boundary.
    • S and V are phrased separately.
    • O and V are phrased together.
      – Pronouns cannot be the head of a p-phrase, hence only one φ.

(8) a. Subj, WF/NF

\[
[TP \ O_{pron} \ S \ \ t_{aux} \ [s \ V ]] \Rightarrow \{(O_{pron} \ S) \ (V)\} \phi \\
\]  

b. Obj, WF/NF

\[
[TP \ S_{pron} \ t_{aux} \ [s \ O \ V ]] \Rightarrow \{(S_{pron} \ O) \ (V)\} \phi \\
\]  

Analysis: German

• Information Structure (relative prominence)
  – Subj, WF
    • 2 accents
      – Downstep on the accent on V.

(9) a. Subj, WF

\[
\times \ \times \ \Rightarrow \{S_h \ (V)_h\} \phi \\
\]  

Analysis: German

• Information Structure (relative prominence)
  – Subj, NF
    • An additional prominence on S
    • The relative prominence is realized by:
      – Postnuclear deaccenting on V
      – Tonal H-raising on S

(9) b. Subj, NF

\[
\times \ \times \ \Rightarrow \{S_h \ (V)_h\} \phi \\
\]
Analysis: German

• Information Structure (relative prominence)
  – Obj, WF/NF
    • Only 1 accent: Stress subordination on V
    • The additional prominence on NF does not create any prominence relation with any other accent: no effect. (Conflation)

  (9) c/d. Obj, WF/NF

\[
\begin{array}{c}
\times \\
\times \\
\{ (O_F, V)_h \} \rightarrow \{ (O_F, (V)_h) \}_ip \\
\end{array}
\]

Analysis: Hungarian

• Syntax (prosodic phrasing)
  – Word order difference between WF and NF:
    • WF: Everything (Ptl-Verb, arguments) remains within vP.
    • NF: The verb moves to the Foc head, leaving Ptl behind; the argument to the preverbal position (Spec,FocP).
  – No asymmetry between the subject and the object sentences: no difference in prosodic phrasing.

  (10) a. WF (S/O)
    b. NF (S/O)

\[
\begin{array}{l}
[\ell F \ Ptl-V \ (O/S_{pro}) \ S/O ] \Rightarrow [\ (Ptl-V)_h (S/O)_h ]_ip \\
[\nu \ Ptl-V \ (O/S_{pro}) \ t_{OA} ] \\
\end{array}
\]
Analysis: Hungarian

• Information structure (relative prominence)
  – Non-initial accents within ip are always compressed.
  – Additional prominence added to the preposed NF
  – The prominence relation is realized as an F0-range expansion of the focused phrase.

Analysis: Hungarian

• Information structure (relative prominence)
  – ip-internal compression
  – F0-expansion on NF

(10) a. WF (S/O)

\[
\begin{array}{c}
\{ \text{Ptl} \text{-} \text{V} \} \phi (S/O) \phi \\
\{ \text{Ptl} \text{-} \text{V} \} \phi (A) \phi \\
\{ \text{Ptl} \text{-} \text{V} \} \phi (A) \phi \\
\end{array}
\]

\[
\begin{array}{c}
\text{S/O} \\
\text{WF} \\
\end{array}
\]

b. NF (S/O)

\[
\begin{array}{c}
\{ \text{S/O} \} \phi (V) \phi (\text{Ptl}) \phi \\
\{ \text{S/O} \} \phi (V) \phi (\text{Ptl}) \phi \\
\end{array}
\]

Analysis: Hungarian

• Syntax (prosodic phrasing)
  – Japanese subjects may stay in-situ (i.e., Spec,vP).

(11) a. Subj, WF/NF:

\[
[TP \ (O_{\text{sub}}) \ [S \ t_0 \ V]]
\]

b. Obj, WF/NF:

\[
[TP \ (S_{\text{obj}}) \ [S \ t_0 \ O \ V]]
\]
Analysis: Japanese

- **Syntax (prosodic phrasing)**
  - Each pitch accent forms a MiP (= φ).
  - Phrasing pattern, as well as the word order, is identical in all conditions.

(11) a. Subj, WF/NF:

\[
\left[ T_R \ O_{\text{pro}} \right] \ [T_R \ S \ t_0 \ V] \Rightarrow \left\{ (S)_{\text{pro}} \, (V)_{\text{ip}} \right\}
\]

b. Object sentences (WF/NF): 

\[
\left[ T_R \ S_{\text{pro}} \right] \ [T_R \ t_0 \ O \ V] \Rightarrow \left\{ (O)_{\text{pro}} \, (V)_{\text{ip}} \right\}
\]

- **Information structure (relative prominence)**
  - Downstep on V
  - Additional prominence added on NF
  - Relative prominence is realized as Post-focal compression

(12) a. WF:

\[
\times \times \Rightarrow \left\{ (S/O)_{\text{ip}} (V)_{\text{ip}} \right\}
\]

b. NF:

\[
\times \times \Rightarrow \left\{ (S/O)_{\text{ip}} (V)_{\text{ip}} \right\}
\]

**Analysis: Summary**

<table>
<thead>
<tr>
<th></th>
<th>German</th>
<th>Hungarian</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Syntax</strong></td>
<td>S/O: asymmetry</td>
<td>S/O: no effect</td>
<td>S/O: no effect</td>
</tr>
<tr>
<td></td>
<td>WF/NF: no effect</td>
<td>WF/NF: F-movement Mapping: ip</td>
<td>WF/NF: no effect</td>
</tr>
<tr>
<td></td>
<td>Mapping: φ</td>
<td>Mapping: ip</td>
<td>Mapping: ip (MaP)</td>
</tr>
<tr>
<td><strong>IS</strong></td>
<td>H-raising on NF, deaccenting of V (when more than 1 accent.)</td>
<td>F0-expansion on NF</td>
<td>post-focal compression on V</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>downstep (ip) integration</td>
<td>compression (ip) obligatory accent (φ)</td>
<td>downstep (ip, MaP) lexical accent (φ, MiP)</td>
</tr>
</tbody>
</table>
Thank You

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References


References


Contact Information

• Shinichiro Ishihara <s_i@alum.mit.edu>
• Caroline Féry <caroline.fery@googlemail.com>
• SFB 632 “Information Structure” University of Potsdam
  http://www.sfb632.uni-potsdam.de/