Gricean Theory

Lecture 17

March 21, 2024

Announcements:

This lecture is supplemented by the following readings:

- Chierchia & McConnell-Ginet: Ch.4 (187–203)

Your sixth homework assignment is available and is due on Thursday, April 4th.

1 Introduction

We currently have a semantic system for interpreting sentences that relies on the following set of rules:

(1) **Functional Application (FA)**
If X is a node that has two daughters, Y and Z, and if ⟦ Y ⟧ is a function whose domain contains ⟦ Z ⟧, then ⟦ X ⟧ = ⟦ Y ⟧(⟦ Z ⟧).

(2) **Predicate Modification (PM)**
If X is a node that has two daughters, Y and Z, and if ⟦ Y ⟧ and ⟦ Z ⟧ are in $D_{\langle e,t\rangle}$, then ⟦ X ⟧ = $[\lambda x : x \in D_e . [\![Y]\!](x) = T$ and $[\![Z]\!](x) = T]$

(3) **Non-Branching Nodes (NN) Rule**
If X is a non-branching node that has Y as its daughter, then ⟦ X ⟧ = ⟦ Y ⟧

(4) **Terminal Nodes (TN) Rule**
If X is a terminal node, then ⟦ X ⟧ is specified in the lexicon.

These rules are capable of composing and interpreting structures that consist of a range of different kinds of expressions. More specifically they allow us to compute the **extension** of a sentence and derive its **truth conditions**.

(5) ⟦ S ⟧ = T *iff* p

Our semantic system also has a means for deriving the presuppositions that are introduced by an expression. These can be represented as a **domain restriction** on the extension of some expression.

(6) $[\lambda x : \boldsymbol{x \in D}$ **and** $\boldsymbol{D}$ **is** ... . x ...]

Thus we have a system that is capable of computing two of the three types of informational content that we identified at the beginning of the semester.

(7) a. **Assertion**
Information explicitly contributed by an expression

b. **Presupposition**
Information that is taken for granted to be true by an expression

c. **Implicature**
Information that is implied/inferred from an expression

Our current goal is to develop a theory of implicatures like the one from the familiar exchange in (8).

(8) A: How was Fred's doctor appointment?
B: Well, he stopped smoking.
⇝ Fred's doctor appointment didn't go well.

That is, we are working on developing a set of rules/principles that allow us to compute the implicatures associated with any given expression.

This will lead us today to propose the following overarching principle that governs rational, cooperative participation in a conversation:

(9) **The Cooperative Principle**
Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

With an explicit definition of what it means to be cooperative, it is possible to understand implicatures to represent inferences that:

(i) arise from the fact that an expression *S* was asserted in a particular context, and

(ii) are validated by the assumption that the speaker is a cooperative conversational participant.

Toward defining what it means to be **cooperative**, we will start from the foundational work of H.P. Grice, to assume that people follow a set of **Conversational Maxims**:

(10) **Maxims of Conversation**

a. *Maxim of Relevance*: Be relevant.

b. *Maxim of Quality*: Don't say false/unjustified things.

c. *Maxim of Quantity*: Don't say less/more than necessary.

d. *Maxim of Manner*: Be brief/orderly.

Interestingly, not only will these general guidelines allow us to understand how and why implicatures are computed, but it will also help us understand two of their key properties: cancelability and reinforceability.

2 Maxims of Conversation

During our last meeting, we looked at a number of puzzles regarding the conveyance of non-asserted, non-entailed information content, viz. **implicatures**.

(11) Cindy has some of the markers.
⇝ Cindy does not have all of the markers.

(12) Bert has two cats.
⇝ Bert does not have more than two cats.

(13) Mike dances or Mike golfs.
⇝ It's not the case that Mike dances and Mike golfs.

Those investigations are interesting for demonstrating that we are capable of regularly communicating more information that what we actually assert.

But, the larger puzzle to be had from those investigation is how conversational participants so uniformly associate a sentence with its implicatures. This facts suggests that we share a general set of rules/principles that allow us to compute the implicatures.

