SCALAR IMPLICATURE - SOME ILLUSTRATIONS

Trịnh Hữu Tuệ, HU Berlin

Conversational Maxims

Grice (1967, 1989) proposes that conversations are conducted under the assumption that speakers follow certain rules of coöperative behavior.

Quality and Relation

(1) Quality
Say only what you believe!

(2) Relation
Be relevant![1]

(3) Q: Is X a good student?
A: He has excellent handwriting?
$\rightsquigarrow$ (S believes) X is not a good student

(4) Because the information that X is a good student is relevant, if S believes X is a good student, S will say so. Since S does not say X is a good student, it's not the case that S believes that X is a good student. Given that S is opinionated about X, it follows that S thinks X is not a good student.
(i) $B_S p \rightarrow A_S p$
(ii) $\neg A_S p$
(iii) $\neg B_S p$, from (i) and (ii)
(iv) $B_S p \vee B_S \neg p$, Opinionated Speaker[2]
(v) $B_S \neg p$, from (iii) and (iv)

Quantity

(5) Quantity
Be informative![3]

(6) Coöperative Speaker
A coöperative speaker asserts the most informative proposition which is relevant and which he believes to be true

(7) Implicature computation (consequence of CS)
If a coöperative speaker asserts a proposition p and a relevant alternative q is more informative than p, we can conclude that $\neg B_S q$ (which can then be strengthened to $B_S \neg q$ if no contradiction arises)[4]

(8) Q: Who will John will invite?
A: A or B
$\rightsquigarrow \neg B_S A \wedge \neg B_S \neg A, \neg B_S B \wedge \neg B_S \neg B$[5]

(9) (i) A is relevant and more informative than A $\vee$ B. Hence $\neg B_S A$.
(ii) B is relevant and more informative than A $\vee$ B. Hence $\neg B_S B$.
(iii) Because $B_S(A \vee B)$, if $B_S \neg A$ then $B_S B$. We proved that $\neg B_S B$. Hence $\neg B_S \neg A$.
(iv) Because $B_S(A \vee B)$, if $B_S \neg B$ then $B_S A$. We proved that $\neg B_S A$. Hence $\neg B_S \neg B$.

[1] We may think of every conversation as an attempt to answer some question, i.e. the question under discussion. A relevant proposition can be thought of as one which could be an answer to the question under discussion (cf. Lewis 1988, Groenendijk and Stokhof 1984, 1990).

[2] Gricean reasoning and logic alone gives us only the weak conclusion in (4iii). It is only with OS that we are able to derive the stronger conclusion in (4v) (cf. Soames 1982).

[3] A preliminary understanding of informativity might be the following: a proposition p is more informative than another proposition q iff knowing p guarantees knowing q but not vice versa.

[4] Following Sauerland (2004), we call inferences of the form $\neg B_S p$ "primary implicatures," inferences of the form $B_S \neg p$ "secondary implicatures," and the step from primary to secondary implicatures the "epistemic step."

[5] An inference of the form $\neg B_S p \wedge \neg B_S \neg p$ is called an ignorance inference: the speaker is ignorant about p.

Secondary Implicatures

We have a strong intuition that the speaker of (10A) believes John will not invite both A and B.

(10) Q: Who will John invite?
A: A or B
Non-semantic inference: $B_S \neg(A \wedge B)$

The lexical approach

Hypothesis: $[p \text{ or } q] = [p \,\overline{\vee}\, q] = 1$ iff $p \neq q$

Problem: Downward-entailing contexts

(11) a. John will not invite A or B.
$= \neg[A \vee B]$
$\neq \neg[M \,\overline{\vee}\, L]$
b. If John invites A or B, there will be a fight.
$= [[A \vee B] \rightarrow \text{fight}]$
$\neq [[A \,\overline{\vee}\, B] \rightarrow \text{fight}]$

The homophony approach

Hypothesis: there are two lexemes, $\text{or}_\vee$ and $\text{or}_\triangledown$, and hearers choose the analysis which leads to a globally stronger meaning.

(12) a. John will invite A $\text{or}_\triangledown$ B.
b. (i) John will not invite A $\text{or}_\vee$ B.
(ii) If John invites A $\text{or}_\vee$ B, there will be a fight.

Problem: Parallelism contexts[6]

(13) John left a tip. Bill didn't.
$=$ John left a $\text{tip}_{\text{advice}}$. Bill didn't <leave a $\text{tip}_{\text{advice}}$>.
$\neq$ John left a $\text{tip}_{\text{advice}}$. Bill didn't <leave a $\text{tip}_{\text{money}}$>.

(14) John will invite A or B. Bill wont't.
$\neq$ John will invite A $\text{or}_\triangledown$ B. Bill won't <invite A $\text{or}_\triangledown$ B>.
$=$ John will invite A $\text{or}_\triangledown$ B. Bill won't <invite A $\text{or}_\vee$ B>.

The Gricean approach

Hypothesis: [M or L] $\rightarrow$ semantics $\rightarrow$ [M $\vee$ L] $\rightarrow$ pragmatics $\rightarrow$ [M $\,\overline{\vee}\,$ L]

(15) Q: Who will John will invite?
A_1: A or B
A_2: A and B

(16) Hearer's reasoning
S said A $\vee$ B, although A $\wedge$ B would have been relevant and more informative. It follows that S does not believe A $\wedge$ B to be true. The assumption that S is opinionated about A $\wedge$ B does not lead to contradiction. Hence, we can conclude that S believes A $\wedge$ B to be false.

