Conversational implicature: interacting with grammar

Full paper: http://www.stanford.edu/~cgpotts/manuscripts/potts-interacting2013.pdf

1 Introduction

Grice defined conversational implicatures as social, cognitively complex meanings created jointly in interaction. Grammar-driven accounts are framed in opposition to this conception, especially for scalar implicatures (SIs): "the facts suggest that SIs are not pragmatic in nature but arise, instead, as a consequence of semantic or syntactic mechanisms" (Chierchia, Fox & Spector 2012; CFS).

I seek to mediate this debate. I describe a general framework for interactional models of implicature and then assess the major arguments for grammar-driven approaches. My central findings are that many of these arguments are conceptually or theoretically problematic, and that the valid ones do not compromise the Gricean picture. Stepping back, I find that the two sides in this debate are not really in opposition, but rather offer complementary insights.
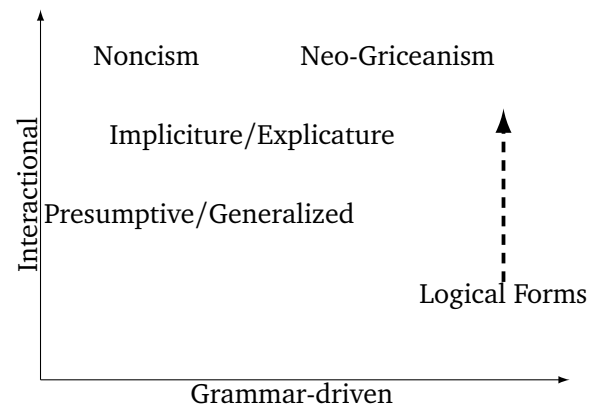
2 Conversational implicature

Definition 1 (Conversational implicature). Speaker S conversationally implicates q by uttering U to listener L in context C iff

   i. It is a mutual, public presumption of S and L that S is cooperative in C at least insofar as communication is concerned.

  ii. In order to maintain (i) in C given U, it must be supposed that S thinks q.

 iii. S thinks that both S and L mutually, publicly presume that L is willing and able to work out that (ii) holds.

Central properties (sections 2.1–2.5)

- Context dependence
- Linguistic dependence
- Cognitive and interactional complexity
- Uncertainty
- Post-semanticality

Cancelability (section 2.6) *Not* a consequence of Grice's (1975) definition. The definition seems to leave room for cancelation in particular cases, but it does not ensure it for all. Cancelation always compromises the speaker's cooperativity to some degree. In many cases, this is tolerable. If the compromises are too great, the speaker's behavior is uncooperative to the point of infelicity.

3 Interactional models

This section describes a framework that I think is capable of doing justice to the above Gricean conception of conversational implicatures. The framework is not my own, but rather synthesizes proposals by a lot of other people. Versions of it have been independently proposed in linguistics, economics, cognitive psychology, and AI.
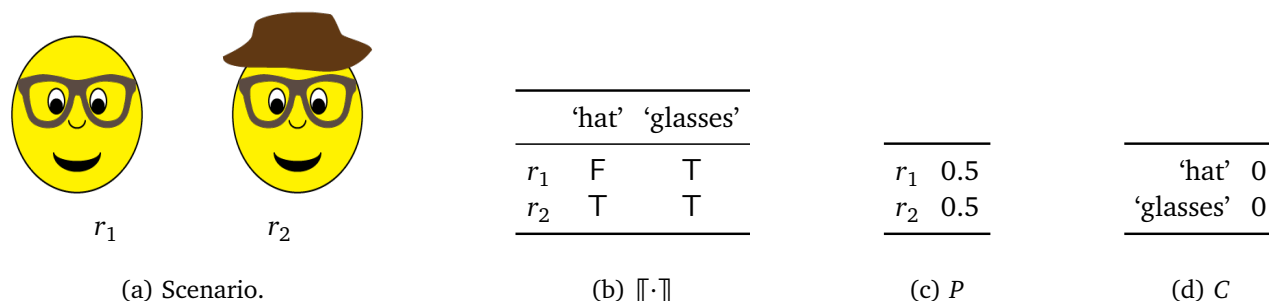
	'hat'	'glasses'
r_1	F	T
r_2	T	T

(a) Scenario.

(b) $[\![\cdot]\!]$

r_1	0.5
r_2	0.5

(c) P

'hat'	0
'glasses'	0

(d) C

Figure 2   A communication game supporting a scalar implicature.

