The Role of Structural Parallelism in Anaphoric Antecedent Resolution

Neal E. Snider (nusinder@rochester.edu) Jeffrey T. Runner (runner@ling.rochester.edu)
Departments of Brain & Cognitive Sciences and Linguistics, University of Rochester

Introduction

During comprehension, lexical items activate their semantic and phonological neighbors, as reflected by eye movements (Allopenna89b, Huettig&Altman05, Yee&Sedivy06). We investigate to what extent different types of anaphors activate the lexical representation of their antecedents, particularly the similarities with initial comprehension as evidenced by neighborhood effects. We look at anaphoric reactivation by VP ellipsis (example 1 below), (do-in) (2) and pronoun (3) anaphora.

Several linguistic theories (see Merchant03) hold that the entire VP is restructured at the ellipsis site, which we take as a prediction that the lexical content will be reactivated during ellipsis processing. This VP reactivation should have effects on the reactivation of related items (semantic and phonological). However, linguistic trees of VP (example 1) and pronoun anaphors only require conference with an event and an entity respectively. Therefore, we only expect reactivation of the relevant and its semantic neighbors. Assuming a linking hypothesis between “activation...and likelihood of fixation” (Tanenhaus&Brown-Schmidt88), we test these predictions in two visual world eye tracking experiments.

Method

We monitored participants’ eye movements as they listened to one of four ellipsis, anaphora (do-in) and pronoun), or control sentences (see examples) while four pictures appeared on screen (from Yee&Sedivy06). One picture (the Target) was the object of the antecedent clause, one was related (the Related) to the Target semantically or phonologically, and the other two were distractors. After the antecedent clause, participants clicked on a fixation cross on a blank screen before hearing the second clause. There were 24 fillers, 8 monocausal, and 16 bi-causal with different object referents in the first and second clauses.

Analysis

The region of interest for the analysis was a 400ms window starting 150ms after the offset of the verb. Gaze state dependencies and subject and item effects were controlled using mixed-model logistic regression (Frank et al2009). Effects of the ellipsis/and anaphoric eye movements at the beginning of the analysis region and the slope of eye movements (effects after the ellipsis or anaphor) were analyzed, as well as their interaction with the conditions.

Expt 1: Semantic neighbor

(21 participants, 24 items)

The security guard opened the lock, (Antecedent) and the night watchman... (1) did, too.
(2) did it, too. (Do-in)
(3) slept. (Intrinsice control)
(4) slept.

Both Target and Related are likely to be involved in an event described by the Antecedent and Pronoun condition verb (by off-line norms).

Expt 2: Phonological cohort

(29 participants, 20 items)

The customer picked up the lock, (Antecedent) and the manager... (1) did, too.
(2) did it, too. (Do-in)
(3) slept. (Intrinsice control)
(4) slept.

Both Target and Related are INDIFFERENTLY likely to be involved in an event described by the Antecedent verb and Pronoun condition verb.

Conclusion

Reactivation of antecedent nominals in VP ellipsis and (do-in) anaphora seems to have the same time course of processing as in the antecedent clause:

If a semantic neighbor and the verb is predictive of the Target and Related

⇒ only predictive, anticipatory eye movements in the antecedent and VP ellipsis/anaphor

If a phonological cohort and the verb is not predictive of the Target or Related

⇒ no predictive eye movements and only increasing eye movements upon hearing the antecedent and ellipsis.

This is consistent with reactivation of the antecedent VP at the VP ellipsis/anaphor site with a similar time course of processing. Further:

• VP ellipsis reactivates more lexical structure than

• VP (do-in) anaphora, which reactivates event semantics

References


We would like to thank NSF (BCS-0518842), NIH (HD-27206), and the Center for Language Sciences at the University of Rochester for their support. Also thanks to Eiling Yee for the visual stimuli, and Stephanie Huston for help with recorded materials.