The psychology of meaning

Lecture 3: Quantity implicatures

1. The Standard Recipe

Clyde says:

(1) Bonnie stole some of the pears.

On the classical Gricean account, (1) means that Bonnie stole at least some of the pears, and may implicate that she didn't steal all of them. This implicature is explained by assuming that the hearer reasons, and is entitled to reason, as follows:

i. Rather than saying (1), Clyde could have made a stronger statement:
(1*) Bonnie stole all the pears.
Why didn't he do so?

ii. The most likely explanation is that Clyde doesn't believe that (1*) is true: $\neg \textsc{Bel}_C(1^*)$. [*weak implicature*]

iii. Clyde is likely to have an opinion as to whether (1*) is true: $\textsc{Bel}_C(1^*) \vee \textsc{Bel}_C(\neg(1^*))$. [*Competence Assumption*]

iv. Between them, (*ii*) and (*iii*) entail $\textsc{Bel}_C(\neg(1^*))$: Clyde believes that Bonnie didn't steal all the pears. [*strong implicature*]

- If the Competence Assumption did not hold, (1*) and $\neg(1^*)$ would both be possible for Clyde, and (2) would be true:

  (2) $\textsc{Poss}_C(1^*) \wedge \textsc{Poss}_C(\neg(1^*))$, or equivalently: $\neg\textsc{Bel}_C(\neg(1^*)) \wedge \neg\textsc{Bel}_C(1^*)$

  The Competence Assumption is equivalent to the negation of (2).

Another example:

(3) A: Has Clyde's book come out yet?
B: He has corrected the proofs.

B's answer clearly implies that the answer to A's question is no. This, too, is a Q-implicature, which is obtained by applying the Standard Recipe:

i. Rather than giving the answer in (3), B could have made a stronger statement:

(3*) Yes, it has.

Why didn't she do so?

ii. The most likely explanation is that B doesn't believe that (3*) is true: $\neg \textsc{Bel}_B(3^*)$.

iii. B is likely to have an opinion as to whether (3*) is true: $\textsc{Bel}_B(3^*) \vee \textsc{Bel}_B(\neg(3^*))$.

iv. Between them, (*ii*) and (*iii*) entail $\textsc{Bel}_B(\neg(3^*))$: B believes that Clyde's book hasn't come out yet.

The only difference between this derivation and the previous one is that the relevant alternative, (3*), cannot be generated from B's statement by substituting one word for another.

The general format of the Standard Recipe:

S has said φ.

i. S could have made a stronger claim by saying ψ. Why didn't he do so?

ii. Presumably, it's because S doesn't believe that ψ is true: $\neg \textsc{Bel}_S(\psi)$.

iii. S has an opinion as to whether ψ is true: $\textsc{Bel}_S(\psi) \vee \textsc{Bel}_S(\neg\psi)$.

iv. Between them, (*ii*) and (*iii*) entail $\textsc{Bel}_S(\neg\psi)$: S believes that ψ is false.

2. Disjunction and ignorance

Disjunctive sentences of the form "φ or ψ" generally give rise to the implicature that the speaker doesn't know which of φ and ψ is true. E.g., if Clyde says (4), his utterance is likely to be construed as implying that he is agnostic about the truth values of its disjuncts, (5a,b):

(4) Bonnie stole an apple or a pear.

(5) a. Bonnie stole an apple.
b. Bonnie stole a pear.

- Grice (1978/1989: 46-47) analyses these ignorance inferences as Q-implicatures: had Clyde known that (5a) is true, he should have said so, and since he didn't he is implicating that $\neg \textsc{Bel}_C$(5a); the same for the (5b).
- Q: But why aren't these inferences strengthened?
- A: We cannot make the Competence Assumption for either disjunct, on pains of contradiction (Sauerland 2004):

i.	$\textsc{Bel}_C((5a) \vee (5b))$	[*Quality*]
ii.	$\neg\textsc{Bel}_C(5a)$	[*Quantity*]
iii.	$\neg\textsc{Bel}_C(5b)$	[*Quantity*]

If, in addition, we adopt the Competence Assumption for (5a), we get a contradiction, as follows:

iv.	$\textsc{Bel}_C(5a) \vee \textsc{Bel}_C(\neg(5a))$	[*Competence*]
v.	$\textsc{Bel}_C(\neg(5a))$	[*from* (*ii*) *and* (*iv*)]
vi.	$\textsc{Bel}_C(5b)$	[*from* (*i*) *and* (*v*)]
vii.	contradiction	[*between* (*iii*) *and* (*vi*)]

3. Inference to the best explanation

The Standard Recipe schematises a form of *abductive* reasoning, and therefore it should not be viewed as an algorithm for generating Q-implicatures.

