Background
Word boundaries in continuous speech are hardly acoustically marked. However, listeners use language-specific cues (e.g., lexical stress placement) to segment speech into words (for an overview, see Cutler, 2001).

How are listeners influenced by this native-language segmentation experience when confronted with an unknown foreign language? French has final accent, and French listeners benefit from vowel lengthening and/or a pitch change on the final syllable of each word in an artificial language (Bagou et al., 2002). Dutch has mainly initial stress, and Dutch listeners benefit from a pitch rise on the first syllable of each word in an artificial language (Vroomen et al., 1998).

BUT: Can listeners benefit from regularities that are not familiar from their native language?

The Current Study
An artificial language of 9 randomly concatenated words was presented to French and Dutch adult listeners in 3 versions: with no stress vs. those with initial- or final-syllable stress (pitch excursion) on each word. An additional experiment tested word-boundary characteristics shared.

Method

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<th>French vs. Dutch Experiment</th>
<th>Australian Experiment</th>
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<td>72 French Listeners (Dijon, France)</td>
<td>72 Australian Listeners (Sydney, Australia)</td>
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<tr>
<td>72 Dutch Listeners (Nijmegen, The Netherlands)</td>
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9-word artificial language
6 three-syllable (CVCCV) 3 four-syllable (CVCCVCC)

A pool of 30 diphone-synthesized (MBROLA) syllables from: 6 consonants (/p,b,m,f,s,k/) & 5 vowels (/a,e,i,o,u/), chosen to be as phonetically similar as possible between French and Dutch, were randomly allocated to words to create 24 unique languages, each of 10 minutes duration.

To test for the influence of phonetic differences, half of the participants heard a language synthesized using male Dutch diphones and half a language using male French diphones.

3 Between-Subjects Conditions
No Stress Initial Stress Final Stress
(first syllable) (last syllable)

No stress condition: Monotone 120 Hz.
Stress conditions: A parabolic pitch rise-fall from 120 Hz to 170 Hz over the 1st or last syllable of each word (from Thiessen & Saffran, 2003).

Test items: 27 pairs of words and partwords (e.g., last syllable of one word and the first two syllables of another word). Participants were asked to indicate which member of each pair was a word of the language.

Participants performed the task very well – all mean scores were above chance (50%, many significantly so).

Data were analysed using planned contrasts:
Stress (initial + final) > No Stress
M = 5.8%, SE = 2.5%, 95%CI: 0.8%-10.8%.

For French listeners, final stress > initial stress, regardless of talker accent. Dutch listeners unexpectedly benefited from final stress, regardless of the talker, and only benefited from initial stress when the talker’s accent was Dutch.

Significant Language Background x Stressed Syllable x Talker interaction: M = 5.9%, SE = 2.9%, 95%CI: 0.2%-11.7%.

Most of the Dutch participants had been exposed to French at school or on vacation, and many volunteered that the language “sounded French”.

Thus, Dutch listeners may have become sensitive to French word boundary cues. Only when the stress pattern was consistent with Dutch AND the speaker was Dutch did they benefit from initial stress.

Australian listeners, with much less knowledge of French, should benefit from initial stress only.

References