Prosodic Structure in Child Jakarta Indonesian

Fay Woolf
Jason Brown
Julie Cervinkova
Margarita Meshcheryakova

University of Auckland
Prosody and Language Acquisition

- Stress is an important aspect of child phonology

- Ability to detect stressed vs. unstressed syllables by 2 months (Jusczyk & Thompson 1978)

- A critical role of stress in the child’s recognition of word boundaries and segmentation strategies from approximately 8 months of age (Johnson & Jusczyk 2001, Jusczyk et al. 1999, Thiessen & Saffran 2003)

✓ The child’s stress system is set relatively early
What is Jakartan Indonesian?

• Standard (Bahasa) Indonesian - a highly restricted dialect used mainly in writing and formal speech
• Spoken (Colloquial) Jakartan Indonesian - the accommodation between Standard Indonesian and other varieties present in a given location:
  ✓ Betawi
  ✓ Chinese
  ✓ Malay
  ✓ Javanese
  ✓ Sundanese
• A language variety that has been claimed to lack lexical stress altogether
Prosodic Studies of Indonesian

- Stress is phonetically weak and has no distinctive function (Laksman, 1994; Teeuw, 1984, as cited in Zanten, Goedemans & Pacilly, 2003; Zanten & Heuven, 2004)

- Stress is free and acceptable in any position within a word unless it is the very first or the last syllable of a whole sentence, or the penultimate syllable is ‘heavy’ (Heuven & Zanten, 1997; Zanten & Heuven, 2004)
Prosodic Studies of Indonesian

• Word stress is relatively fixed:
  ✓ on the penultimate syllable unless it has the central vowel [ə] (Halim, 1984, as cited in Laksman, 1994; Teeuw, 1984, as cited in Zanten, Goedemans & Pacilly, 2003)
  ✓ on the ultimate syllable (Samsuri, 1971, as cited in Zanten, Goedemans & Pacilly, 2003)

• No stress at the word level at all, at the phrasal and sentential levels only (Halim, 1974, as cited in Goedemans & Zanten, 2007; Zubkova 1966 as cited in Goedemans & Zanten, 2007)
Prosodic Studies of Adult Jakartan

  - exclude the penultimate stress within a word hypothesis
  - argue that there is no stress at the word-level at all
  - phrase-level prominence is considered to be the only plausible alternative
- Odé (1994)
  - no fixed or free word stress
  - prominence should be described as beyond the syllable level
- Laksman (1994)
  - the pre-final vowel always has the highest fundamental frequency, which is a direct correlate of word stress
  - a schwa can be stressed and should not be considered an exception
How do children cope with a lack of word stress in the input?

? Are the younger generations imposing a metrical structure on the raw data, where prominences may be present?

? Are they acquiring a ‘flat’ structure, representative of the ambient language?
Methods

Data

• Data from two Jakarta Indonesian children (i.e. PRI and MIC), over several years, from CHILDES database (Gil & Tadmor 2007; cf. MacWhinney 2000)

• This study focuses on 2 monolingual children, since local languages can have an influence on the production/perception of prosody (van Zanten & Heuven 2004, van Zanten et al. 2003)
Procedure

- Recordings at youngest and oldest age were selected, with one selection from middle of range.
- Files were sampled after 10 minutes, and approximately 10 minutes of recording were taken at each sample and annotated.
- Duration, mean F0, max F0, max Intensity measured for each vowel.

<table>
<thead>
<tr>
<th>Child</th>
<th>Start</th>
<th>Middle</th>
<th>End</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI</td>
<td>2;7</td>
<td>4;1</td>
<td>6;1</td>
<td>F</td>
</tr>
<tr>
<td>MIC</td>
<td>2;0</td>
<td>3;0</td>
<td>3;10</td>
<td>M</td>
</tr>
</tbody>
</table>
Results
Comparisons with respect to duration indicated final syllables are significantly ($p > .05$) longer than penultimate in later stages.
Comparisons of penult and final syllables for both children with respect to mean f0 and peak f0 were not significant.
When utterance-final measures were removed, comparisons of duration remained significant for the younger child, but were no longer significant for the older child.

**Utterance-final Duration (MIC)**

<table>
<thead>
<tr>
<th></th>
<th>2;0</th>
<th>3;0</th>
<th>3;10</th>
</tr>
</thead>
<tbody>
<tr>
<td>final</td>
<td>200</td>
<td>220</td>
<td>200</td>
</tr>
<tr>
<td>non-final</td>
<td>190</td>
<td>170</td>
<td>190</td>
</tr>
</tbody>
</table>
Utterance-final Duration (PRI)

- final: 2;7
- non-final: 4;1
- final: 6;1

Significance:
- p < .001
- p < .01
- p < .0001
Non-Utterance Final Syllables

<table>
<thead>
<tr>
<th>MIC</th>
<th>Duration</th>
<th>Max F0</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2;0</td>
<td>n.s.</td>
<td>n.s.</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>3;0</td>
<td>n.s.</td>
<td>n.s.</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>3;10</td>
<td>p &lt; .05</td>
<td>n.s.</td>
<td>p &lt; .05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRI</th>
<th>Duration</th>
<th>Max F0</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2;7</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>4;1</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>6;1</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

- While MIC exhibits some variation, with consistent higher intensity differences between final and penultimate syllables,
- PRI exhibits **no differences whatsoever.**
Conclusion

- Implication: there are no consistent cues to word stress in Jakartan
- Final lengthening in utterances accounts for most durational differences
- There are no pitch differences
- This raises the question of whether children exploit any prosodic cues perceptually
- Results indicate that final lengthening is a strategy that may aid in utterance boundary identification
Strengths and Limitations

- First study to look at Child Jakartan Indonesian
- Focus on monolingual children
- Small number of children and uneven age distributions
- No adult comparative data