The first person to articulate what this might look like was the philosopher and linguist H.P. Grice in 1967. And while his ideas have undergone significant revision, the fundamental idea is that rational, cooperative conversational participants adhere to the following principle:

(14) **The Cooperative Principle**
Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

When paired with a sufficient definition of what it means to be **cooperative**, implicatures can be seen to represent inferences that:

(i) arise from the fact that an expression S was asserted in a particular context, and

(ii) are validated by the assumption that the speaker is a cooperative conversational participant.

Crucially, it is not simply that speakers intuitively grasp these additional layers of meaning. For Grice, an implicature is calculated by way of a deductive argument, the premises of which are validated by general principles of conversation.

These principles, referred to as Grice's **Maxims of Conversation**, guide a conversational participants own behavior and their deductive reasoning regarding the contributions of another's utterances.

(15) **Maxims of Conversation**
a. *Maxim of Relevance*: Be relevant.
b. *Maxim of Quality*: Don't say false/unjustified things.
c. *Maxim of Quantity*: Don't say less/more than necessary.
d. *Maxim of Manner*: Be brief/orderly.

2.1 Maxim of Relevance

The maxim of relation instructs us to only contribute information that is relevant to the current topic of conversation.

(16) **Maxim of Relation**
Be relevant.

In a rational conversation, cooperative people don't just make random statements. Rather there's generally a topic under discussion and statements are relevant to that topic.

(17) **A violation of the Maxim of Relation**

A: Have you seen *Jurassic Park*?
B: Yeah, I watched it last night.
C: Did anyone see the newest one?
D: #My cat's breath smells like cat food.

2.2 Maxim of Quality

The Maxim of Quality instructs us to only contribute information that we consider to be truthful.

(18) **Maxim of Quality**

i. Do not say what you believe to be false.
ii. Do not say that for which you lack adequate evidence.

In a rational conversation, cooperative people do not assert something if they know that it's false or if they have no idea whether it's true.

(19) **A violation of the Maxim of Quality**

A: How does *Jurassic Park* end?
B: The park is a huge success.
A: Wow, really?
B: #I don't know I've never seen it.

2.3 Maxim of Quantity

The Maxim of Quantity instructs us to only contribute only as much information as is relevant to the conversational goals.

(20) **Maxim of Quantity**

i. Make your contributions to the conversation as informative as required.
ii. Do not make your contribution to the conversation more informative than is required.

In a rational conversation, cooperative people provide as much information as they can without also violating the other maxims.

(21) **A violation of the Maxim of Quantity**

A: What are the names of the paleontologist and the paleobotanist in *Jurassic Park*?
B: #Alan Grant.

(22) **A violation of the Maxim of Quantity**

A: What are the names of the paleontologist and the paleobotanist in *Jurassic Park*?
B: #Alan Grant, Ellie Sattler, and Ian Malcolm.

Importantly, this maxim requires that we have some kind of metric that we can use to compare utterances in order to determine which ones are more or less informative. We will return to this below.

2.4 Maxim of Manner

The Maxim of Manner instructs us to only contribute information in a logical and efficient way.

(23) **Maxim of Manner**

i. Make your contributions brief.
ii. Make your contributions orderly.

In a rational conversation, cooperative people do not employ overly anfractuous language to express uncomplicated ideas and they make contributions in some kind of logical order.

(24) **A violation of the Maxim of Manner**

A: What did they feed to the velociraptor in *Jurassic Park*?
B: #An domesticated female ungulate of binomial title, Bos taurus.
A: ... So, a cow.

(25) **A violation of the Maxim of Manner**

A: What happened to Dennis Nedry in *Jurassic Park*?
B: #He shut off the security system to get an 18 minute window. He was hired to steal dinosaur embryos. When we he was driving to the docks he got lost and was eaten by a dinosaur. He snuck into the cold storage room and stole dinosaur embryos. Dodgson gave him a can of shaving cream to store the stolen dinosaur embryos in.
A: ... How could he steal the embryos after being eaten?

2.5 Interim Summary

The foundational concept of the Gricean Theory of implicatures proposes that rational, cooperative participants in a conversation adhere to the following principle:

(26) **The Cooperative Principle**

Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

The majority of the work in this theory is done by the **Maxims of Conversation**, which direct how conversational participants contribute to a conversation.

