Einführung in Pragmatik und Diskurs

Implicatures

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Conversational Implicatures: Summary

- We've seen at an intuitive level that one main attraction of conversational implicatures is that they elegantly capture the fact that the same expression can have different meanings in different contexts
- To demonstrate the benefits of conversational implicatures for semantics, we need to express more rigorously how the maxims work, i.e., how are the CIs processed (either when producing or when interpreting uttera nces).
- We will look at two specific cases of generalised quantity CIs in more detail namely, **clausal** and **scalar** CIs (Gazdar 1979) and show how they help simplify the task of semantics.

Scalar

Generalized Conversational Implicatures

Scalar GCIs (Gazdar 1979)

A **Scale** is the ordering through logical entailment of a set of linguistic expressions, e.g.
$\langle e_1, e_2, \ldots e_n \rangle$ where $e_1 \models e_2 \models \ldots \models e_n$

Scalar Implicature: Use of a weaker (entailed) form relative to a scale implicates the negation of stronger forms in that scale e.g.

$$A(e_2) \text{ implicates } \neg A(e_1)$$

(This is a concrete instantiation of the Maxim of Quantity.)

Scalar GCIs: Examples

(1) a. Some people believe in God.
SGCI: Not everyone believes in God.
b. Some people believe in God, in fact almost everyone believes in God.
c. * Some people believe in God, in fact hardly anyone believes in God.

(2) We have 100 Euro in the bank.

(3) Mo Green can run 100m in 9.8s.

(4) Bjoerndalen did very well in the last biathlon season.

(5) Sven Fischer did very well in the last biathlon season, but he did not win the world cup.

(6) Mr. X wasn't a poor candidate, but he was a weak candidate.

(7) As a dessert, you can have icecream or cheese.

Clausal

Generalized Conversational Implicatures

Clausal Quantity GCIs

Intuition: If S uses some linguistic expression which does not commit her to some embedded proposition p and there is another expression that would commit her so then S implicates that she does not know whether p.

Definition: If S asserts some complex expression r, such that

(i) r contains an embedded sentence p and
(ii) r neither entails nor presupposes that p is true and
(iii) there is an alternative expression r' of roughly equal brevity which does entail or presuppose that p is true

then, by asserting r rather than r', S implicates that she doesn't know whether p is true or false, i.e. S implicates ($\Diamond q$ and $\Diamond \neg q$).

Examples of Clausal QGCIs

(8) *I believe John is away.*
CQGCI: I do not know whether John is away
Since there is an alternative expression
I know John is away.
which contains *John is away* and entails it.

(9) *The Russians or the Americans have just landed on Mars.*
CQGCI: S does not know whether it was the R or the A who has just landed on Mars, possibly even both.

More Clausal Implicatures

Strong-	Weak-Form	Implicatures of W-F
p and q	p or q	{ ◇p, ◇¬p, ◇q, ◇¬q }
Since p,q	If p, q	{◇p, ◇¬p, ◇q, ◇¬q }
a knows that p	a believes that p	{ ◇p, ◇¬p }
a realised that p	a thought that p	{ ◇p, ◇¬p }
necessarily p	possibly p	{ ◇p, ◇¬p }

where ◇p means "it is possible that p"

Conversational Implicatures Simplify Semantics

Simplifying semantics

- GCI give a simple explanation of why some **expressions** seem ambiguous, e.g.

  (10) *Some politicians are corrupt.*
  (11) *The flag is white.*
  (12) *The soup is warm, in fact hot.*

- GCIs permit maintaining relatively simple linguistic analyses of expressions corresponding to **logical connectives**, that are compatible with logical results.

  (13) *Do you want coffe or tea? Milk or sugar?*
  (14) *Jon may be here.*
  (15) *If Chuck got a schoarship, he'll give up medicine.*

Simplifying semantics

Basic idea: Words are not ambiguous. Rather, they have a core meaning (semantics) which can be augmented by (defeasible) implicatures (pragmatics).

