Truth-Conditional Meaning

Lecture 03

January 11, 2024

Announcements:

Your first homework assignment is available and is due on Thursday, January 16th.

Portner: Ch1. (12–23)

1 Introduction

Recall that our program for this course is to develop an explanatory model of what makes it possible to understand the meaning of natural language expressions.

We formulated this program—known as **formal semantics**—as an attempt to answer the following question:

(1) **The Fundamental Question of Formal Semantics**
What is the system of rules that comprises our ability to compositionally compute the meaning of natural language expressions?

As represented above, the approach that we are taking to this question is informed and guided by the hypothesis that languages are compositional systems:

(2) **Principe of Compositionality**
The meaning of a complex expression can be computed from:
(i) the meaning of its component expressions and
(ii) their mode of combination.

A challenge we face before being able to undertake this program is that we will have to be more precise about what we mean when we use the vague, pre-theoretic term "meaning." We must define:

(i) the relevant notion of **meaning** that the component parts of expressions have and

(ii) the relevant notion of **meaning** that our compositional system is intended to compute.

Our current goal is to consider the issue in (ii). We will then see that we can use this to guide our consideration of the issue in (i).

During our last meeting, we identified the **informational content** conveyed by an utterance as the relevant concept of 'meaning' for our investigation.

(3) **Informational Content**
The information about the world that an expression conveys

We also saw the need to distinguish between (at least) three different types of informational content that can be conveyed by a sentence. These differ primarily on the basis of how they are conveyed:

(4) a. **Assertion**
Information explicitly contributed by an expression (truth conditions)

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

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

So, whatever our semantic rules are going to look like, our goal is to have them compute the kinds of meanings outlined above.

Today we will take a closer look at the meaning of assertions, i.e. **truth conditions**. Our goal is to develop a more grounded understanding of what they are and why they are part of our model.

(5) **Truth Conditions**
The conditions under which an expression is true

2 Truth Conditions

2.1 Asserted Meanings as Truth Conditions

We let the following guide our approach to determining a suitable definition of the term meaning:

> *"In order to say what a meaning* is*, we may first ask what a meaning* does*, and then find something that does that."*
>
> — *David Lewis,* General Semantics (1970)

Our starting-off point was the relatively uncontroversial claim that human languages are communication systems. As such, they serve as a vehicle for conveying information.

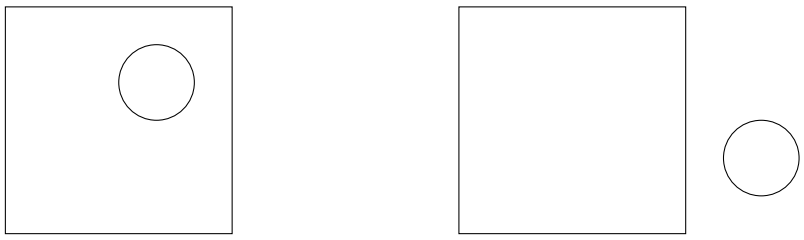
Perhaps the most salient kind of meaning conveyed by any given sentence is information about the world. We refer to this as broadly as the **informational content** of an expression.

(6) **Informational Content**
The information about the world that an expression conveys

We see this when we consider the asserted meaning of simple sentences like in (7) below:

(7) The circle is inside the square.

This sentence explicitly conveys information about how the world can be expected look. Moreover, with this information, we are capable of capable of evaluating whether this expression is true of false relative to some scenario.



In other words, understanding what the sentence in (7) conveys is the same thing as understanding the conditions in which it would be true and the conditions in which it would be false.

It is plausible, therefore, that what sentences convey are precisely those conditions in which that sentence would be true, namely its **truth conditions**.

(8) **Truth Conditions**
The conditions under which an expression is true

To summarize:

- A major component of what the 'meanings' of expressions seem to do is convey different kinds of informational content.
- Truth conditions reflect the kind of asserted informational content that is intuitively contributed by an expression.
- Thus, it is possible to conceive of the asserted meaning of expressions as their truth conditions.

In line with the philosophical and semantic traditions that we are following, we will elevate this conclusion to the level of a postulate: **the meaning of the asserted content of an expression is its truth conditions.**

Our goal, therefore, is (in part) to develop a set of semantic rules that compute the *truth conditions* of an expression from (i) the meaning of its component parts and (ii) their mode of composition.