(6) A: Clyde seems to have become such a penny-pincher. What's the matter with him?
B: He had to borrow money for some expensive pet he wanted to buy, and now he's saving wherever he can.

(7) I see that somebody hasn't eaten his porridge, yet.

(8) A mutual acquaintance of ours will not be able to keep his appointment.

4. Relevance

The derivation of Q-implicatures must be constrained by relevance if we want to avoid pseudo-implicatures like the following:

> Bonnie says:
>
> (9) Clyde is a dope.
>
> Instead of saying (9), Bonnie could have a made the following statement, which is patently stronger:
>
> (10) Clyde is a dope and Jupiter is larger than Saturn.
>
> So, apparently Bonnie doesn't believe that (10) is true, and since she has committed herself to the truth of the first conjunct, we are forced to conclude that she doesn't believe that Jupiter is larger than Saturn.

What is relevance? I don't know of any satisfactory answer to this question, but it does seem that relevance is a multi-faceted thing, comprising at least three factors:

- discourse purposes
- hearer's interest
- general interest

4.1. Discourse purposes

> Make your contribution as informative as is required (for the current purposes of the exchange). (Grice 1975/1989: 26)

This explains why (11) doesn't yield ignorance implicatures in the context of a treasure hunt, for example:

(11) The prize is either in the garden or in the attic. (Grice 1978/1989: 45)

A common way of setting up discourse goals is by asking questions, and therefore the derivation of Q-implicatures may be constrained by questions (Matsumoto 1995):

(12) A: What have you done with that mail?
B: I've typed it.

(13) A: Did you handwrite that letter?
B: No. I typed it.

Questions need not be explicit: Discourse topics may be viewed as questions that are open at any given point in the conversation, which may be explicit or implicit (van Kuppevelt 1996).

4.2. Hearer's interest

(14) A: I tried to call you yesterday afternoon. Where were you?
B: I was playing tennis with a friend of mine.

4.3. General interest

(15) Q: Where is Bonnie?
A_1: She went out to buy a sofa.
A_2: She went out to buy a piece of furniture.

(16) a. I saw an animal on the lawn this morning.
b. I saw a dog on the lawn this morning.

General interest is determined in part by language and/or culture: Matsumoto observes that in English a sentence like (17) will not tend to implicate that the speaker doesn't know whether Michio is older or younger than Takashi:

(17) Michio is Takashi's brother.

However, if (17) is translated into Japanese, the result is a sentence that does have this implicature:

(18) Kochira wa Takashi-kun no kyoodai no Michio-kun desu.
this TOP Takashi-Mr. GEN brother GEN Michio-Mr. COP

The contrast between the two languages is explained by the fact that, in addition to words corresponding to English "brother" and "sister", Japanese also has a system of sibling terms that encode sex as well as seniority:

ani "older brother"	*otooto* "younger brother"
ane "older sister"	*imooto* "younger sister"

Moreover, and crucially, *these are the preferred terms for introducing siblings*, and therefore the use of "kyoodai" in (18) is marked in much the same way that "animal" is marked in (16a).

5. Scalar implicatures

A large part of the literature on Q-implicatures has focused its attention on one particular species of Q-implicatures, viz. scalar implicatures (Horn 1972):

(19) Wilma read some of the papers.

Alternatives:
Wilma read many of the papers.
Wilma read most of the papers.
Wilma read all of the papers.

$\rightsquigarrow$ Wilma didn't read {many/most/all} of the papers.

This has led to a widespread misconception of what Q-implicatures (and scalar implicatures) are: the generative view.

5.1. The generative view on scalar implicature

- A Horn scale is a sequence of increasingly informative expressions. E.g.