(27) **Maxims of Conversation**

a. *Maxim of Relevance*
Be relevant.

b. *Maxim of Quality*
   (i) Do not say what you believe to be false.
   (ii) Do not say that for which you lack adequate evidence.

c. *Maxim of Quantity*
   (i) Make your contributions to the conversation as informative as required.
   (ii) Do not make your contribution to the conversation more informative than is required.

d. *Maxim of Manner*
   (i) Make your contributions brief.
   (ii) Make your contributions orderly.

From this we get the big key idea of the Gricean Theory of implicatures:

(28) **The Calculation of an Implicature**
An implicature is an inference that:

i. arises from the fact that an expression *S* was asserted in a particular context, and
ii. is validated by the assumption that the speaker is **observing the Maxims of Conversation**.

Overlap in Coverage. As the maxims are formulated here, there may be some overlap in their coverage. That is, they may conspire to give rise to implicatures.

For instance, by omitting requested information, one may be seen as simultaneously violating both Quality and Quantity. Similarly, by adding irrelevant information to a contribution one could be seen as violating the maxims of both Relevance and Manner.

Flouting the Maxims. Interestingly, understanding conversations in this way also allows us to explain what it means to lie, to be sarcastic, to be politely indirect, and even to tell a joke.

These are speech acts that involve intentionally **flouting** one or more of the conversational maxims. This describe cases in which a (possibly cooperative) conversational participant intentionally disobeys a conversational maxim for some effect.

For instance, we regularly flout the Maxim of Manner, among other things, to "distance" ourself from commands and requests as a means of being more polite.

(29) a. Meet with me tomorrow.
b. Will you meet with me tomorrow?
c. Would you meet with me tomorrow?
d. Could you meet with me tomorrow?
e. I wonder if you could meet with me tomorrow.
f. I am wondering if you could meet with me tomorrow.
g. I was wondering if you could meet with me tomorrow.

Rationality beyond Conversation. It is also interesting to note that Grice saw the Cooperative Principle and its maxims as being applicable to all forms of interaction.

(30) **Rational behavior in a non-linguistic context**
Context: You are helping me put together a bookshelf

a. **Maxim of Relation**
You won't just sit there playing Tetris.

b. **Maxim of Quality**
If I ask for some screws, you won't hand me old, bent, rusted ones.

c. **Maxim of Quantity**
If I ask for a screwdriver, you won't hand me three.

d. **Maxim of Manner**
If I ask for a screwdriver, you won't walk clockwise around the room twice before picking it up and counter-clockwise around the room twice before handing it to me.

3 Informativity and Entailment

As mentioned above, and as we will see below, a key part of the Maxim of Quantity requires that we have a defined metric for measuring and comparing the relative informativity of different utterances.

(31) **Maxim of Quantity**

i. Make your contributions to the conversation **as informative** as required.
ii. Do not make your contribution to the conversation **more informative** than is required.

One influential way of doing this relies on the relationship of **entailment**.

(32) **Entailment**
A sentence S1 entails a sentence S2, if whenever S1 is true, then S2 is true.

(33) **Sentence S1 entails sentence S2**

S1: Kendra and Ray are coming to the party.
S2: Kendra is coming to the party.

Said slightly differently, a sentence S1 entails a sentence S2 if the situations in which S1 is true are a subset of the situations in which S2 is true:

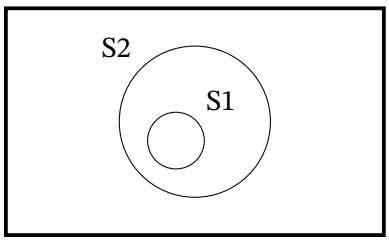

Figure 1: Visual representation of an entailment relation

Now, given that a sentence S1 entails a sentence S2:

- If S1 is true, then S2 is true.
- So, if you know that S1 is true, then you also know that S2 is true.
- This means that S1 conveys **as much or more** information, relative to S2.

And, given that S2 does not entail S1:

- If S2 is true, then it is not guaranteed that S1 is true.
- So, just because you know that S2 is true, you don't know whether S1 is true.
- This means that S2 conveys **less** information, relative to S1.

With this in hand, we can define a metric for **Informativity** that is based on entailment.