2.2 Some Technical Notes on Truth Conditions

Statements of the truth conditions of an expression are typically presented in the following way, with S representing the expression and p representing its truth conditions:

(9) **Truth-conditional Statement**
S is true if and only if (*iff*) p

In the case of (7), we can state its truth conditions as follows:

(10) **Truth-Conditional Statement for** (7)
$\underbrace{\textit{The circle is inside the square}}_{\text{Expression}}$ is true *iff* $\underbrace{\text{the circle is inside the square}}_{\text{Truth Conditions}}$.

Let us reiterate that the **truth conditions** of an expression are different than the actual **truth value** of that expression.

(11) **Truth Value**
The value (True of False) assigned to an utterance on the basis of its usage

Knowing what a sentence means does not require knowing whether it's actually true. It is when the truth conditions of an utterance attain that the utterance is assigned the value True upon its usage.

Even with all of this, truth conditions are, admittedly, a pretty weird way to talk about the meaning of sentences in natural language. Some things that weigh heavy on the minds of many include:

- **But what actually *are* truth conditions?**
  Truth conditions describe language-external and mind-external facts about the world. They are a collection of conditions that must hold for some expression to be used truthfully.
- **But where do they actually *come* from?**
  The truth conditions of any given expression have to be reasoned out. We do this by intuitively evaluating the kinds of scenarios in which a sentence is true and those in which it is false.
- **But why do we present them like *that*?**
  We need some way of expressing the truth conditions of a sentence and human languages happen to be the most effective way of conveying information that we have. And what better way to express the meaning of a sentence—when possible—than with an expression that obviously has the same meaning?

This last point leads us to make a distinction between an **object language** and the **metalanguage**.

(12) **Object Language**
The language that we are studying

(13) **Metalanguage**
The language that we are using to characterize the truth conditions of sentences in an object language

The object language and the metalanguage can both the same language. As English speakers, this will naturally be the case when English is our object language.

(14) $\underbrace{\textit{The woman saw the girl}}_{\text{Object language: English}}$ is true *iff* $\underbrace{\text{The woman saw the girl .}}_{\text{Metalanguage: English}}$

The object language and the metalanguage can also be different.

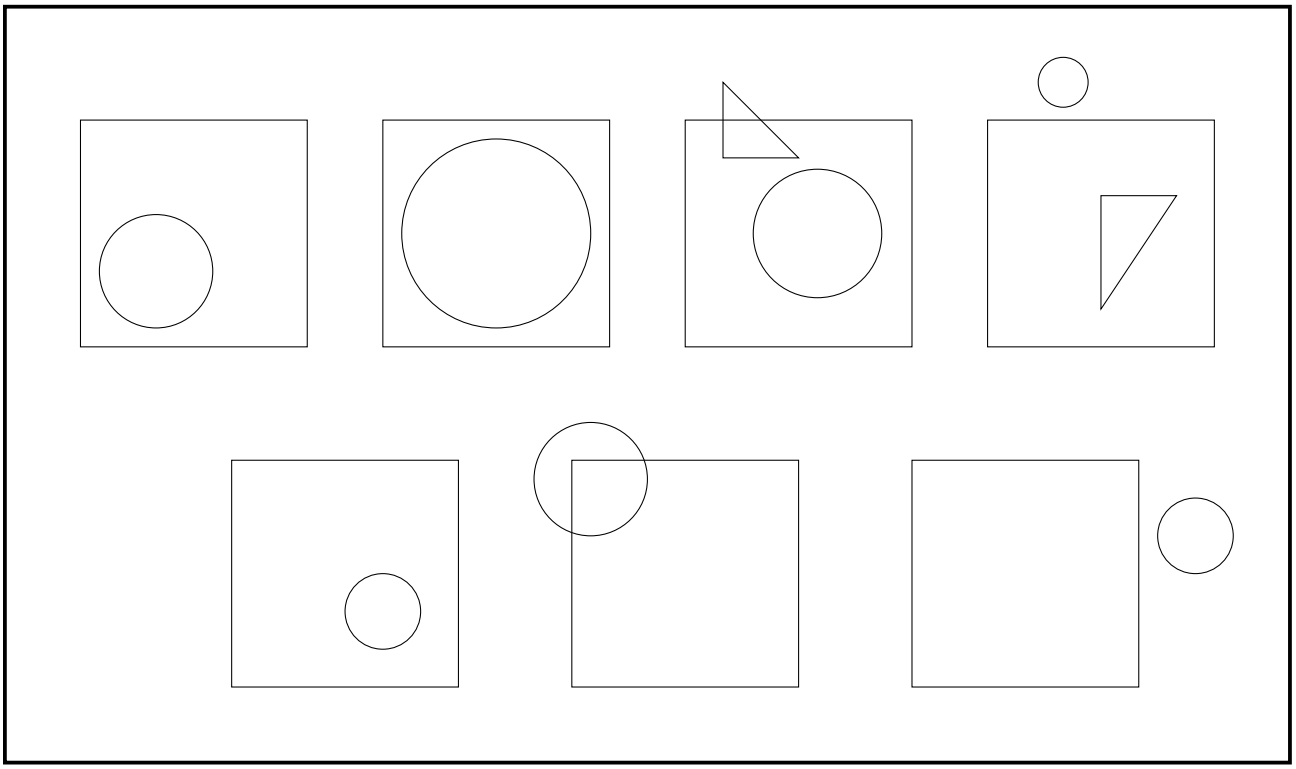
(15) $\underbrace{\text{ʔɨta səbəjti nəta gʷal rɨjəjata}}_{\text{Object language: Tigrinya}}$ is true *iff* $\underbrace{\text{The woman saw the girl .}}_{\text{Metalanguage: English}}$

