

On the Suspension of Implicatures

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Abstract

In this talk we apply the techniques of preferential models from nonmonotonic semantics to game theoretic pragmatics in order to explain the mechanisms underlying the cancellation and suspension of implicatures. We present a uniform account of scalar and relevance implicatures, and treat direct suspension by asserted content and indirect suspension by secondary implicatures.

The topic of our talk is an old one: that of suspension and cancellation of implicatures. The difference between these two forms of annulling an implicatures can be seen from the following examples:

- (1) a) Cancellation: Some, in fact all, of the boys came to the party.
- b) Suspension: Some, perhaps all, of the boys came to the party.

In both cases, the scalar implicature from “*some*” to “*some but not all*” is cancelled. In case of cancellation proper, there is an explicit contradiction between the scalar implicature and the literal content of the utterance. In the case of suspension, the speaker only asserts the possibility of its negation (Horn, 1989, pp. 234-235). The classical account is that of Gazdar (1979) who assumes that cancellation and suspension result from an incremental amplification of utterance interpretation, such that first all logical consequences are added, secondly, if consistent, all clausal implicatures, thirdly all scalar implicatures, and finally all presuppositions. Hence, annulation of scalar implicatures is explained by a contradiction with the logical consequences, and suspension by a contradiction with the clausal implicatures of an utterance.

In this talk, we propose a game theoretic model which not only explains the cancellation and suspension of scalar implicatures but also of *relevance* implicatures. Especially, we will discuss some principled examples which cannot be explained by a Gazdarian incremental account:

- (2) a) A: Does this job candidate speak Spanish?
 - i. He speaks Portuguese. +> He does not speak Spanish.
 - ii. B: I know he speaks Portuguese. +> B does not know whether he speaks Spanish.
- b) A: How did the students do in the exam?
 - i. B: Some students passed. +> Not many passed.
 - ii. B: I know that some students passed. +> B does not know whether many passed.

The first example, (2(a)i), shows a relevance implicature. (Hirschberg, 1991) explained it as a generalised scalar implicature which results from a relevance scale. The suspensions in (2(a)ii) and (2(b)ii) cannot be explained by an incompatibility with a clausal implicature as *know* does not generate clausal implicatures (Gazdar, 1979; Levinson, 2000). Hence, an incremental account would predict that the *i*) and *ii*) versions lead to exactly the same implicatures.

In this talk we, apply the techniques of preferential models from the semantics of nonmonotonic logics to game theoretic pragmatics in order to explain the mechanisms underlying the cancellation and suspension of implicatures.

From a logical point of view, implicatures are a kind of nonmonotonic inferences. A large class of nonmonotonic logics are concerned with inferences to what *normally* holds. For these logics, *normality* can be semantically defined by *preferential models* (Bossu & Siegel, 1985; Shoham, 1987; Kraus et al., 1990; Schlechta, 2004). We borrow the idea of preferential models and apply it to a game theoretic model of implicatures as developed in (Benz & v. Rooij, 2007).

At one point, Grice defined an implicature to be what *is required that one assume a speaker to think in order to preserve the assumption that he is observing the Cooperative Principle* (Grice, 1989, p. 86). We take this definition serious and explicate it in the framework of signalling games, more precisely, we identify the implicature of an utterance with the indicated meaning of a signal in the sense of (Lewis, 2002, p. 144), see also (Benz & v. Rooij, 2007; Benz, 2007). In this talk, we add to this definition a normality assumption which accounts for the nonmonotonicity of implicatures.

Speaking very generally, a nonmonotonic inference $T \sim R$ is valid in a nonmonotonic logic based on *preferential models* iff $M(T) \models R$ holds classically in a set $M(T)$ of preferred T models. $M(T)$ represents the assumptions about what normally holds if T is true. Let us again consider the standard example of a scalar implicature: *Some of the boys came to the party* (T) $+>$ *Not all of the boys came to the party* (R). In the common explanation of this implicature, it must be assumed that the speaker knows how many of the boys came, i.e. $M(T)$ only contains possible worlds in which the speaker knows the actual world. If the expert condition is violated, then the implicature doesn't arise anymore, as can be seen from (1b). Accordingly, we will propose a game theoretic model in which a joint preference relation over a partition of all speaker types is defined such that the implicature of an utterance is calculated with respect to the minimal partition in which the utterance is licensed. The standard implicatures then follow from a preference for types with *expert* speakers. They are suspended if the utterance can only be *optimal* if the expert assumption is violated. We show that this model can explain the examples in (2). In the remainder of this abstract, we provide a brief sketch of the solution.