(34) **Informativity Metric**
A sentence S1 is more informative than a sentence S2 if:
i. S1 entails S2 and
ii. S2 does not entail S1.

With respect to the example above we can say that S1 is more informative than S2 by virtue of asymmetically entailing S2.

(35) S1: *Kendra and Ray are coming to the party* **is more informative** than
S2: *Kendra is coming to the party*

Upon hearing S1, we also know that S2 is true. But, upon hearing S2, we do not necessarily know that S1 is true.

4 Some Examples of Deriving Implicatures

With this much in hand, we can engage is a number of case studies to see how the Maxims of Conversation might be used to validate implicatures in various contexts.

(36) **Maxims of Conversation**
a. *Maxim of Relevance*: Be relevant.
b. *Maxim of Quality*: Don't say false/unjustified things.
c. *Maxim of Quantity*: Don't say less/more than necessary.
d. *Maxim of Manner*: Be brief/orderly.

Once we have seen how these maxims are assumed to guide contributions to conversations, we will investigate some key predictions of this Gricean Theory of implicatures.

During our next couple of meetings, we will return to those key puzzles that lead us to search for a theory of how implicatures are computed.

4.1 Example 1: A Quantity Implicature

Consider the following conversation:

(37) A: Who are you bringing to the party?
B: I am bringing Kendra to the party.
⇝ I am bringing only Kendra to the party.

According to the Cooperative Principle, the Maxims of Conversation validate the following line of reasoning by the other conversational participants:

- B has said only that they are bringing Kendra to the party. They did not say that they are bringing Ray/Sue/Tony.
- **B is following the Maxim of Quantity.** Therefore, B's statement was as informative as possible without violating the other maxims.
- If B had also said that they were bringing Ray/Sue/Tony, they would have made **a more informative statement.**
- After all, saying that they are bringing Kendra *and Ray/Sue/Tony* would entail that they are bringing Kendra, but not vice versa.
- But, since B didn't say that they were bringing Ray/Sue/Tony, **it must because such a statement would violate some other maxim.**
- Saying that they were bringing Kendra and Ray/Sue/Tony would have been a relevant statement **(Maxim of Relation)**, and it would would have been brief and orderly **(Maxim of Manner)**.

  So, it must be that such a statement would have violated the Maxim of Quality.
- Therefore, B either believes that "I'm bringing Kendra and Ray/Sue/Tony to the party" is not true, or they don't have sufficient evidence to assert it.
- However, B is assumed to know who they are bringing to the party.
- Therefore, the fact that B didn't say that they are bringing Kendra and Ray/Sue/Tony to the party must be because B knows that it is not true.
- Therefore, B is not bringing Ray/Sue/Tony to the party.
- **Therefore, they are bringing only Kendra to the party.**

Note that there are two assumptions that are crucial to the line of reasoning presented here and, therefore, to the generation of the implicature:

- B is cooperatively being as informative as possible by following the Maxim of Quantity.

  So, in a context where B is keeping it secret who they are bringing, the implicature does not arise.
- B knows who they are bringing to the party.

  So, in a context where B drives a ride-share and may only have partial knowledge of who they are bringing, the implicature does not arise.

4.2 Example 2: A Quantity and Quality Implicature

Consider the following conversation:

(38) A: Where does Derek live?
B: Derek lives somewhere in Troy.
⇝ B does not know exactly where Derek lives.

According to the Cooperative Principle, the Maxims of Conversation validate the following line of reasoning by the other conversational participants:

- B has said only that Derek lives somewhere in Troy.
- **B is following the Maxim of Quantity.** So, their utterance was as informative as possible without violating the other maxims.
- If B had said precisely where Derek lives in Troy, that would have been **a more informative statement**.
- After all, saying exactly where in Troy Derek lives would entail that Derek lives somewhere in Troy, but not vice versa.
- So, since B didn't say exactly where Derek lives, **it must be because that would violate some other maxim.**
- Saying exactly where Derek lives would have been a relevant statement **(Maxim of Relation)**, and it would have been brief and orderly **(Maxim of Manner)**.
- So, **it must be that such a statement would violate the Maxim of Quality.**
- Therefore, the fact that B didn't say exactly where Derek lives means that B does does not have sufficient evidence to assert it.
- **Therefore, B doesn't know exactly where Derek lives.**

Note that, in this and the previous example, the line of reasoning based the Maxim of Quantity is being validated by the our concept of **Informativity**.