	'hat'	'glasses'
r_1	0	1
r_2	0.5	0.5

(a) S_0

	r_1	r_2
'hat'	0	1
'glasses'	0.67	0.33

(b) $L(S_0)$

	'hat'	'glasses'
r_1	0	1
r_2	0.75	0.25

(c) $S(L(S_0))$

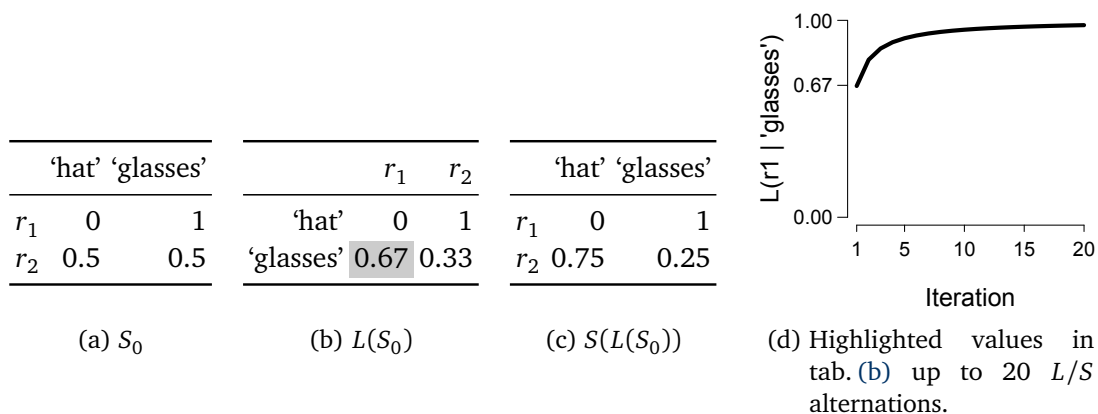(d) Highlighted values in tab. (b) up to 20 L/S alternations.

Figure 3   The fig. 2 implicature in production and interpretation.

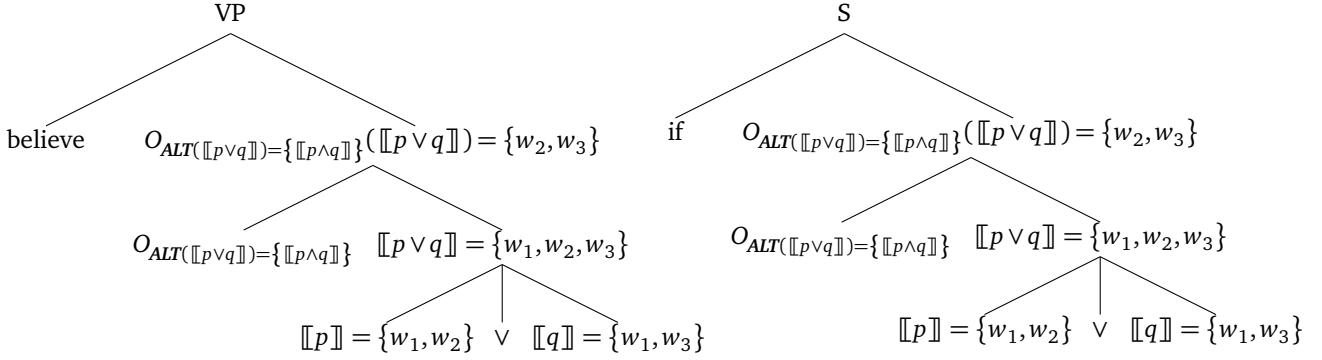**Central properties (recalling sections 2.1–2.5)**

- Context dependence: the structure of the game and the nature of the prior (Stiller, Goodman & Frank 2011; Frank & Goodman 2012)

- Linguistic dependence: message sets and costs (Jäger 2012; Bergen, Goodman & Levy 2012)

- Cognitive and interactional complexity: how deeply are the discourse participants willing and able to reason (Camerer, Ho & Chong 2004; Franke 2009)?

- Uncertainty: ubiquitous in the model

- Post-semanticality: generalized to $L(S(\ldots(L(S_0))))$

4 Grammar-driven models

Definition 2 (Exhaustification operator O; see Fox 2009 for the full definition).

$$O_{ALT}(p) = p \wedge \forall q \in ALT : (p \not\sqsubseteq q) \sqsubseteq \neg q$$

Embedded O_{ALT}

VP
- believe
- $O_{ALT(\llbracket p \vee q \rrbracket) = \{\llbracket p \wedge q \rrbracket\}}(\llbracket p \vee q \rrbracket) = \{w_2, w_3\}$
  - $O_{ALT(\llbracket p \vee q \rrbracket) = \{\llbracket p \wedge q \rrbracket\}}$ $\llbracket p \vee q \rrbracket = \{w_1, w_2, w_3\}$
    - $\llbracket p \rrbracket = \{w_1, w_2\}$ $\vee$ $\llbracket q \rrbracket = \{w_1, w_3\}$

S
- if
- $O_{ALT(\llbracket p \vee q \rrbracket) = \{\llbracket p \wedge q \rrbracket\}}(\llbracket p \vee q \rrbracket) = \{w_2, w_3\}$
  - $O_{ALT(\llbracket p \vee q \rrbracket) = \{\llbracket p \wedge q \rrbracket\}}$ $\llbracket p \vee q \rrbracket = \{w_1, w_2, w_3\}$
    - $\llbracket p \rrbracket = \{w_1, w_2\}$ $\vee$ $\llbracket q \rrbracket = \{w_1, w_3\}$

