Where to next? Pronoun interpretation as a side effect of discourse direction

Hannah Rohde, Andrew Kehler, & Jeffrey L. Elman (UC San Diego)
hannah@ling.ucsd.edu

Previous work has demonstrated that pronouns are resolved differently in transfer-of-possession passages that vary by verbal aspect (Rohde et al. 2006, cf. Stevenson et al. 1994), suggesting that event structure influences referent identification.

(1) [Perfective - salient Goal]: John$_{SOURCE}$ gave a book to Bob$_{GOAL}$. He_____
(2) [Imperfect - salient Source]: John$_{SOURCE}$ was giving a book to Bob$_{GOAL}$. He____

Further, the influence of event structure was observed only in passages in which certain coherence relations were inferred to hold (Rohde et al. (2006), Arnold (2001)). Since verbal aspect itself influences the elicited coherence relation (e.g., Elaboration/Explanation/Occasion/Parallel/Result/ViolatedExpectation from Kehler (2002), cf. Wolf et al. (2004)), Rohde et al. suggested that the influence of verbal aspect may be a side-effect of the influence of coherence type.

Given that hypothesis, we predict that a shift in the distribution of coherence relations ought to induce a shift in the distribution of pronoun interpretations. To test this, we designed two experiments to manipulate the distribution of coherence relations in story continuations.

Study 1: We modified Rohde et al.'s stimuli to include different types of objects-of-transfer, anticipating that abnormal objects would elicit more continuations *explaining* the event (i.e. Explanation relations).

(3) John gave/was-giving a **book/bloody-meat-cleaver** to Bob. He_____
      (perf)/(imp)   (normal)/(abnormal)

Sixty-nine monolingual English speakers wrote continuations for passages like (3). Judges annotated the unambiguous passages for the intended pronoun interpretation and the coherence relation. As predicted, the distribution of coherence relations differed significantly by object type. The distribution of pronoun interpretations, however, was not significantly affected—abnormal objects yielded more Explanations and fewer Elaborations (two Source-biased relations), but they also yielded more Results and fewer Occasions (two Goal-biased relations). Together, these shifts in coherence had a canceling effect, rendering the overall pronoun interpretation pattern similar to that from Rohde et al.'s original experiment. The data did, however, provide conditional probabilities for the likelihood that a pronoun refers to a specific referent given a coherence relation; these probabilities show that pronoun interpretation varies based on coherence relation. Furthermore, these probabilities were consistent with the biases observed by Rohde et al.

Study 2: If coherence is what matters, passages containing more Source-biased relations should contain more Source interpretations. In our second experiment we changed only the instructions for Rohde et al.'s original stimuli. Forty-two monolingual English speakers were instructed to write continuations for passages like (1) & (2), answering either the question "Why?" (Explanation) or "What happened next?" (Occasion or Result).

As predicted, pronoun interpretation and coherence differed significantly by instruction type. The pattern of interpretation corresponded directly to the distribution of coherence relations. No model of pronoun interpretation that ignores coherence relations can account for these results, since the stimuli were identical between conditions. The conditional probabilities were again consistent with the original experiment. Using the probabilities from our first experiment along with the coherence breakdown for each participant in our second experiment, we can reliably predict the distribution of pronoun interpretations from discourse factors alone. E.g., for Source resolutions (SR):

(4) %SR=%Elab*p(SR|Elab) + %Exp*p(SR|Exp) + %Occ*p(SR|Occ) + %Par*p(SR|Par) + %Res*p(SR|Res) + %V-E*p(SR|V-E)

In summary, these experiments demonstrate that a shift in the distribution of coherence relations results in a predictable, corresponding shift in pronoun interpretations. This work lays the groundwork for a predictive model of pronoun interpretation that incorporates information about discourse coherence.

References
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