This is a signature pattern for the family of **Scalar Implicatures**. These are implicatures that arise from the general inference that:

- The speaker said p.
- There is a more informative/stronger statement q that the speaker did not say.
- Since the speaker didn't say q, they aren't sure about q or believe/know q is false.
- The speaker would/should know about q.
- Therefore, q is false.

We will look at this in more detail in our next meeting when we return to some of the puzzles we uncovered last time.

4.3 Example 3: A Relevance Implicature

Consider the following conversation:

(39) A: Are you going to the party?
B: I have homework.
⇝ I am not going to the party.

According to the Cooperative Principle, the Maxims of Conversation validate the following line of reasoning by the other conversational participants:

- B has said only that they have homework.
- **B is following the Maxim of Relevance.** So, their utterance is relevant to answer the question at hand.
- Therefore, since B is saying something relevant, B intends their utterance to convey an answer that question.
- The most reasonable way that B's homework would bear upon the question at hand, is if **their need to do their homework conflicts with their ability to go the party**.
- Therefore, by saying that they have homework, B intends to convey that their homework conflicts with the party.
- **Therefore, B cannot come to the party.**

Note that the reasoning here, and therefore the generation of this particular implicature, relies on a key assumption:

- The fact that B has homework is relevant to the question at hand if B's need to do their homework conflicts with the party.

  So, in a context where B, as a means of avoiding their homework, always goes to a party when they have homework, the implicature is not generated. In fact, in that case we make the opposite inference..

4.4 Example 4: A Relevance and Manner Implicature

Consider the following conversation:

(40) A: Can Jeff dance?
B: He can move his body at the same time that music is playing.
⇝ Jeff cannot dance.

According to the Cooperative Principle, the Maxims of Conversation validate the following line of reasoning by the other conversational participants:

- B has said only that Jeff can move his body at the same time that music is playing.
- **B is following the Maxim of Relevance.** So, their utterance is relevant to answer the question at hand.
- Therefore, since B is saying something relevant, B intends their utterance to convey an answer that question.
- Now, moving his body at the same time that music playing is essentially the same thing as dancing.
- But **B is following the Maxim of Manner.** So, they made their contribution in a way that was as brief and orderly as possible **without violating the other maxims**.
- Since B didn't simply say that Jeff can dance **it must be because such a statement would violate some other maxim**.
- Saying that Jeff can dance wouldn't have been either more or less informative **(Maxim of Quantity)**.
- **So, it must be that such a statement would violate the Maxim of Quality.**
- Therefore, it must be the case the B believes the statement that Jeff can dance is false or otherwise misleading.
- Given that B has asserted that Jeff can move his body at the same time that music is playing, it must be that B believes that this act falls short of what would allow them to say that Jeff can dance.
- One obvious reason this act would fall short of saying that Jeff can dance is that it is of such poor quality that one would not consider it dancing, but merely performing random movements.
- Therefore, Jeff may dance, but B considers it to be of such poor quality that it doesn't qualify as dancing.
- **Therefore, Jeff cannot dance.**

4.5 Example 5: A Relevance Implicature

Consider the following conversation:

(41) *Advertisement*: Baked Lays have 65% less fat.
⇝ Baked Lays have 65% less fat than competing chips

According to the Cooperative Principle, the Maxims of Conversation validate the following line of reasoning by the other conversational participants:

- The advertiser states that their chips have 65% less fat.
- **They are following the Maxim of Relevance.** So, their statement is relevant to the question of which chips I should buy.
- Therefore, they intend their statement to convey an answer that question.
- A saliently effective way of answering that question would be to present the advantages that Baked Lays have over that companies competitors.
- Therefore, **they intend their statement to convey an advantage of their chips over their competitors.**
- Their statement would convey such a meaning if it were interpreted as the more explicit statement: Baked Lays have 65% less fat *than its competitors* (i.e., and not bacon, and not other Lays).
- Therefore, they intend to convey that Baked Lays have 65% less fat than their competitors.
- **Therefore, Baked Lays have 65% less fat that competing chips.**

Indeed, a lot of false advertising comes, not from explicitly saying things that are false, but saying things that strongly invite us to draw inferences that are false.

