

- (1) Today, we're going to talk about another way to understand meaning as a kind of truth-condition, namely what's usually called *intensional semantics* or *possible-worlds semantics*. The main ideas are developed by Carnap (1947/1956) and have then been sharpened by, among others, Hintikka (1961) and Lewis (1970). An especially mathematically sophisticated version was developed by Montague (1974).
- (2) The idea behind this kind of semantics is to use possible worlds as a tool for explaining what a truth-condition is.
 - (a) As I've said before, a possible world is a complete description of a state-of-affairs. It's one possible state that the world could be in.
 - (b) So, for a sentence S to be true in a world w the state of that world would have to be such that it makes S true.
 - (c) In this way, we can think of the set of all possible worlds where S is true as containing exactly those states of affairs which makes S true. In every other world S would be false.
 - (d) But that's exactly what we want a truth-condition for S to tell us: exactly which states of the world where S is true!
 - (e) So, we can say that a truth-condition for a sentence S is a partition of all possible worlds into those where S is true and those where it is false. More formally, we can think of this as a function

$$I_S : W \rightarrow \{\text{True}, \text{False}\}$$

where W is the set of all possible worlds. This function takes a world w as input and outputs the truth-value of the sentence S in that world. That is, $I_S(w) = \text{True}$ if S is true in w and $I_S(w) = \text{False}$ if S isn't true in w .

- (3) We can also apply the very same thought about how expresses the way the world is on smaller constituents of a sentence. Carnap makes the distinction between the *extension* and *intension* of an expression. The expression will refer to something in every possible world, namely its extension. For example, a singular term points to a unique object whereas a predicate points to the set of things in that world which satisfies it. These are their extensions in the possible world w : the things in w which the expression refers to.
- (4) The intension is supposed to be more like the meaning of the expression. It's what determines the extension of the expression in every possible world.
 - (a) So the intension of a singular term t is a a choice of referent for t in every possible world. Again, we can think of it as a function from the set of possible worlds to the set of objects in the world. The intension I_t of a term t is then the function such that $I_t(w) = x$ where x is the referent of t in the world w .

- (b) A definite description like, for example, ‘The tallest person in the world’ has an intension which in every possible world w picks out the human in w who is tallest. So, it is a function whose value is different for different possible worlds.
 - (c) Names, as we’ve discussed, seem to be rigid designators. So, they are supposed to refer to the same individual in every possible world. Hence, their intension always picks out the same extension; it’s a constant function. $I_{Niklas}(w) = \text{Niklas}$ for all worlds w .
 - (d) The extension of predicates is the set of objects in that possible world which satisfies them. So, the intension for the predicate ‘is green’ is a function which for every world w picks out the set of green objects in w . Written as a function, $I_{\text{is green}}(w) = \{x \text{ such that } x \text{ is green in } w\}$
- (5) To put it together, the intension of a complete sentence is its truth-condition as defined above. Accordingly, its extension in a possible world w is its truth-value in w .
- (a) Now, since the T -schema tells us how the truth-values and extensions of expressions can be understood compositionally we can use it to derive a principle of compositionality for intensions.
 - (b) Essentially, the idea is that we require that the extensional T -schema holds for the extensions of all expressions in every possible world. Then, since intensions are functions from worlds to extensions, they are fully determined when their values in every possible world is fixed.
 - (c) For example, if P and Q are sentences, then we know that $P \wedge Q$ is true in a world w if and only if P is true in w and Q is true in w . Hence, the intension for the sentence $P \wedge Q$ is determined by the condition that

$$I_{P \wedge Q}(w) = \text{True} \text{ if and only if } I_P(w) = \text{True} \text{ and } I_Q(w) = \text{True}$$

Similarly, we can extend convention T for other expressions.

- (6) Can possible-worlds semantics deal with the objections presented to Davidsons theory?
- (a) There’s no change on the point that it only attempts to explain fact-stating language.
 - (b) It has no problem explaining the difference in meaning between mammals with a heart and mammals with kidneys. Although they happen to share an extension in our world, there are possible worlds where their extensions are different. As such, their intensions are not the same.
 - (c) Modal connectives are also easy for the theory to explain. As I’ve mentioned earlier, possible worlds are a tool developed especially to provide truth-conditions for statements of necessity and possibility. But other connectives which are not truth-functional (like ‘but’ or ‘despite’) are more difficult.
- (7) One way to think of this theory is as a development of Frege’s theory. That is, intensions are essentially Fregean senses and extensions are the references they determine. The proposition which is expressed by a complete sentence is its truth-condition, which is to say the set of possible worlds where the sentence is true. In this way, possible-worlds semantics is a propositional theory which explains what a proposition is; it’s a set of possible worlds.
- (8) When we discussed propositional theories I said that there were some explanatory challenges that they face.

