

Lecture 2: Implication Relations

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1 Definitions

implication: A sentence A implies another sentence B if and only if: Whenever a speaker utters A, they are committed to the truth of B. (Not to be confused with **implicatures**.)

Kinds of **implications** ["A implies B"]:

- **entailments** ["A entails B"; "A logically implies B"]
- **presuppositions** ["A presupposes B"]
- **implicatures** ["A (con conversationally) implicates B"]

entailment: A entails B if and only if: Whenever A is true, B is true too.

Alternative definitions of entailment (Chierchia & McConnell-Ginet):

- The information that B conveys is contained in the information that A conveys
- A situation describable by A must also be a situation describable by B
- A and not B is contradictory (can't be true in any situation)

Examples of entailments:

- (1) Mary invited Fred and Jack. \models Mary invited Fred.
- (2) I got into MIT yesterday. \models I got into MIT.
- (3) There are three pens on the table. \models More than two pens are on the table.

presupposition: "If A presupposes B, then A not only implies B but also implies that the truth of B is somehow taken for granted, treated as uncontroversial" (Chierchia and McConnell-Ginet, 1990, p. 28).¹

How Stalnaker (1978), in *Assertion*, defines presupposition:

Roughly speaking, the presuppositions of a speaker are the propositions whose truth he takes for granted as part of the background of the conversation. A proposition is presupposed if the speaker is disposed to act as if he assumes or believes that the proposition is true, and as if he assumes or believes that his audience assumes or believes that it is true as well. Presuppositions are what is taken by the speaker to be the COMMON GROUND of the participants in the conversation, what is treated as their COMMON KNOWLEDGE or MUTUAL KNOWLEDGE.

Definite descriptions, for example, presuppose existence and uniqueness:

- (4) a. Is the mathematician who proved Goldbach's Conjecture a woman?
b. Somebody proved Goldbach's Conjecture. [existence]
c. Only one person proved Goldbach's Conjecture. [uniqueness]

Factive verbs presuppose their complements:

- (5) a. Do you regret beating your wife?
b. You beat your wife.

Aspectual verbs also presuppose their complements:

- (6) a. Have you stopped beating your wife?
b. You have beaten your wife in the past.

implicature: A conversationally implicates B if and only if:

- A implies B
- A does not entail B
- A hearer can reason based on the fact that a speaker says A that the speaker must believe B.

Conversational implicatures are inferences that a hearer can make based on the assumption that the speaker is adhering to certain norms of conversation.

- (7) There are 2 pens on the table \sim No more than 2 pens are on the table.
- (8) You can have chicken or beef \sim You can't have both.
- (9) Some of the students passed \sim Not all of the students passed.

The reasoning goes as follows: I assume that the speaker knows whether all of the students passed, and would have said that they all passed if in fact they had, because that is relevant. Therefore, they must not have.

¹Note: If A presupposes B, then A entails B, in the sense that whenever A is true (or false), B is true. To refer to entailments that are not presuppositions, sometimes linguists use the term 'ordinary entailment' or 'vanilla entailment'.

2 Tests/Diagnostics

2.1 Defeasibility/Cancellation

An inference from A to B is *cancellable* or *defeasible* if one can assert A, and deny B without contradicting oneself.

Implicatures are defeasible:

- (10) a. Joan likes some of her presents.
 b. Joan doesn't like all of her presents. [implicature of (10a)]
 c. Joan likes some of her presents, and (in fact) she likes all of her presents.
 d. Joan likes some of her presents. I wonder if she likes all of her presents.
- (11) a. Mary used to swim a mile daily.
 b. Mary no longer swims a mile daily. [implicature of (11a)]
 c. Mary used to swim a mile daily, and she still does.
 d. Mary used to swim a mile daily. I wonder if she still does.

