PROBABILISTIC DISCOURSE MARKERS– ABDUCTION AND ADVERSATIVE CONJUNCTION

This work discusses a Bayesian treatment for the interpretation of adversative conjunctions, exemplified with the English connective *but*. Specifically, it focuses on examples like (1) and (2) which offer a challenge for most theories of adversative conjunction since they contrast the same left conjunct with two right conjuncts which are the negation of each other. It's been argued that a *probabilistic argumentative* treatment of *but* can account for these cases (Anscombre & Ducrot, 1977; Merin, 1999; Author, 20XX), i.e. an account that analyzes an utterance "A *but* B" as follows:

- The left conjunct A must raise the probability of some pivot conclusion C
- The right conjunct B must be a counter-argument to C, i.e. it must lower $P(C)$

Probabilistic AT deals with (1-2) by considering that they rely on different argumentative pivots. (1) uses a pivot akin to H_{excl} ="*Lemmy is the only one to play basketball*", whose probability is raised by the first conjunct and lowered by the second conjunct (which contradicts H_{excl}). (2) instead targets H_{alt} ="*Lemmy is not the only one to play basketball*". Here, we refine this analysis by proposing a model for the abduction process by which the pivot of the utterance is determined. We show that there should generally be a preference for abducing H_{alt} as the most likely goal to be targeted by a speaker who asserts the first conjunct of (1) and (2). We argue that this predicts a preference for (2) over (1) (confirmed by experimental results, see Fig. 2).

We model the abduction process as follows. Let $G_A = \{H_i \mid rel(A, H_i) > 0\}$ be the set of potential goals associated with an utterance of content A ($rel(A, H_i)$ is a relevance function that measures the argumentative potential of a content A for a conclusion (Hypothesis) H_i Merin, 1999 ; van Rooij, 2004). Abduction seeks to determine $H_{opt} \in G_A$, i.e. the most likely goal to be targeted by the speaker of A. In Bayesian terms, this means finding H_{opt} that maximizes $P(H_{opt}|A)$. The conclusion targeted by an utterance needs to obey the argumentative constraints imposed on it by all operators in the discourse. For (1-2), we argue that the abduction process is a two stage process: (*i*) a goal H_{opt} is abduced for the first conjunct, and (*ii*) is fed in the semantics of the conjunction *but*. If H_{opt} is compatible with the instructions of *but*, i.e. if the second conjunct argues against H_{opt}, then H_{opt} is kept as the pivot. If not, a reanalysis process requires interpreters to find a goal which satisfies the constraint of *but*. We therefore predict that when the goal H_{opt} abduced from the first conjunct isn't compatible with the rest of a conjunction, interpreting the utterance requires more effort than an utterance that involves no reanalysis of H_{opt} and should be dispreferred. We argue that out of the blue, and based on the content of the first conjunct, in most cases the goal H_{alt} is favoured over H_{excl}, i.e. (2) should be favoured over (1). Fig. 1 shows the difference between the posterior probabilities of these two goals as a function of n the number of alternatives to Lemmy, and b the probability that a "random" person plays basketball (calculations withheld for reasons of space). As the number of increases, so does the difference between $P(H_{alt})$ and $P(H_{excl})$, meaning that, overall, a sentence like (2) should be preferred. As the probability b decreases, sentences like (1) are predicted to become more acceptable. In other terms, when the property being discussed is a "rare" one, it should be easier to contrast the fact that two people have the property in question. This makes intuitive sense, as (3) appears better than (1) and being ambidextrous is indeed more rare than playing basketball. Experiments however failed to exhibit an effect of the scarcity of the predicate used (Fig. 2). Less intrusive methods (eye-tracking) are currently being investigated to better study this aspect of our proposal.

Examples

(1) Lemmy plays basketball, but so does Ritchie.
(2) Lemmy plays basketball, but Ritchie does not.
(3) Lemmy is ambidextrous, but so is Ritchie.

Figures

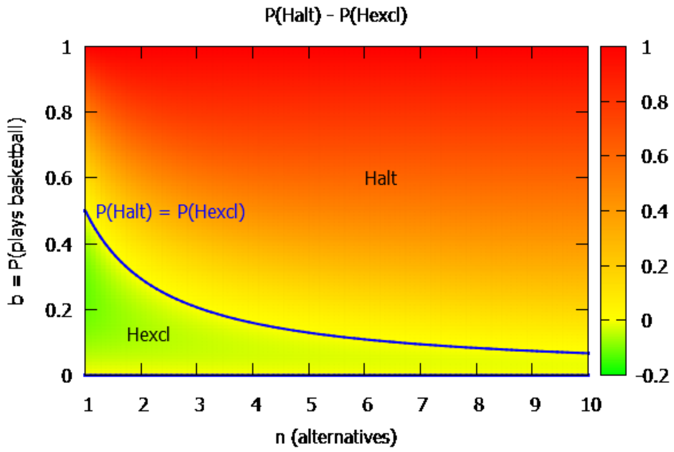

Figure 1 Comparing posterior probabilities P(Hexcl) and P(Halt) in terms of the number of alternatives to the object of the predicate in the left conjunct *n* and probability *b* of the core predicate of the left conjunct.

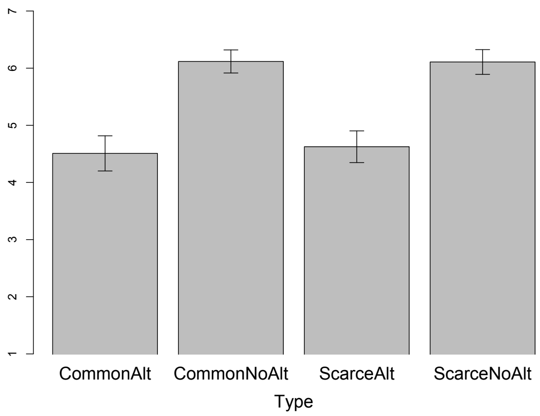

Figure 2 Acceptability judgments, comparison of items like (1) (Alt condition) and (2) (NoAlt condition), with a common predicate (Common condition) and a rare predicate (Scarce condition) (30 participants, 7-point Likert scale, 16 exp. items pseudo-randomized in a Latin square design). The difference between Alt and NoAlt conditions is significant ($\chi(1)=20.83$, $p<0.01$).

References

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