(16) $\underbrace{\textit{The woman saw the girl}}_{\text{Object language: English}}$ ist wahr wenn und nur wenn $\underbrace{\text{Die Frau hat das Mädchen gesehen .}}_{\text{Metalanguage: German}}$

With regard to what truth conditions actually do, note that there will be (infinitely) many different scenarios in which the truth conditions of sentence are satisfied.

Exercise: Consider the scenarios depicted in the following figure. In which scenarios is the sentence in (17) True? In which scenarios is it sentence False?

(17) The circle is inside the square.



At a certain level, then, it is possible to say that the truth conditions specify *sets* of possible scenarios.[1] They serve to divide possible scenarios into the set of those in which a sentence is True and the set of those in which it is False.

Exercise: Consider the informational content in (18) below. Is this a presupposition of the sentence in (17)? Is it an implicature of the sentence in (17)? What is your evidence and reasoning?

(18) The circle is entirely inside the square.

[1]It is common to find this idea formalized in terms of **possible worlds**. See Portner (2005:14–15) for discussion.

3 Why Use Truth Conditions?

With a more solid foundation for the truth-conditional aspect of meaning, we are in a position to consider why this is the approach to meaning we are taking.

The first reason is that this approach to meaning has allowed us to develop a productive and wide-ranging theory of what meaning is and how it is computed compositionality. Over the course of this semester we'll see a number of the results that have been achieved.

The remainder of this section gives an overview of some of the other benefits of this approach, which don't require a full background in formal semantics to appreciate.

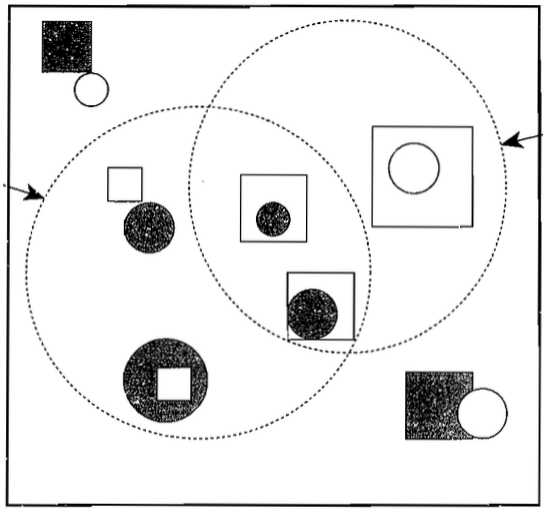
3.1 Logical Connectives

Logical connectives include words such as *and* and *or*. A truth-conditional conception of meaning nicely captures the meaning of sentences that contain these elements:

(19) [*P and Q*] is true *iff P* is true and *Q* is true

Exercise. Consider the sentences in (20) relative to the contexts provided. In which scenarios are each of these sentences true?

(20) a. The circle is inside the square.
b. The circle is shaded.
c. The circle is inside the square and the circle is shaded.



Still working under the idea that the meaning of a sentence is its truth conditions, which specify sets of possible scenarios in which it is true, the logical connective *and* simply produces the **intersection** of two sets of possible scenarios.

Exercise. In which of the scenarios above is the sentence in (21) with *or* considered to be true? Provide a truth condition statement that reprsents the meaning of a sentence [*P or Q*].

(21) The circle is in the square or the the circle is shaded.