Entailments are **not** defeasible:

- (12) a. Jane ate oatmeal for breakfast this morning.
 b. Jane ate breakfast this morning. [entailment of (12a)]
 c. #Jane ate oatmeal for breakfast this morning, but/and (in fact) she didn't eat breakfast this morning.
 d. #Jane ate oatmeal for breakfast this morning. I wonder if she ate breakfast this morning.
- (13) a. Mary is an Italian violinist.
 b. Some Italian is a violinist. [entailment of (13a)]
 c. #Mary is an Italian violinist, but no Italian is a violinist.
 d. #Mary is an Italian violinist. I wonder if any Italians are violinists.

The hash-mark symbol (#) indicates that the example is (*pragmatically*) *infelicitous*. In this case, the infelicity comes from the fact that the speaker is contradicting himself, or, in the "I wonder if..." cases, entertaining a contradiction.

Presuppositions are **not** defeasible either:²

- (14) a. Mary stopped smoking.
 b. Mary smoked in the past. [presupposition of (14a)]

²Except under negation: *Sue didn't stop smoking – She never smoked!*

- c. #Mary stopped smoking, but she never smoked in the past.
 d. #Mary stopped smoking. I wonder if she smoked in the past.
- (15) a. After Hans painted the walls, Pete installed the cabinets.
 b. Hans painted the walls. [presupposition of (15a)]
 c. #After Hans painted the walls, Pete installed the cabinets, and/but Hans did not paint the walls.
 d. #After Hans painted the walls, Pete installed the cabinets. I wonder if Hans painted the walls.
- (16) a. Only Mary smokes.
 b. Mary smokes. [presupposition of (16a)]
 c. #Only Mary smokes, but Mary doesn't smoke.
 d. #Only Mary smokes. I wonder if Mary smokes.

Summary:

	cancellable/defeasible
Implicatures	yes
Entailments	no
Presuppositions	no

2.2 Reinforcement

To *reinforce* an inference is to say it explicitly in subsequent discourse.

Implicatures can be reinforced:

- (17) Mary used to swim a mile daily, but she no longer does.
 [implicature of first clause: Mary no longer swims a mile daily.]
- (18) Joan likes some of her presents, but she doesn't like all of her presents.
 [implicature of first clause: Joan doesn't like all of her presents.]

Entailments cannot be:

- (19) #Mary had oatmeal for breakfast this morning, and she had breakfast this morning.
 [entailment of first clause: Mary had breakfast this morning.]
- (20) #Mary is an Italian violinist, and some Italian is a violinist.
 [entailment of first clause: Some Italian is a violinist.]

Presuppositions cannot be either:

- (21) #Mary stopped smoking, and she used to smoke.
 [presupposition of first clause: Mary used to smoke.]

- (22) #After Hans painted the walls, Pete installed the cabinets, and Hans painted the walls.
[presupposition of first clause: Hans painted the walls.]
- (23) #Only Mary smokes, and Mary smokes.
[presupposition of first clause: Mary smokes.]

Summary:

	cancellable	reinforceable
Implicatures	yes	yes
Entailments	no	no
Presuppositions	no	no

So far we have no tests for distinguishing entailments and presuppositions.

2.3 Projection

If sentence *S* implies *I*, then *I projects across negation* if the negation of *S* also implies *I*.

If sentence *S* implies *I*, then *I projects across question formation* if the yes/no question corresponding to *S* also implies *I*.

Presuppositions project. “If *A* presupposes *B*, then to assert *A*, deny *A*, wonder whether *A*, or suppose *A* – to express *any* of these attitudes toward *A* is generally to imply *B*, to suggest that *B* is true and, moreover, uncontroversially so. That is, considering *A* from almost any standpoint seems already to assume or presuppose the truth of *B*; *B* is part of the background against [which] we (typically) consider *A*” (C&MG, p. 28).

Chierchia and McConnell-Ginet say that “presuppositions come in families,” meaning that if *A* presupposes *B*, then all of the sentences in *A*’s family also presuppose *B*.

