

Do Listeners Keep Track of Global Prosodic Information?: Evidence from an Eye-Tracking Study

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Abstract

Recent studies (e.g., Carlson et al., 2001) have argued that attachment decisions are affected not by the absolute size of the boundary but by its size relative to relevant earlier boundaries in an utterance. This study examines listeners' sensitivity to global prosodic information in both on-line and off-line processing. In contrast to previous findings, listeners were not sensitive to relative boundary size in the relative clause structure that we investigated. Listeners' attachment decisions were reliably affected by the absolute size of the most recent boundary.

Previous Work

Intonational Boundaries:

- Perceptual Breaks in the speech stream
 - Lengthening, pausing, changes in F0

Boundaries and Attachment:

(1) *Someone shot the servant (a) of the actress (b) who was on the balcony.*

- Boundaries act as a signal to syntactic closure
 - Bias listeners to look away from the referent of the word at the boundary (eye-tracking, Lee et al., 2008)
 - Boundary at (a) --> low attachment
 - Boundary at (b) --> high attachment
- Relative boundary size matters (offline, Carlson et al., 2001, Clifton et al., 2002)
 - HA interpretation is more likely when boundary (b) > boundary (a) than (b) = (a), or (b) < (a)

Experiment 1

Research Question:

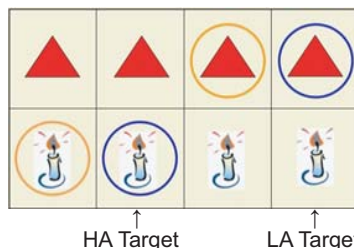
- Do listeners keep track of global prosodic structure (i.e., relative boundary size) during on-line processing?
 - Whether boundaries are interpreted *locally* or *globally*?
 - Visual world eye-tracking paradigm

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□ Auditory Instruction

(2) *Click on the candle below the triangle that's in the blue circle.*

□ Example Visual Display



□ Participants selected one of the pictures in the display according to auditory instructions

□ 4 Boundary Conditions (2 x 2)

(3) *Click on the candle (IP/ip) below the triangle (IP/ip) that's in the blue circle.*

(IP: intonational boundary ▪ ip: intermediate phrase boundary)

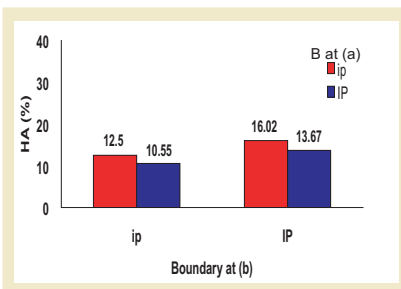
□ Measures

- 1) % of post-sentence HA responses
- 2) Proportion of fixations towards HA referents (candles)

□ Predictions (Both Behavioral & Fixation data)

- The *Local* Interpretation Hypothesis (% HA)
 (ip, IP), (IP, IP) > (IP, ip), (ip, ip)
- The *Global* Interpretation Hypothesis (% HA)
 (ip, IP) > (IP, IP), (ip, ip) > (IP, ip)

□ Results (64 Subjects)

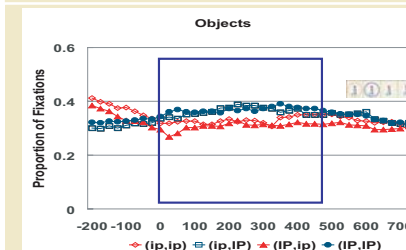


1) Behavioral data

- Main effect of boundary at (b):
 ip < IP
 (F(1,63)=6.3, F2(1,31)=5.8)

2) Eye Fixation Data

- After the onset of "that" (y-axis : Proportion of Fixations)



- Consistent with the selection data
- Main effect of boundary at (b)
 (F(1,63)=6.4, F2(1,31)=8.9)

- The results indicate that listeners interpreted late boundaries just *locally* --> **Contradict previous findings**

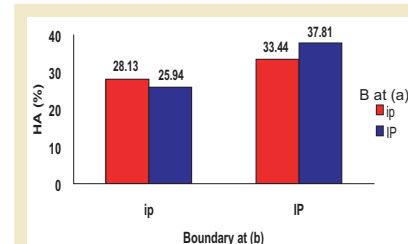
Experiment 2

Does the absence of an interaction in Expt. 1 reflect effects of referential context?

- Same test items as in Expt. 1, **without** visual scenes
- Two-alternative forced choice task
 - e.g., *The triangle is in the blue circle* (LA) vs. *The candle is in the blue circle* (HA)

□ Results (40 Subjects)

- Replicated Expt. 1
- Main effect of boundary at (b)
 (F(1,39)= 6.7, F2(1,31)=7.0)



Discussion

- Conflicting findings across studies seem to suggest that listeners do not always keep track of global prosodic information in parsing.
- Default structural preferences & listeners' sensitivity to global prosodic structure
 - In our data, early boundaries might have provided just redundant (thus, uninformative) information to listeners as low attachment was already structurally preferred.