Our basic structures representing utterance situations are *interpreted signalling games*, i.e. tuples $G = \langle (\Omega, P), N, \Theta, p, (\mathcal{F}, \mathcal{A}), u, c, \llbracket \cdot \rrbracket \rangle$ consisting of (1) a finite probability space (Ω, P) , (2) the set N of *speaker* and *hearer*, (3) a finite set $\Theta \subseteq \mathcal{P}(\Omega)$ of speaker's types, (4) a probability measure $p(\cdot | v)$ on Θ modelling the hearer's expectations about the speaker's type for each $v \in \Omega$, (5) the set of forms \mathcal{F} , (6) a set \mathcal{A} of hearer actions, (7) a joint payoff function u ; (8) a function c measuring the complexity of forms, and (9) an interpretation function $\llbracket \cdot \rrbracket$ for the forms. The speaker's payoff in a situation w in which he chooses signal F and the hearer action a is $u(a, w) - c(F)$. All costs are assumed to be nominal.

If G is an interpreted signalling game and (s, h) a solution to G , we call the triple $\mathcal{G} = \langle G, s, h \rangle$ a *solved interpreted signalling game*. The set of all propositions that the speaker *could* have had in mind when making his utterance is given by $\|F\| :=$

$\{\theta \in \Theta \mid \exists v \in \Omega : p(v) s(F|\theta) > 0\}$. This set represents the *indicated meaning* of an utterance F in the Lewisian sense. In accordance with the above mentioned Gricean characterisation of implicatures as the proposition that the speaker *must* have had in mind when making his utterance, we say that *an utterance of F implicates that R* , “ $\mathcal{G} \models F \text{+>} R$ ”, iff $\|F\| \subseteq R, R \subseteq \Theta$.

In order to account for the defeasibility of implicatures, we assume that for each form F there is a set $M(F)$ which represents the normality assumptions about *utterances* of F . The set $M(F)$ is derived from a *preferential model* $\langle \mathcal{N}, \leq \rangle$ consisting of a partition \mathcal{N} of Θ and a linear well-founded order \leq . The preferential model tells us which speaker types are *normal*. We then can define the normal utterance situations for F as the set $M(F) = \min\{N \in \mathcal{N} \mid \|F\| \cap N \neq \emptyset\}$. Adjusting our previous definition of implicatures leads to: “ $(\mathcal{G}, \mathcal{N}) \models F \text{+>} R$ ” iff $\|F\| \cap M(F) \subseteq R$.

For our examples in (2), we can assume that \mathcal{N} consists of the set N of types for which the speaker is an expert, and the set \bar{N} of types for which the speaker is not an expert. The normal case is the expert case. For a full theory, we need a general method for finding solutions (s, h) . Following (Benz, 2007; Benz & v. Rooij, 2007), we assume that backward induction is used, and that the speaker has a preference for shorter forms. It follows that the simpler *i*) forms in (2) implicate that the speaker is an expert. Hence, the implicatures of the *i*) forms can be explained as in the cited accounts. Now, if the speaker is not an expert, using the *i*) forms will be misleading. Hence, the shortest forms which are non-misleading are the *ii*) forms, in particular these forms implicate that the speaker is not an expert. As the implicatures of the *i*) forms depend on the expert assumption, this also explains the *suspension* of their implicatures. The implicatures of the *ii*) forms can then be derived from the presumed optimality of these forms in a similar fashion to the explanations of the implicatures of the *i*) forms in the expert case. There are important details missing in our sketch which cannot be provided here due to space limitations but will be presented in the talk.

References

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