3.2 Relations Between Sentences

Sentences may stand in a particular relationships with other sentences.

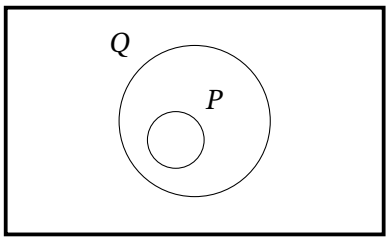
(22) **Entailment**
A sentence *P* entails a sentence *Q* if the truth of *P* guarantees the truth of *Q*.

(23) **Contradiction**
A sentence *P* and a sentence *Q* are contradictory if the truth of *P* guarantees the falsity of *Q* and vice versa.

These relations between sentences can straightforwardly be understood by treating the meaning of a sentence as a set of truth conditions that specifies a set of scenarios in which it is true.

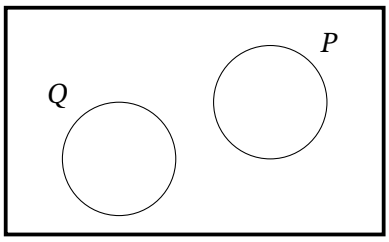
A sentence P entails a sentence Q when the scenarios in which P's truth conditions are satisfied are a *subset* of the scenarios in which Q's truth conditions are satisfied.

(24) **Sentence P entails sentence Q**
P: There is a shaded triangle inside the circle.
Q: There is a triangle inside the circle.



A sentence P contradicts a sentence Q when the scenarios in which P's truth conditions are satisfied are *disjoint* from the scenarios in which Q's truth conditions are satisfied.

(25) **Sentence P entails sentence Q**
P: The triangle is bigger than the circle.
Q: The circle is bigger than the triangle.



In other words, the logical relationships between sentences can be modeled as the relationships between their truth conditions.

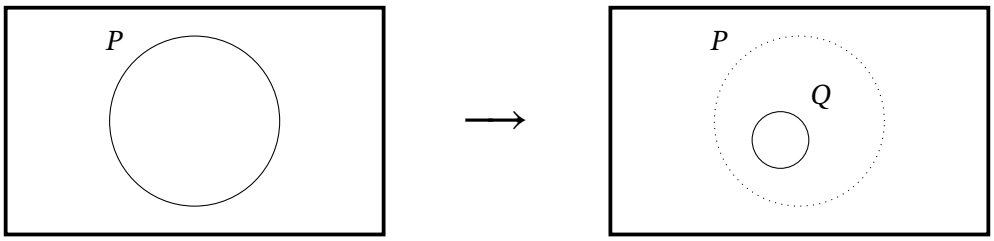
3.3 Belief Updates

Finally, thinking of the meaning of a sentence as truth conditions that specify sets of possible scenarios in which that sentence is true provides a way to understand how conversations evolve.

Consider a situation in which you don't know what the weather the sentence in (26) is true. The set of scenarios that are compatible with your beliefs about the actual world will contain scenarios in which (26) is true and scenarios in which it is not true.

(26) It snowed in Detroit on December 25th, 1985, for four hours.

Exercise: What happens if I utter (26) (and you believe me?)



The sharing and adoption of informational can be modeled as the adjustment of that set of scenarios that we believe to truthfully represent the world around us.

4 They 'Reality' of Truth Conditions

With all of this in hand, we restate our goal for explaining how we are able to understand the meaning of sentences in natural languages:

We wish to develop a set of semantic rules that compute the *truth conditions* of an expression from (i) the meaning of its component parts and (ii) their mode of composition.

Given our other beliefs about how our knowledge of language is encoded, this goal assumes that our ability to compute truth conditions is part of our cognitive capacity for language.

This raises a lot of questions. But perhaps it isn't so crazy. Consider what is an entirely plausible characterization of how the meaning of an utterance would be computed:

(27) **I. Speaker Utters:**
The house is on fire.

II. Listener Computes:

i. Syntax
The string [ðə hɑ͡ʊs ɪz ɑn fɑ͡ɪɻ] has the following structure: [the house [is [on fire]]]

ii. Semantics
The structure [the house [is [on fire]]] is true *iff* the house is on fire

iii. Pragmatics

- The speaker is honest, so what he says is truthful
- So, [the house [is [on fire]]] is true
- And, so, given its truth condition, the house is on fire
- Oh $#@% !!

In brief, our goal of having a system to compositionally compute the truth conditions of an utterance allows us to deduce information about the world.

And, after all, conveying information about the world does seem to be a major purpose of human languages.