The perception of boundary tones in infancy across languages

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BACKGROUND

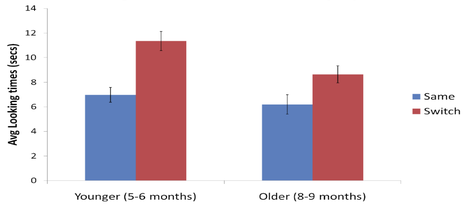
Like for consonants and vowels, infants' ability to discriminate lexical tones becomes language-specific with age (e.g., Mattock & Burnham, 2006)
However, we know less about when infants perceive pitch marking of prosodic units.

Intonation = use of prosodic features to express sentence-level meaning (Ladd, 2008)

Intonation and word order of statements and yes/no questions (Frota, 2014; Ladd, 2008; Elordieta & Hualde, 2014):

Language	STATEMENT	YES/NO QUESTION	Cue
English	The ball is red. **(L%)**	Is the ball red? **(LH% or H%)**	Word order Intonation
Portuguese	A bola é vermelha. **(L%)**	A bola é vermelha? **(LH%)**	Intonation
Basque	Baloia gorria da. **(L%)**	Baloia gorria (al) da? **(HL%)**	Intonation

Portuguese 5- and 8-month-olds are able to distinguish Portuguese statement and yes/no questions, even in the presence of segmental variability (Frota et al., 2014).



Can English-learning and Basque-learning infants discriminate Portuguese boundary tones (when all else is controlled)?

Is Portuguese-learning 5-month-olds' ability to categorize boundary tones in the face of segmental variability a consequence of their language experience? In other words, are Portuguese 5-mo-olds language-specific in their perception of boundary tones?

METHOD

Experiment 1: n=22
mean age = 127 days
range = 114:148;
12 girls

Experiment 2: n=22
mean age = 127 days
range = 111:153;
11 girls

Experiment 3: n=22
mean age = 128 days
range = 110:147;
10 girls

Experiment 4: n=21
mean age = 130 days
range = 114:134;
12 girls

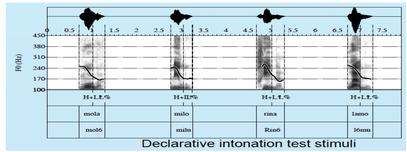
	Language of infants	Habit %	Stimuli type
Experiment 1	English	60	Segmental variability
Experiment 2	English	60	No segmental variability ("lamu" only)
Experiment 3	English	50	No segmental variability ("lamu" only)
Experiment 4	Basque	60	Segmental variability

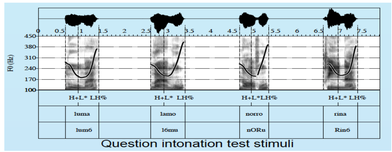
Visual Habituation Procedure (setup identical to Frota et al, 2014)

Habituation (infant-controlled)	TEST (novel)	CTRL (familiar)
IF Statement	**THEN** Question	Statement
IF Question	**THEN** Statement	Question

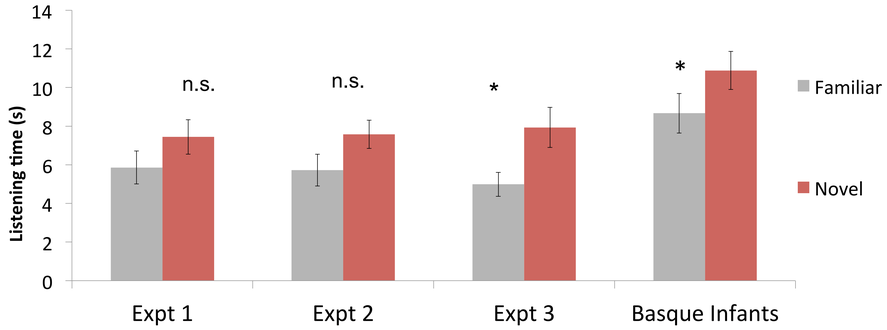
STIMULI

- 16 segmentally varied, single-prosodic word utterances of Portuguese - bisyllabic, all sonorant pseudo-words with initial stress
  (e.g., /malo/, /lemo/, /mela/, /luma/, /lamo/, /rina/).
- Produced by a female native Portuguese speaker in infant-directed register.
- Different pseudo-words used for the habituation and test phase (Frota et al., 2014).





RESULTS



DISCUSSION

-Native language experience influences the perception of boundary tones earlier in development than vowels, consonants or even lexical tone.

- 5-month-olds, whether they are learning Portuguese, English or Basque, are already language-specific in their perception of boundary tones in the face of segmental variability .

- Basque-learning infants' success in distinguishing Portuguese statements and questions demonstrates that English-learning infants' difficulty is not simply because they were tested with non-native stimuli.

English-learning infants' previously reported difficulty distinguishing English statements and questions likely stems from their limited ability to discriminate boundary tones.

The aspects of infants' specific language experience that give rise to cross-linguistic differences in developmental patterns, however, need further investigation.

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