- (24) a. Joan regrets getting her Ph.D. in linguistics.
b. Joan doesn’t regret getting her Ph.D. in linguistics.
c. Does Joan regret getting her Ph.D. in linguistics?
d. If Joan regrets getting her Ph.D. [in] linguistics, she should consider going back to graduate school in computer science.

All imply:

- (25) Joan got her Ph.D. in linguistics.

Another example:

- (26) a. All Mary’s lovers are French.
b. It isn’t the case that all Mary’s lovers are French.
c. Are all Mary’s lovers French?

- d. If all Mary’s lovers are French, she should study the language.

All imply:

- (27) Mary has (three or more?) lovers.

Entailments do not project:

- (28) a. Mary did not have oatmeal for breakfast this morning.
b. Did Mary have oatmeal for breakfast this morning?
c. If Mary had oatmeal for breakfast this morning, then...

These do not imply that Mary had breakfast this morning.

- (29) a. Mary is not an Italian violinist.
b. Is Mary an Italian violinist?
c. If Mary is an Italian violinist, then...

These do not imply that some Italian is a violinist.

Implicatures also do not project:

- (30) a. Mary didn’t use to swim a mile daily.
b. Did Mary use to swim a mile daily?
c. If Mary used to swim a mile daily, then...

These do not imply that Mary does not currently swim a mile daily.

- (31) a. It is not true that Joan likes some of her presents.
b. Does Joan like some of her presents?
c. If Joan likes some of her presents, then...

These do not imply that Joan does not like all of her presents.

Summary:

	cancellable	reinforceable	projection
Implicatures	yes	yes	no
Entailments	no	no	no
Presuppositions	no	no	yes

2.4 Hey, wait a minute!

Accommodation. A presupposition doesn't already have to be known to all conversational participants in all cases. The following can be uttered felicitously to a reservations clerk who has no knowledge about your present or prior personal habits:

(32) I don't want to sit near the smoking section because I just stopped smoking.

"With no reason to suppose otherwise, the clerk can quite reasonably be expected to accept the passenger's presupposition as if it were already taken for granted and discourse should proceed unproblematically. What happens in such cases is called *accommodation*." (CMG)

More examples of accommodation:

(33) A: Bill is very handsome.
B: Yes, and his wife is lovely, too.

(34) We regret that you cannot bring dogs inside.

However, you can refuse to accommodate, saying *Hey wait a minute!*

(35) A: Joan regrets getting her Ph.D. in linguistics.
B: Hey, wait a minute, I had no idea that Joan did her Ph.D. in linguistics.

(36) A: Sue stopped smoking.
B: Hey, wait a minute, I had no idea that Sue ever smoked.

So *Hey wait a minute!* seems like a test for presupposition. But with **entailments**, *Hey wait a minute!* also seems OK:

(37) A: Mary is an Italian violinist.
B: ?Hey, wait a minute, I had no idea that Mary was Italian.

(38) A: All of the students were at the party.
B: Hey wait a minute, I didn't (even) know that SOME of the students were at the party.³

It doesn't seem so bad with **implicatures** either:

(39) A: Some of the students were at the party.
B: ?Hey wait a minute, I thought that all of the students were at the party.

So this is not a great test.

Summary:

	cancellable	reinforceable	projection	HWM
Implicatures	yes	yes	no	?
Entailments	no	no	no	?
Presuppositions	no	no	yes	yes

³From lecture notes by Danny Fox.

2.5 Precedability

If *A* implies *B*, then the implied part (*B*) is *precedable* if *A* can be used felicitously *after* an utterance that entails *B*. [note: I am making up this term]

Presuppositions are precedable:

(40) Mary smokes, and only Mary smokes.
[presupposition of second clause: Mary smokes.]

(41) Someone broke a typewriter, and the person who broke a typewriter is Sam.
[presupposition of second clause: Someone broke a typewriter.]

Entailments are not:

(42) #Nobody but Mary smokes, and only Mary smokes.
[entailment of second clause: Nobody but Mary smokes.]

