Acoustic Correlates of Future Syntactic Structure in Active and Passive Sentences

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Introduction

Temporary Syntactic Ambiguity
- Resolved as the sentence unfolds

The pig was kiss- ed by the sheep

- Stromswold et al. (under review)
  - Listeners can predict syntax before hearing verbal inflection
  - Linguistically trained speaker lengthened passive verb stems

Do naive adult speakers also lengthen passive verb stems?
Are there other acoustic cues to active and passive structure?

Materials

 Actives: The_____ was_____ -ing the_____.
 Passives: The_____ was_____ -ed by the_____.

Verbs
- Each verb occurred in an active and a passive
  - 16 verbs x 2 syntactic structures = 32 sentences
- Each noun occurred in first NP and second NP position
  - 32 sentences x 2 NP positions = 64 sentences

Nouns
- bear  elephant  lion  rhino
- cat  fox  monkey  sheep
- cow  frog  mouse  turtle
- dog  hippo  pig  zebra
- duck  kangaroo  rabbit

Methods

Data Collection
- 7 adult monolingual native English speakers
  - Recorded audio in sound-attenuated booth
    - Sampling rate: 44.1 kHz
    - Equipment: Digital preamplifier and head-mounted condenser microphone
    - Read sentences once silently before reading aloud

Data Processing
- 3 coders marked morpheme boundaries using PRAAT
  - High inter-rater reliability (p < .001)
  - Calculated mean intensity, mean pitch, and duration

Results

- Significant passive verb stem lengthening effect for all participants
- Actives louder than passives
- Auxiliary strengthening
  - All participants said actives louder
  - Difference significant for 3 participants
  - Auxiliary lengthening
    - 6 participants lengthened passive auxiliary
      - Significant for 1 participant

Discussion

- Passive verb stem lengthening is robust
  - Significant for all 7 participants
- Other acoustic cues
  - Some evidence of auxiliary lengthening
  - Some evidence of higher intensity in actives
- Why is the passive verb stem longer?
  - Stem longer in monosyllabic words for Germanic languages (Beckman & Edwards, 1990)
    - Active inflection -ing is syllabic
    - Passive inflection -ed is not
- Why do speakers cue this syntax?
  - Likely not intentional
    - Participants were not speaking to someone else
  - Did not think audio would be used in a comprehension study
    - Particularly if effect is phonological
- Future work
  - Comprehension study using same sentences
  - In adults and in children
  - Follow-up production study
  - Include auxiliary has (e.g., The pig has kissed the sheep)

References


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