Pronominalization and expectations for re-mention: Evidence from benefactives

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Abstract

Coherence provides a window into people’s inferences and expectations about relationships that hold across sentences. Different approaches to coherence place different emphasis on the roles of meaning (Winograd 1972; Hobbs 1979) and form (Ginzburg et al. 1995)—two components which are combined in the Bayesian Model put forward by Kehler et al. (2008). The Bayesian Model, in its strong form, posits the independence of a referent’s referentiality for re-mention and its likelihood of being mentioned with a pronoun. However, evidence regarding this independence is mixed.

We use a new context type with three referents to test:
(i) whether predictability influences pronounization
(ii) whether Bayes’ Rule captures the relationship between pronoun interpretation and production

In a story continuation experiment, we replicate two previously-established findings: that the presence of a pronoun boosts the proportion of continuations about the subject, and that grammatical role influences pronounization. We find no evidence of any dependence between predictability and pronounization.

While both these findings are in line with the Bayesian model, the Bayesian model is not the best quantitative fit for our data when evaluated against other models. Follow-up studies will evaluate if this is due to the 3 referent context or to the specific construction we tested.

Goal

To replicate/extend findings on pronoun production and pronoun comprehension to a new type of sentence frame with more than two referents.

Models of coherence

Mirror Model

Listeners base their interpretation decisions on their estimates of the speaker’s likelihood to use a pronoun to mention particular referents (Ariel 1990; Gundel et al. 1993)

\[ p(\text{referent|pronoun}) \approx p(\text{pronoun|referent}) \]

Expectancy Model

Listeners’ expectations about who will be mentioned next determines their interpretation of a subsequent pronoun (Arnold 2001)

\[ p(\text{referent|pronoun}) \approx p(\text{pronoun|referent}) \]

Bayesian Model

Incorporates both of these components: an expectation about which referent will be re-mentioned (the prior) and an estimate of how likely a speaker is to use a pronoun when re-mentioning a particular referent (the likelihood) (Kehler et al. 2008; Kehler & Rohde 2013; Rohde & Kehler 2014)

\[ p(\text{referent|pronoun}) \approx p(\text{pronoun|referent}) \times p(\text{referent}) \]

Strong versus weak Bayes

(1) a. John scolded Bob. He ___________ [pronoun prompt condition]
   b. John scolded Bob. ___________ [free prompt condition]

In story continuations involving items like (1), a pronoun is more likely to be interpreted as referring to the one referent (Bob in 1a), but more likely to be produced to refer to the other (John in 1b) (Stevenson et al. 1994)

The Bayesian model captures this asymmetry

In its strong form, the Bayesian model separates the discourse features that influence the prior and the likelihood:

meaning drives the prior
topicality drives the likelihood

This complete separation has been contested in recent work that shows that the likelihood of pronounization increases for referents with a higher prior (e.g., Rosa & Arnold 2017)

In its weak form, the Bayesian model states that the pronoun production and interpretation are related by Bayesian principles.

Discussion

As in earlier work, the Bayesian Model’s correlation with the observed pronoun interpretation is higher than that of the Expectancy Model. In contrast to earlier work, however, the Mirror Model provided the best fit to the observed data, at least in the by-items analysis.

The Bayesian model’s poor performance due to the presence of three referents, or does it have something to do with the specific sentence frame (Benefactives)?

Follow-up 1: Benefactive sentence frames with 2 human referents (n=85)

(4) Adam scolded the clean-up crew for Russel.

References


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