Implicit interactionality

i. "the facts suggest that SIs are not pragmatic in nature but arise, instead, as a consequence of semantic or syntactic mechanisms" (CFS).

ii. Resolving underspecification pragmatically: where is O, and which ALT functions are intended/perceived?

iii. The grammatical system specifies a many-to-one mapping from surface to logical forms. Only a pragmatic theory can explain how discourse participants coordinate on these LFs.

iv. "one can capture the correlation with various contextual considerations, under the standard assumption (discussed in the very beginning of this paper) that such considerations enter into the choice between competing representations (those that contain the operator and those that do not)" (CFS).

(4) a. *Utterance*: Sandy's work this term was satisfactory.

b. *Potential implicature*: Sandy's work was not excellent

c. *Available alternatives*: $\{\llbracket satisfactory \rrbracket, \llbracket good \rrbracket, \llbracket excellent \rrbracket\}$

d. *Available, semantically distinguishable logical forms:*
Sandy's work was

   i. $\llbracket satisfactory \rrbracket$

   ii. $O_{ALT(\llbracket satisfactory \rrbracket) = \{\llbracket excellent \rrbracket\}}(\llbracket satisfactory \rrbracket)$

   iii. $O_{ALT(\llbracket satisfactory \rrbracket) = \{\llbracket good \rrbracket, \llbracket excellent \rrbracket\}}(\llbracket satisfactory \rrbracket)$

An ambiguist account From this perspective, implicature calculation is ambiguity resolution: the listener must venture an inference about which logical form was intended, and the speaker must hope that the listener can do this successfully.

5 Apparently embedded implicatures

In a surprising twist, CFS's theory allows the Gricean to hold to her utterance-based, post-semantic position even if embedded implicatures turn out to be real. On CFS's view, embedded implicatures are simply those in which O_{ALT} operators are embedded. The Gricean can embrace these logical forms. I believe this theoretical synthesis is achievable but non-trivial; the existence of embedded implicatures would compel the Gricean to refashion all her explanations in terms of how speakers and listeners coordinate on logical forms using highly underspecified surface forms. So it is worth asking how much motivation there is for a theory of implicature based in reasoning about O_{ALT}.

5.1 Attitude embedding   It was originally thought that examples like (5) required embedded O_{ALT}, but Russell (2006) showed that basic Gricean reasoning already captures them:

(5)   George believes that some of his advisors are crooks.

Implicature: George believes not all of his advisors are crooks.

5.2 Conditional antecedents   On a material conditional analysis, (8) is contradictory without O_{ALT} in the antecedent. There is no contradiction on a Lewis–Kratzer analysis (Lassiter In progress).

(8)   If you take phonology or semantics, you attend meeting A. If you take both, you attend meeting B.

5.3 Hurford's constraint   Hurford (1974) argues that "The joining of two sentences by *or* is unacceptable if one sentence entails the other", but he notes that scalar disjunctions like *some or all* are apparent exceptions. These are not exceptions if locally enriched (*some-but-not-all or all*). However, there are too many counterexamples to Hurford's generalization for it to be plausible as an independent constraint.[1] For 161 nominal counterexamples: http://goo.gl/VAGqnB

5.4 Intrusive constructions   Undoubtedly challenging; Gricean reactions have been varied (Bach 1994; Levinson 2000; Russell 2006; Geurts 2009).

(15)   It is better to eat *some* of the cake than it is to eat *all* of it.
(18a)   It is safer to drive home and drink beer than it is to drink beer and drive home.

5.5 A case of local enrichment   Chemla & Spector (2011) study scalar terms in the scope of non-monotone quantifiers. In such contexts, the reading requiring O_{ALT} cannot be derived as an enrichment of the literal semantics or the utterance-level implicature. Participants in their experiments nonetheless perceived O_{ALT}-style readings. Though the participants seem to have struggled with the experimental materials, this looks like powerful evidence in favor of O_{ALT}.

6 Uncancelable implicatures

There seem to be instances of uncancelable implicatures (Sadock 1978; Chierchia 2004; Eckardt 2007; Spector 2007; Magri 2009; Lauer 2013: §9). Their existence does not challenge anything about the Gricean program. On the contrary, uncancelability is predicted in a broad range of cases where a costly, weak form is unilaterally entailed by a less costly form. Grammar-driven views have resorted to stipulations about obligatory uses of O_{ALT}, but Grice might suffice to achieve the effects.

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1 Not in the paper: Chemla (2013) presents corpus evidence that Hurford violations correlate with implicatures. Roger Levy and I replicated the result with Google Books data. However, this pattern reflects the speaker's perceived need for implicature suspension and does not require Hurford's constraint.