One meaning of 'or'

(16) *Do you want coffe or tea? Milk or sugar?*

The basic meaning of 'or' is inclusive. The exclusive-*or* interpretation arises from:

(a) the conventional meaning of 'or' as $\vee$ (inclusive *or*) plus

(b) the Scalar Implicature invoked by p *or* q due to the scale $\langle$ *and, or* $\rangle$, i.e., $\neg(p \wedge q)$

i.e.

$((p \vee q) \wedge \neg(p \wedge q)) \equiv (p \bigvee q)$

Meaning of Modals

(17) *Jon may be here.*
seems to imply: Jon may not be here.

More generally:

(1) $\Diamond p \rightarrow \Diamond\neg p$ If p is possible, then it is possible that not p
(2) $\Box p \rightarrow \Diamond p$ If p is necessary, then it is possible that p
(3) $\Box p \rightarrow \neg\Diamond\neg p$ If p is necessary, then it is not possible that not p

But (1), (2) and (3) leads to a contradiction, c.f. $\Box p \rightarrow \neg\Box p$

i. $\Box p$
ii. $\Diamond p$ i. and Axiom 2
iii. $\Diamond\neg p$ by ii. and axiom 1
iii. $\neg\Box p$ by ii. and axiom 3

Therefore $\Box p \rightarrow \neg\Box p$

So, logicians do not take (1) to be a valid axiom.

However, the full meaning of NL modal *may* can be captured by scalar implicature: *An utterance of a sentence of the form* $\Diamond p$ *conversationally implicates* $\Diamond\neg p$.
The inference is defeated in case $\Box p$ is known, e.g., as in

(18) *Jon may be here, in fact he can't be anywhere else.*

Meaning of Conditionals

(19) *If Chuck has got a scholarship, he'll give up medicine.*

seems to imply that S does not know whether Chuck has got a scholarship nor whether he'll give up medicine.

But this inference is *defeasible*:

(20) A: *I've just heard that Chuck has got a scholarship.*
B: *Oh dear, if Chuck has got a scholarship, he'll give up medicine.*

Hence to avoid an ambiguous *if-then*, the defeasible aspects of its meaning should be part of its conversational (i.e. defeasible) implicatures – not of its meaning.

Basic meaning of "If p then q": $p \rightarrow q$
Clausal implicature of "If p then q": $\{\Diamond p, \Diamond\neg p, \Diamond q, \Diamond\neg q\}$

Implicatures of Complex Sentences

Projection of Implicatures

Because of the several types of implicatures, the implicatures of an expression may not be the simple sum of its implicatures (some implicatures might cancel others).

(21) *Some, if not all, of the workers went on strike.*
(i) Scalar Implicature of "some":
Not all of the workers went on strike
(ii) Clausal Implicature of "if":
Possibly all of the workers went on strike

Although (i) and (ii) are inconsistent, the sentence is well-formed. Intuitively, the clausal implicature cancels the scalar implicature.

The projection problem: How to compute the implicatures of a complex expression from the implicatures of its parts.

Gazdar's Projection Mechanism

C_0: the **initial** context, i.e., a set of propositions believed to be true by S. C_U: the **final** context after processing utterance U, i.e., a set of propositions believed to be true by S: it is computed by adding the semantic and pragmatic inferences of U sequentially to C_0 as follows:

1. First, add the *entailments* of U to C_0 yielding a new context C_1
2. Next, add to C_1 the *clausal implicatures* of U that are consistent with it. Inconsistent implicatures are rejected i.e. not added to the context. The result is a new context C_2.
3. Last, add to C_3 the *scalar implicatures* of U that are consistent with it, yielding the final context C_U

On this account, *defeasibility* is captured by making implicatures acceptable only if they are consistent with entailments and other implicatures that have priority.

Gazdar's Projection Mechanism

- Correctly accounts for example (21).
- Explains how implicatures may be overtly denied:

(22) *Some of my best friends are drug-addicts, in fact probably all.*

The entailments of the second clause added to the context first, hence canceling the scalar implicature of *some* (i.e. *not all of my best friends are...*)

- Appears general enough for complex sentences:

(23) *Some of the Elgin Marbles are fakes, and either the rest of them are too, or they're inferior originals.*

i. ¬ *(All of the EM are fakes)*
ii. ◇ *(The rest of the EM are fakes too)*
iii. ◇¬ *(The rest of the EM are fakes too)*
iv. ◇ *(The rest of the EM are inferior originals)*
v. ◇¬ *(The rest of the EM are inferior originals)*

(i) and (ii) are inconsistent. Since (i) is scalar and (ii) clausal implicature, (i) is canceled. The sentence as a whole has implicatures (ii)-(v).

