

The mechanics of causal discourse expectations

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Psycholinguistic studies of discourse structure have revealed interpretation biases which prove to be highly consistent across production and comprehension, experimental paradigms and languages. For instance, (1) illustrates that the default interpretation of the pronoun varies with the verb and the discourse relation – a phenomenon commonly referred to as implicit causality (IC; (1a) and (1b)) and implicit consequentiality (1c) biases (e.g. Pickering & Majid 2007).

- (1) a. John congratulated Bill because he... (he = Bill)
b. John fascinated Bill because he... (he = John)
c. John fascinated Bill so he... (he = Bill)

Semantic and pragmatic theory, however, have largely ignored discourse biases such as IC, even though these provide an interesting window into the interaction of verbal semantics and discourse coherence relations. The existing research suggests that discourse coherence (Kehler et al. 2008) and verbal semantics (Au 1986; Hartshorne & Snedeker, t.a.) are important factors of IC. However, the exact nature of IC is still poorly understood. Thus, verb-based accounts of IC have merely established correlation patterns between reference resolution and thematic properties of verb arguments (in different guises; cf. e.g. Brown & Fish 1983, Hartshorne & Snedeker, t.a.). Likewise, Kehler et al. (2008) did not explain why it is that IC verbs are prone to trigger the expectation that an explanation will follow.

In the first part of the talk, I will present a new semantic theory of IC proposed by Bott & Solstad (forthcoming) which incorporates the discourse coherence and reference resolution properties of IC verbs. IC verbs, we claim, trigger expectations for *specific explanation types* building upon the causal typology proposed by Solstad (2010). They do so because they are *underspecified with respect to causal content* which is crucial to the conceptualization of the event or state denoted by the verb. Put differently, IC verbs carry an empty “slot” for specific explanatory content. On this view, IC reflects a general processing preference for not leaving missing content unspecified, i.e. a tendency to avoid accommodation (Altmann & Steedman 1988; van Berkum et al. 1999; van der Sandt 1992). On our account, the reference resolution property of IC verbs is but an epiphenomenon of the explanatory preferences which derives from the association of the missing content with one of the two arguments of IC verbs.

In the second part of the talk I will present empirical evidence from three discourse continuation studies in which we manipulated whether the missing causal information was already provided in the prompt or not. Consider, for instance, (2).

- (2) John congratulated Bill (on the brilliant victory) because he...

The results show an almost perfect correspondence between the type of causal content left underspecified by the verb, the causal type of explanations triggered and the observed coreference. Specifying the causal content in the prompt completely changed the distribution of explanation types in a fully predictable way and, as a consequence, eliminated the IC biases observed in the unmodified conditions. The results thus show that IC bias strongly depends on the availability of specific explanation types and that it can be manipulated by specifying those implicit explanations. It should be emphasized that our theory can also account for focussing effects in processing (see, e.g., Koornneef & van Berkum 2006, Pyykkönen & Järviö 2010): If a verb triggers a specific kind of explanation, we may expect focussing, i.e. anticipation, of the associated referent.

As to the relevance for studies on anticipatory processing in general, it may be noted that our theory operates at the level of general expectation types, more specifically *different subtypes of explanation relations*, whereas much work on anticipation to date has been concerned with particular expectations at token level, e.g. expectations regarding the occurrence of specific words and token-specific features (cf. the overview in Kamide 2008). We will conclude with predictions for online studies on IC bias we are currently preparing.

References: Altmann & Steedman (1988): “Interaction with context during human sentence processing”, *Cognition* • Au (1986): “A verb is worth a thousand words”, *JML* • Bott & Solstad (forthcoming). From verbs to discourse: a novel account of implicit causality. T appear in Hemforth, Schmiedtová & Fabricius-Hansen (eds.): *Experimental approaches to cross-linguistic meaning* • Brown & Fish (1983): “The psychological causality implicit in language”, *Cognition* • Hartshorne & Snedeker (t.a.): “Verb argument structure predicts implicit causality”, *LCP* • Kamide (2008): “Anticipatory Processes in Sentence Processing”, *LaLC* • Kehler et al. (2008): “Coherence and coreference revisited”, *JoS* • Koornneef & van Berkum (2006): “On the use of verb-based implicit causality in sentence comprehension”, *JML* • Pickering & Majid (2007). What are implicit

causality and consequentiality? *LCP* • Pyykkönen & Järvikivi (2010): "Activation and persistence of implicit causality information in spoken language comprehension", *EP* • Solstad (2010): "Some new observations on *because (of)*", in *AC proceedings 2009* • van Berkum et al. (1999): "Early referential context effects in sentence processing", *JML* • van der Sandt (1992): "Presupposition Projection as Anaphora Resolution", *JoS*.