- ⟨some, many, most, all⟩
- ⟨warm, hot, scalding⟩
- ⟨clever, brilliant⟩
- ⟨or, and⟩

- Two expressions are "scale mates" iff there is a Horn scale that contains them both; β is a stronger scale mate of α's iff there is a Horn scale in which β occurs to the right of α.
- *Using Horn scales to generate alternatives*
  $\varphi[\beta]$ is an alternative to $\varphi[\alpha]$ iff β is a stronger scale mate of α's.

What's wrong with the generative view?

- The generative view doesn't generalise to other cases of Q-implicature.
- It is a mistake to suppose that entailment relations between alternatives are projected from the lexicon.
- The assumption that Horn scales are scales is redundant.

5.2. Scalar implicatures and downward entailment

(20) Fred didn't read many of the books Wilma gave him.

Assuming, as before, that "many" figures in the scale ⟨some, many, most, all⟩, the substitution method yields (21) as one of the alternatives to (20):

(21) Fred didn't read all the books Wilma gave him.

So, the implicature that is predicted is $\neg\textsc{Bel}_S((21))$, which is clearly wrong. On the other hand, the generative approach doesn't account for the fact that (20) may license inferences like $\textsc{Bel}_S(\neg(22))$, i.e. $\textsc{Bel}_S$(Fred read some of the books Wilma gave him):

(22) Fred didn't read any of the books Wilma gave him.

Apparently, negation (and downward-entailing environments in general) cause problems for the generative view in its simplest form.

Upward entailing environments
$\varphi[...]$ is an upward entailing environment iff, for any two expressions α and β: if α entails β, then $\varphi[\alpha]$ entails $\varphi[\beta]$.

Downward entailing environments
$\varphi[...]$ is a downward entailing environment iff, for any two expressions α and β: if α entails β, then $\varphi[\beta]$ entails $\varphi[\alpha]$.

Another way of saying this is that an upward entailing environment $\varphi[...]$ *preserves* the direction of the entailment relations between the expressions that can fill the dots; a downward entailing environment, on the other hand, *reverses* entailment relations. To illustrate, assuming that "scarlet" entails "red", and using "$\Rightarrow$" to symbolise entailment:

(23) Fred is wearing scarlet socks $\Rightarrow$ Fred is wearing red socks.
Fred isn't wearing red socks $\Rightarrow$ Fred isn't wearing scarlet socks.

Hence, while "Fred is wearing [...] socks" is an upward entailing environment, "Fred isn't wearing [...] socks" is a downward entailing environment.

Using Horn sets to generate alternatives
$\varphi[\beta]$ is an alternative to $\varphi[\alpha]$ iff α and β share a Horn set and $\varphi[\beta]$ is stronger than $\varphi[\alpha]$.

This works for upward and downward entailing contexts, but crucially, it gives up on the notion that entailment relations between alternatives are determined locally: the semantic information encoded in Horn scales is redundant.

NB: It is deeply mistaken to say that scalar implicatures are "suppressed" in downward-entailing environments.

Scalar implicatures without the generative view

- My main objection against the generative view is that it stands in the way of a truly unified treatment of Q-implicatures. If we adopt the substitution method for dealing with scalar implicatures, we create an undesirable dichotomy between scalar and non-scalar Q-implicatures.
- Even if we treat scales as primitives, we can still distinguish between Q-implicatures according to the alternatives they derive from.

(24) a. Betty read "Lolita" or "Pale Fire".
b. Betty read "Lolita".

(25) a. Betty read some of these novels.
b. Betty read all of these novels.

(26) a. Betty read "Pale Fire".
b. Betty read "Pale Fire" and "Lolita".

Each of the (a) sentences can license the implicature that the speaker

doesn't believe that the corresponding (b) sentence is true, and while (25a) and (25b) are roughly the same length, (24a) is longer than (24b), and (26a) is shorter than (26b). These differences can be important.

- If we had to define scalar implicatures in purely descriptive terms, we might say that a scalar implicature is a Q-implicature associated with a sentence $\varphi[\alpha]$, where the relevant alternative is of the form $\varphi[\beta]$ and α and β are of roughly the same length, as a consequence of which $\varphi[\alpha]$ and $\varphi[\beta]$ are similar in length, as well.

Recommended reading

Geurts (2010: Chapters 2 and 3)

References

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