Projection and Detachability

(24) *Some academics are lazy.*
(25) *Some if not all academics are lazy.*
(26) *Some and perhaps all academics are lazy.*

- Truth conditionally, (24-26) are synonymous.
  So, by *detachability*, they should have the same implicatures — but they don't.
- Gazdar's projection mechanism explains why:

(24) SGQCI: (*some*) Not all academics are lazy.
(25) CGQCI of *if* cancels the SI of *some*.
(26) Additional content *perhaps all academics are lazy* cancels the SI introduced by *some*.

Projection and Detachability

Implicatures will be preserved by substitution of synonyms only if these substitutes carry no additional implicatures or entailments inconsistent with the original implicatures and of higher priority.

Projection: Problems

Gazdar's projection mechanism is not the final solution.

- Wrong predictions for Maxim exploitation where implicatures often cancel entailments.
- Hierarchy of implicatures vs. order in discourse?
- Does not capture interactive aspects.

A Remaining Problem: "Reading Into"

e.g., **Perfection of Conditionals**

(27) *If you mow the grass, you'll get 10 Euro.*
Intuitively, this means
If and only if you mow the grass, will you get 10 Euro.

- i.e., by making a weaker statement, S implicates a stronger statement. This is the opposite of usual quantity implicatures.
- Problem: Violation of the quantity maxim!
- Intuition: another principle is operating: the **Informativeness Principle: Read as much into an utterance as is consistent with what you know about the world**.

Informativeness Principle: Examples

(28) He pressed the button and the motor started.
a. p and then q
b. p and therefore q
c. p is the cause of q

The Informativeness principle competes with the Quantity Maxim:

(29) *Gilbert wrote the 'Mikado'.*
CI: Gilbert **and he alone** wrote the 'Mikado'.
(= Quantity wins.)

(30) *Gilbert and Sullivan wrote the 'Mikado'.*
CI: Gilbert and Sullivan **jointly** wrote the 'Mikado'.
(= Informativeness wins.)

Conversational vs. Conventional Implicatures

- Implicatures: pragmatic, non truth-conditional, inferences:
  = Meaning - Truth-Conditions

- **Conversational implicatures**
  - inferences calculated on the basis of the maxims and the cooperative principle
  - defeasible, non-detachable, calculable and non-conventional

- **Conventional implicatures**
  - inferences associated by convention with particular lexical items, e.g. *but*
  - are non-defeasible, detachable, non-calculable and conventional (though not necessarily truth-conditional)

Conventional Implicatures

Examples of Conventional Implicatures (CnvIs) and their triggers:

- *But*:
  Same truth-conditional content as *and*.
  CnvI: there is a contrast between the conjuncts.

  (31) Peter is rich, but John is intelligent.

- *However, Although, Yet*:
  Same truth-conditional content as *and*.
  CnvI: violation of an expected (general) rule

  (32) Although Greta Garbo was a beauty, she never got married.

- *Even*:
  Same truth-conditional content as without.
  CnvI: The least likely one of suitable 'alternatives'.

  (33) Peter even past the pragmatics exam.

- *Only*:
  Same truth-conditional content as without.
  CnvI: The only of suitable 'alternatives'.

  (34) Peter only passed the pragmatics exam.

- Politeness markers (e.g., forms of address:
  Ge. *du vs. Sie*, Fr. *tu vs. vous* Cz. *ty vs. vy*)

- etc.

Properties of Conventional Implicatures

- **Non-Defeasible:** cannot be suspended or cancelled by adding more content (because they do not rely on implicit assumptions about the context).

- **Detachable:** attached to form, they depend on the occurrence of a particular linguistic item(s).