(17) a. Sentence uttered: A $\vee$ B
b. Relevant and more informative alternative: A $\wedge$ B
c. Primary implicatures: $\neg B_S(A \wedge B)$
d. Secondary Implicature: $B_S \neg(A \wedge B)$

[6] Examples by Tamina Stephenson.

The Symmetry Problem

Purely Gricean accounts face a problem noted by Kroch (1972), and discussed further in Fintel and Heim (1997), who labeled it the "symmetry problem" (see also Fintel and Fox (2002)).

(18) Q: Who will John invite?
A_1: Mary or Lisa
A_2: Mary and Lisa
A_3: Mary or Lisa, but not both

(19) a. Sentence uttered: M $\vee$ L
b. Relevant and more informative alternatives: M $\wedge$ L, M $\overline{\vee}$ L
c. Primary implicatures: $\neg B_S$(M $\wedge$ L), $\neg B_S$(M $\overline{\vee}$ L)
d. Secondary implicatures:
(i) predicted: none
(ii) attested: $B_S\neg$(M $\wedge$ L)

Neo-Gricean Solutions

Horn scales

Horn (1972, 1989) propose that we do not compute implicatures using the purely pragmatic notion of relevance, but the more formal notion of "scales," i.e. families of lexical items which are stipulated to exist as part of the structure of our mental lexicon.

(20) Examples of Horn scales
a. {or, and}
b. {some, all}
c. {one, two, three, ...}
d. {warm, hot}

(21) Computation of implicatures (not a consequence of Coöperative Speaker)
If a coöperative speaker asserts p and a scalar alternative q is more informative, we can conclude that $\neg B_S q$ (which can then be strengthened to $B_S \neg q$ if no contradiction arises)

(22) Scalar alternatives
q is a scalar alternative of p iff q can be derived from p by replacing Horn-scalar items in p with their scale mates

(23) a. Sentence uttered: A $\vee$ B
b. Relevant and more informative Horn-alternative: A $\wedge$ B
c. Primary implicature: $\neg B_S$(A $\wedge$ B)
d. Secondary implicature: $B_S\neg$(A $\wedge$ B)

Sauerland scales

Horn's account cannot explain ignorance inferences: it allows speakers to say $p \vee q$ when they believe that p. It also faces a serious problem, identified by Chierchia (2004, 2006).

(24) John will invite A or B or C
a. Sentence uttered: (A $\vee$ B) $\vee$ C
b. More informative scalar alternatives: (A $\wedge$ B) $\vee$ C, (A $\vee$ B) $\wedge$ C, (A $\wedge$ B) $\wedge$ C
c. Primary implicatures: $\neg B_S$((A $\wedge$ B) $\vee$ C), $\neg B_S$((A $\vee$ B) $\wedge$ C), $\neg B_S$((A $\wedge$ B) $\wedge$ C)
d. Secondary implicatures:
(i) predicted: $B_S\neg$((A $\wedge$ B) $\vee$ C), $B_S\neg$((A $\vee$ B) $\wedge$ C), $B_S\neg$((A $\wedge$ B) $\wedge$ C)
(ii) attested: $B_S\neg$((A $\wedge$ B) $\wedge$ C), $B_S\neg$(A $\wedge$ B), $B_S\neg$(A $\wedge$ C), $B_S\neg$(B $\wedge$ C)

Sauerland (2004) proposes the following scale: {or, and, L, R}, where p L $q = p$ and p R $q = q$.

(25) John will invite A or B or C
a. Sentence uttered: (A $\vee$ B) $\vee$ C
b. More informative scalar alternatives: A, B, C, A $\vee$ B, A $\vee$ C, B $\vee$ C, A $\wedge$ B, A $\wedge$ C, B $\wedge$ C, (A $\wedge$ B) $\wedge$ C, (A $\wedge$ B) $\vee$ C, (A $\vee$ B) $\wedge$ C
c. Primary implicatures: $\neg B_S$A, $\neg B_S$B, $\neg B_S$C, $\neg B_S$(A $\vee$ B), $\neg B_S$(A $\vee$ C), $\neg B_S$(B $\vee$ C), $\neg B_S$(A $\wedge$ B), $\neg B_S$(A $\wedge$ C), $\neg B_S$(B $\wedge$ C), $\neg B_S$((A $\wedge$ B) $\wedge$ C), $\neg B_S$((A $\wedge$ B) $\vee$ C), $\neg B_S$((A $\vee$ B) $\wedge$ C)
d. Secondary implicatures: $B_S\neg$(A $\wedge$ B), $B_S\neg$(A $\wedge$ C), $B_S\neg$(B $\wedge$ C), $B_S\neg$((A $\wedge$ B) $\wedge$ C), $B_S\neg$((A $\vee$ B) $\wedge$ C)

(26) Everyone drinks tea or coffee
a. Sentence uttered: everyone drinks tea or coffee
b. More informative scalar alternatives: everyone drinks tea, everyone drinks coffee, everyone drinks tea and coffee
c. Primary implicatures: $\neg B_S$(everyone drinks tea), $\neg B_S$(everyone drinks coffee), ...
d. Secondary implicatures: $B_S\neg$(everyone drinks tea), $B_S\neg$(everyone drinks coffee), ...

Challenges for Neo-Griceans

The functionality problem

(27) a. Either my mom will come or both my parents will come $(m \vee (m \wedge f))$
b. John will invite A or B, or both $((A \vee B) \vee (A \wedge B))$

The encapsulation problem

(28) a. #John gathered 50 leaves in this bag
b. #John has an even number of children. He has three children.

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