Reduplication facilitates early word segmentation

Citation for published version:

Link:
Link to publication record in Edinburgh Research Explorer

Document Version:
Peer reviewed version

General rights
Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy
The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.
Reduplication facilitates early word segmentation
Barbora Skarabela and Mitsuhiro Ota
University of Edinburgh

INTRODUCTION
Background
• Infants’ word segmentation is facilitated by distributional cues and knowledge of familiar words (e.g., own names, mommy).
• Is early word segmentation also facilitated by the phonological shape of words, such as reduplication (sound repetition)?

Why reduplication?
• Neonates show greater brain activation in response to immediate repetition (e.g., mubaba cf. bamuba, mubage) (Gervain, Macagno, Cogoi, Peña, & Meisler, 2008; Gervain, Berent, & Werker, 2012).
• Repetition facilitates pattern generalization in infants and adults (Endress, Dahaene-Lambertz, & Meier, 2007; Gomez & Gerken, 1999; Gomez, Gerken, & Schwanefeldt, 2000; Marcus, Vijayan, Rao, & Vashiton, 1999).
• Early-acquired words often contain repetition of whole syllables or consonants, as in daddy, baa-baa and yamyym (Endress, Nespor, & Meier, 2009; Gervain & Werker, 2008).

Research question
• Are young infants better at segmenting novel words in running speech that are reduplicated than novel words that are not reduplicated?

METHOD
Participants
• 24 9-month-olds (13 , M = 8m 28d, Range: 8m 12d - 9m 12d)
Materials
• 12 novel words: disyllabic CVCV structures in English
• Controlled for phonotactic and neighbourhood properties

<table>
<thead>
<tr>
<th>Set</th>
<th>Replicated</th>
<th>Nonreproduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>neenee/tr/ne</td>
<td>neefoo/tr/ne</td>
</tr>
<tr>
<td>B</td>
<td>boby/b/o/b/p/l</td>
<td>boby/b/o/b/l</td>
</tr>
<tr>
<td>C</td>
<td>yahdaw/daw/yah</td>
<td>yahdaw/daw/yah</td>
</tr>
</tbody>
</table>

RESULTS

Familiarization
- 6 trials:
  - 3 x passage* with reduplicated word (e.g., 6 x neenee)
  - 3 x passage with nonreproduced word (e.g., 6 x boby)

Test
- Central fixation
- 12 trials:
  - 3 blocks with 4 conditions (+/- reduplicated x +/- familiarized)

Mean looking times by word type, familiarization and block.

DISCUSSION and CONCLUSIONS
• Infants are more likely to segment reduplicated rather than nonduplicated words in running speech. They preferentially attend to repeated patterns in the context of word learning.
• It is likely that this is an inherent cognitive bias rather than an experience-based bias from the input.
• This bias may be the source of the prevalence of reduplication in baby-talk words.
• Interestingly, this bias runs against the tendency to avoid adjacent sound repetition in adult language and processing (e.g., Boz-Avedian & Kager, 2014). A conflict between constraints on learning and constraints on linguistic systems?

Reduplication bias from input?
Not likely: Immediate repetition of syllables in infant-directed speech is typically not higher than chance level.

Figure 1: Mean looking times by word type, familiarization and block.

Figure 2: Observed (black dots) vs. simulated (violin plots) frequency of immediate syllable repetition in the infant-directed speech of 9 mothers in the Brent-Ratner corpus. Simulated = random combinations of two syllables using the Monte Carlo method.