- **Conventional:** although not part of propositional content (truth-conditions), still given by convention, so part of "natural" meaning

- **Non-calculable:** (in the sense that calculability refers to the application of maxims to determine conversational implicatures)

Metaphors as Conversational Implicatures

Metaphors

- A typical case of **maxim flouting**
- How do conversational implicatures contribute to the study of metaphors?
- We take a broad view of metaphors which accepts the following examples as paradigmatic cases:

(35) *The tree wept in the wind.*
(36) *Iago is an eel.*
(37) *These stones have drunk a thousand years.*

There is a tradition that views metaphors as a **semantic** (rather than a pragmatic) process. We'll review two central **semantic theories** first.

Semantic Theories of Metaphor

Comparison theory. Metaphors are similes with suppressed predications of similarity e.g. *Iago is an eel* is a metaphor for *Iago is like an eel*

Interaction theory. Metaphors are special uses of linguistic expressions where one metaphorical expression (focus) is embedded in another literal expression (frame) such that the meaning of the focus interacts with and changes the meaning of the frame and vice versa.

Interaction theory

- e.g. Levin 1977, Van Dijk 1972, Weinreich 1966.
- Lexical meanings as sets of features (Katz and Fodor 1963):
  - *stone*: phys.obj, natural, non-living, mineral, concreted.
  - *die*: process with result namely that some living entity ceases to be living.

  (38) *The stone died.*
  "die" requires a living subject hence the sentence is not straightforwardly interpretable.
- *Construal rules*: used to interpret sentences that are not straightforwardly interpretable because of some semantic requirement being violated.

Interaction theory: Example

(39) *The stone died.*
"die" requires a living object ⇒ interpretable.

Alternative 1

- Add feature *non-living* disjunctively to the verb specification for subject
- Feature *living* dropped from "cease to be living"
- Resulting interpretation: "The stone ceased to be"

Alternative 2

- Replace feature *non-living* in specification for "stone" with feature *living* transferred from verb
- Resulting interpretation: "The living natural mineral thing died"

The Pros and Cons of Interaction theory

- Where does literal interpretation cease and metaphorical take over?

  (40) *Jon {hurried / ran / rushed / hustled / whistled} down the stairs.*
- Feature mapping both too limited and too determinate
- Lexical knowledge is not enough: general world knowledge is often required. **The features involved are often incidental rather than defining ones**.
- Metaphors might arise without there being any semantic anomaly, e.g.

(41) *Your defense is an impregnable castle.*

In a chess game, can be understood literally or metaphorically or both.

Comparison theory (e.g., Miller 1979)

(42) a. *Universities are compost heaps.*
b. *Universities are like compost heaps.*

- Metaphors are derived from explicit **similes**, e.g. (42a) is derived from (42b).
- Understanding a metaphor consists in
  1. translating this metaphor into a simile
  2. interpreting the resulting simile
- Rules are used to reduce metaphoric expressions to similes.
- Three types of metaphors which rely on three types of rules are distinguished.

Nominal Metaphors

Form $BE(x, y)$

Rule $BE(x, y)$ is interpreted as: "There are two properties F and G such that x having property F is like y having property G", i.e.,
$BE(x, y) \Rightarrow Fx\ is\ like\ Gy$

Example

(43) *Iago is an eel.*
Interpretation: Iago$_x$'s **(ability to get out of difficult situations)**$_F$ is like (an eel)$_y$'s **(ability to wriggle off hooks)**$_G$.

Predicative Metaphors

Form : $G(x)$ or $G(x, y)$

Rule : $G(x)$ is interpreted as: "There is a property F and an entity y such that x having property F is like y having property G.

Example :

(44) *Mrs Gandhi steamed ahead.*
Interpretation: Mrs Gandhi's **progress in the elections** was is like **a ship** steaming ahead.

Sentential Metaphors

Form : Gy, i.e., similar in form to predicative metaphors, but different in being irrelevant to current context rather than categorically false.

Rule : Gy is interpreted as: "There is another property F and another entity x such that the proposition $F(x)$ is like $G(y)$ (and $F(x)$ is relevant to the current context).

Example :

(45) *A: What kind of mood was the boss in?*
B: The lion roared.
Interpretation: The lion's roaring is like **the boss displaying anger**.

The problems with the Comparison theory

- Fails to specify how the unknowns (i.e. implicit objects and properties being compared to) are to be recovered.
- The problem of metaphorical interpretation is not solved, just displaced, .