For full context, the package actually reads as follows:

(42) Baked lays have 65% less fat
than regular potato chips

But we might take note that this "clarification" does not exactly disrupt the inference.

5 Two Key Predictions of Gricean Theory

Recall that the central claim made by the Gricean Theory of implicatures is the following:

(43) **The Calculation of an Implicature**
An implicature is an inference that:
i. arises from the fact that an expression *S* was asserted in a particular context, and
ii. is validated by the assumption that the speaker is observing the Maxims of Conversation.

This core idea makes (at least) two accurate predictions regarding the behavior of the types of non-asserted content that we have identified an implicatures.

5.1 The Cancelability of Implicatures

If some proposition p is an implicature of a sentence S, then it follows that p is not really a part of the asserted content of S.

That is, p is simply an inference that conversational participants draw on the basis of the assumption that the speaker is adhering to the conversational maxims.

Therefore, a sentence of the form "S and not p" should be logically consistent. It would not contradict any information that is explicitly conveyed or entailed by S.

As we have seen, this is exactly the case:

(44) A: Who are you bringing to the party?
B: I am bringing Kendra to the party. **And I'm also bringing Steve.**

(45) A: Where does Derek live?
B: Derek lives somewhere in Troy. **But I'm not comfortable sharing exactly where.**

(46) A: Are you going to the party?
B: I have homework. **But I'll find you when I get there.**

(47) A: Can Jeff dance?
B: He can move his body at the same time that music is playing. **And he does it quite well.**

As we have also seen, this is not the case with presuppositions. It's also not the case with the asserted or entailed content of an utterance.

(48) A: Who are you bringing to the party?
B: I am bringing Kendra and Steve to the party. **#But I'm not bringing Steve.**

(49) A: Where does Derek live?
B: Derek lives somewhere in Troy. **#But he doesn't live in Troy.**

(50) A: Are you going to the party?
B: I have homework. **#And I don't have homework.**

(51) A: Can Jeff dance?
B: He can move his body at the same time that music is playing. **#But he can't move his body while music plays.**

Therefore, the Gricean Theory of implicatures not only provide a theory of where implicatures comes from, but it explains why their cancelability is a key property of this kind of inference.

5.2 The Reinforceability of Implicatures

If some proposition p is an implicature of a sentence S, then it follows that p is not really a part of the asserted content of S.

That is, p is simply an inference that conversational participants draw on the basis of the assumption that the speaker is adhering to the conversational maxims.

Therefore, a sentence of the form "S and p" should be informative. It would not repeat any information that is explicitly conveyed or entailed by S.

As we have seen, this is exactly the case:

(52) A: Who are you bringing to the party?
B: I am bringing Kendra to the party. **But nobody else.**

(53) A: Where does Derek live?
B: Derek lives somewhere in Troy. **But I'm not sure exactly where.**

(54) A: Are you going to the party?
B: I have homework. **So, I can't make it.**

(55) A: Can Jeff dance?
B: He can move his body at the same time that music is playing. **But he's awful.**

As we have also seen, this is not the case with presuppositions. It's also not the case with the asserted or entailed content of an utterance.

(56) A: Who are you bringing to the party?
B: I am bringing Kendra and Steve to the party. **#And I'm Bringing Kendra.**

(57) A: Where does Derek live?
B: Derek lives somewhere in Troy. **#And he lives in Troy.**

(58) A: Are you going to the party?
B: I have homework. **#And I have homework.**

(59) A: Can Jeff dance?
B: He can move his body at the same time that music is playing. **#And he moves his body while music plays.**

Therefore, the Gricean Theory of implicatures not only provides a theory of where implicatures comes from, but it explains why their reinforceability is a key property of this kind of inference.

6 Practice

Consider the following exchange:

(60) A: I'm starving.
B: There are cookies on the counter.

Provide a sketch of how the implicature provided might be computed from the truth-conditions of the utterance, and the assumption that the speaker is being cooperative. Be sure to clearly write out each step of reasoning in a bulleted/enumerated list.

Is this is a scalar implicature?