(43) #Sam broke a typewriter, and the person who broke a typewriter is Sam.
[entailment of second clause: Sam broke a typewriter.]

Implicatures are:

(44) Sue no longer smokes, but she used to smoke.
[implicature of second clause: Sue no longer smokes.]

(45) Joan doesn't like all of her presents, but she likes some of them.
[implicature of second clause: Joan doesn't like all of her presents.]

Summary:

	cancellable	reinforceable	projection	HWM	precedable
Implicatures	yes	yes	no	?	yes
Entailments	no	no	no	?	no
Presuppositions	no	no	yes	yes	yes

2.6 because

When *S* entails *E* and presupposes *P*, then the entailment *E* is targeted by *because*, not the presupposition *P* (Dretske, 1972).

Some sentences with multiple meaning components of different types:

(46) a. Sue stopped smoking.
b. Sue used to smoke. [presupposition of (46a)]
c. Sue does not currently smoke. [entailment of (46a)]

(47) a. Joan regrets getting her Ph.D. in linguistics.

- b. Joan got her Ph.D. in linguistics. [presupposition of (47a)]
- c. Joan regrets it. [entailment of (47a)]
- (48) a. Only Mary smokes. [presupposition of (48a)]
- b. Mary smokes. [presupposition of (48a)]
- c. Nobody but Mary smokes. [entailment of (48a)]

Applying the tests:

- (49) Sue got fat because she stopped smoking.
(not because she used to smoke, because she no longer does)
- (50) Joan went back to school because she regrets getting her Ph.D. in linguistics.
(not because she got her Ph.D. in linguistics, because she regrets it)

An example from Beaver and Clark (2008):

- (51) And aides and allies were instructed not to characterize Thursday’s vote as a victory or a defeat, even though many viewed it as a partial win, because only 31 Democrats voted for Hyde’s resolution.

“Here, the reason that the vote should not be characterized as a victory or a defeat is not that at least 31 Democrats voted for the resolution – those votes are reasons to characterize the vote as a victory – but rather that no more than the 31 Democrats did so.” (Coppock and Beaver, 2012)

2.7 Emotive factives

- (52) Jim is glad that Sue stopped smoking.
(not that she used to smoke, that she no longer does)
- (53) Joan’s advisor is disappointed that Joan regrets getting her Ph.D. in linguistics.
(not that she got her Ph.D. in linguistics, but that she regrets it)

Another example from Beaver and Clark (2008):

- (54) I am disappointed that only 3 billion dollars will be paid against the approximately 480 billion dollar federal debt.

“What is disappointing to the speaker in (54) is not that at least three billion dollars were paid – that much is good – but rather that no more than those three billion were paid; in other words, the negative component, and not the positive component, is targeted by the emotive factive verb.” (Coppock and Beaver, 2012)

Exercise: Apply the emotive factive test to these examples:

- (55) a. It was Henry who kissed Rosie.
b. Someone kissed Rosie.
- (56) a. Henry kissed Rosie.
b. Someone kissed Rosie.