  (46) *Encyclopedias are like dictionaries.*

  (47) *Encyclopedias are like gold mines.*
- Paraphrases produced by CT-rules are not always intuitively correct e.g

  (48) *The interviewer hammered the senator.*

  Paraphrase: What the interviewer did to the senator is like someone hammering a nail.

Searle's Pragmatic Theory of Metaphors

Distinguishes two steps:

1. **Metaphor Recognition** : Metaphors taken literally either (i) violate the maxim of Quality or (ii) are conversationally inadequate.
2. **Metaphor Interpretation** : Once a conversational inadequacy is recognized, the utterance is matched against pragmatic construal rules or principles of interpretation and the best match selected as the intended interpretation.

(49) *Sam is a giant.*

Rule: x *is* F is interpreted as x *is* G if
x *is* F entails x *is* G and G is a salient feature of things that are F.

Intended meaning: Sam is big.

Problems:

- Searle's rules fail to yield a uniform characterization of metaphors.
- Neither do they explain the motivation for, and the expressive power of, metaphors.

Metaphor Interpretation through Analogy

Metaphors involve the mapping of one whole cognitive domain into another (**domain correspondence**), e.g. (economy-)future and weather:

(50) *Britain's economy apart from the sunny prospects of ... is as bleak as ever; the future of ... is clouded and only the outlook for the ... is bright.*

Thus, the interpretation of metaphors relies on our ability to **reason by analogy**.

This suggests that the interpretation of metaphors is an essentially a **pragmatic** process, one that is concerned with the interaction between a linguistic and an essentially language-independent domain of human experience (e.g., model building, map making, construction of theories).

The Importance of Conversational Implicatures

One of the most important ideas in pragmatics because:

- Offers *functional* explanation of linguistic facts i.e. paradigmatic example of pragmatic explanation.
- Explains why more is communicated than what is actually said (accounts for how additional information is conveyed).
- Simplifies structure and content of semantics (e.g. no ambiguous "and").
- Provides some meaning specification for words such as *well, anyway. ...*
- Very general explanatory power (a few principles explain many facts).

Caveat: exactly how the appropriate implicatures of these cases are to be predicted remains quite unclear.

Computational Processing of Conversational Implicatures

Inferring Implicit Meaning (Hobbs et al 1993)

- TACITUS system: abductive approach to NLU
- Abduction is inference to the best explanation
- The interpretation of a text is the minimal explanation of why it would be true as a whole.
- To interpret a sentence:
  - Prove the logical form together with the constraints that predicates impose on their arguments, allowing for coercions
  - Merge redundancies where possible.
  - Make assumptions where necessary.

- **Local pragmatics** problems tackled: definite reference, compound nominals (e.g., *lube oil alarm*), lexical and syntactic ambiguity (e.g., PP attachment), metonymy (e.g., *the office called*)

(51) *The Boston office called.*
$(\exists x, y, z, e)\quad call'(e, x) \wedge person(x) \wedge related(x, y) \wedge office(y) \wedge boston(z) \wedge nn(z, y)$
Can be interpreted w.r.t. a KB containing:
$boston(b_1)$, $person(j_1)$, $work\_for(j_1, o_1)$,
$office(o_1) \wedge in(o_1, b_1)$
$(\forall x, y) work_for(x, y) \supset related(x, y)$

Conveying Information Implicitly

Generation of minimal descriptions at the clausal and/or at the NP level (e.g., [Knott, O'Donnell, J. Oberlander and C. Mellish et al 1997; McDonald 92; Dale and Reiter 95])

- Task: collect a set of properties which uniquely determine the intended referent, and do so in a minimal way (i.e., obeying Maxim of Manner)

- e.g., the **Incremental Algorithm** (Dale and Reiter 1995):
  - Input: intended referent r, context set C of "distractors", an ordered set of attributes A (typical for the given domain)
  - for each attribute in A find the *best value* for this property, i.e., rules out most distractors
  - stop when no distractors are left

- Efficiency: no backtracking! (polynomial)

- Only "distinguishing descriptions" (no anaphors)

- Does not take into account salience of entities

⇒ Homework !