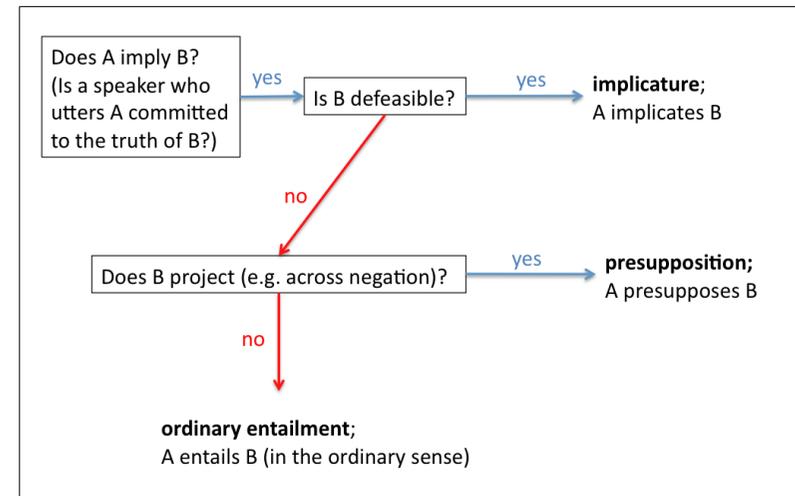


Figure 1: A simple method for diagnosing implication relations

2.8 Diagnosing different types of implication

See Figure 1 for a simple way to diagnose the relation that holds between two sentences.

Chierchia & McConnell-Ginet Exercise 3-(6), p. 33

What relationship holds between (6a) and (6b)?

- (6a) Someone cheated on the exam.
- (6b) John cheated on the exam.

(6a) does not imply (6b), but (6b) implies (6a); any speaker who uttered (6b) would be committed to the truth of 6a. The question is what type of implication it is. The first thing to check is whether it is an implicature or an entailment. To do this we can check whether it is defeasible/cancellable:

- (6') #John cheated on the exam, but nobody cheated on the exam.

Example (6') is pragmatically infelicitous (as indicated by the hashmark symbol '#'). More specifically, the second clause (the negation of (6a)) contradicts (6b). So the inference from (6b) to (6a) is not defeasible. This suggests that the inference is not an implicature, but rather an entailment of some kind.

Now the question is whether this is an ordinary entailment or a presupposition. To test for this, we

can see whether the inference projects, i.e., whether the family of sentences associated with (6b) also imply (6a):

- (6b'): John did not cheat on the exam. [negation]
(6b''): Did John cheat on the exam? [question]
(6b'''): If John cheated on the exam, then he could be in trouble. [conditional]

None of these variants (6b'/6b''/6b''') implies (6a) (that someone cheated on the exam), so the inference does not project. This means that the inference from (6b) to (6a) is not a presupposition, but rather an ordinary entailment.

Chierchia & McConnell-Ginet Exercise 3-(7), p. 33

- (7a) If John discovers that Mary is in New York, he will get angry.
(7b) Mary is in New York.

(7a) implies (7b), in the sense that any speaker who utters (7a) will be committed to the truth of (7b). The question is what type of implication it is. The first thing to check is whether it is an implicature or an entailment. To do this we can check whether it is defeasible/cancellable:

- (7') #If John discovers that Mary is in New York, he will get angry, but Mary is not in New York.

Example (7') is infelicitous; a speaker cannot utter (7a) and then deny (7b) without contradicting himself. So the inference is not defeasible. This suggests that the inference is not an implicature, but rather an entailment of some kind.

Now the question is whether this is an ordinary entailment or a presupposition. To test for this, we can see whether the inference projects, i.e., whether the family of sentences associated with (7a) also imply (7b).

- (7a') If John discovers that Mary is in New York, he will not get angry.
(7a'') If John discovers that Mary is in New York, will he get angry?
(7a''') If it is the case that if John discovers that Mary is in New York, he will not get angry, then Mary could be in trouble.

All of these variants (7a'/7a''/7a''') imply (7b) (that Mary is in New York), so the inference does project. This means that the inference from (7a) to (7b) is a presupposition, and not an ordinary entailment.

Chierchia & McConnell-Ginet Exercise 3-(8), p. 33

- (8a) Seeing is believing.
(8b) If John sees a riot, he will believe it.

Here, (8a) intuitively implies (8b). This implication is not cancellable:

- (8') #Seeing is believing, but if John sees a riot, he won't believe it.

So it is not defeasible, suggesting it is an entailment or a presupposition. Does it project?

- (8a') Seeing is not believing.
(8a'') Is seeing believing?
(8a''') If seeing is believing, then I believe it.

None of these imply (8b). Hence the inference does not project, so it appears to be an ordinary entailment.

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