- (a) Intensions are not quite so mysterious as propositions. We know more about how to reason with them thanks to them being made mathematically explicit as functions. But they still depend essentially on how we understand the machinery of possible worlds.
 - (b) The theory does have more explanatory value than a mere reformulation of intuition in complicated language. Intensions explain how and why meaning is compositional in terms of truth-values and, further, explains the semantics of counterfactual and modal claims.
 - (c) Intensions, however, are still quite disconnected from how we use language. It's not obvious how functions from possible worlds are supposed to figure into an explanation of communication or language driven behaviour.
- (9) That brings us to the interface between semantics and pragmatics. The study of language is, as I mentioned at the first lecture, largely divided into grammar, semantics, and pragmatics. So far, we've essentially just been discussing semantics, which attempts to answer questions about what meaning expressions have independent of context. Pragmatics, on the other hand, is concerned with how expressions are used in and affected by the social context of their utterance.
- (10) Within pragmatics, it's common to draw a distinction between *pure pragmatics* and *semantic pragmatics*. Pure pragmatics is concerned with uses of language which aren't directly connected with any theory of meaning. It studies speech-acts and other social uses of language which is largely independent of what theory of meaning is adopted. This is a topic for a later lecture.
- (11) Semantic pragmatics is about explaining the meaning of context-dependent expressions. In this way, it's a pragmatic enrichment of theories of meaning; taking on indexical and demonstrative expressions.
- (12) Indexicals are expressions whose meaning or reference depends on their context of utterance. The question of what expressions are indexicals and how they should be categorised is extremely disputed, but the one I mention here is quite common.
- (a) Classic examples are 'I', 'You', 'Here', and 'Now'. Since these terms seem to have their reference fixed directly by context, they're sometimes called *pure indexicals*.
 - (b) Another kind of indexicals are those which somehow point out their reference, such as 'Her', 'Him', 'That', or 'There'. These are usually called *demonstratives* or *deictic* expressions.
 - (c) Predicates can also be indexical, like 'Tall', 'Old', or 'Warm'. Different contexts provide different requirements for satisfying them.
- (13) One of the most influential approaches to semantic pragmatics is David Kaplan's extension of possible-worlds semantics to deal with indexicals. Adopting this view also helps that theory avoid the criticism that extensional versions of truth-conditional semantics have difficulty handling indexicals.
- (a) He starts from the idea that intensions are functions from possible worlds to extensions as the basic theory of propositional meaning for an expression. Although he means the same thing, he prefers to call intensions *content*.
 - (b) Imagine that you came to the classroom and it was written on the board that

I'm sick today.

What you need to understand this sentence is to know who wrote it and when it was written. Once you know that, its truth-conditions are clear, since ‘I’ refers to the writer and ‘Today’ refers to the day it was written. With that additional information, you can tell which possible-worlds it’s true in.

- (c) This is the core of Kaplan’s idea for how indexicals work. Each one of them is governed by some associated rule which tells us just what they pick out in the context of utterance.
 - (d) To formalise this, he puts forward two ideas. The first is that every utterance is made in a context which contains information about who is the speaker, hearer, time of utterance, place of utterance, and some other things. The second idea is to postulate a second layer of meaning which he calls the *character* of an expression. Character is a rule for determining the intension of an expression in a given context.
- (14) In other words, character is a function from contexts to intensions. If, for example, $c = \{c_t, c_p, c_L\}$ is a context consisting of a speaker c_t , a place c_p , and a predicate c_L which specifies the contextual understanding of the predicate ‘is tall’.
- (a) The character of ‘I’ and ‘Here’ are the functions $K_I(c) = I_{c_t}$ and $K_{Here}(c) = I_{c_p}$, where I_x is the intension of the term x .
 - (b) The character for ‘is tall’ is the function $K_{is\ tall}(c) = I_{c_L}$, where I_P is the intension for the predicate P .
 - (c) The character for the name Niklas is the function $K_{Niklas}(c) = I_{Niklas}$. Since my name is context-independent, its character is a constant function.
 - (d) What characterises indexical expressions is that their character is *not* a constant function. Non-indexical expressions have the same intension in every context.

One way to think of Kaplan’s theory is as a kind of *two-dimensional semantics*, where the meaning-entity associated with an expression x is no longer an intension. Instead, it’s a function of two variables, one context of utterance and one possible world. That is, the meaning-entity for x is a function $M_x : C \times W \rightarrow E$ where C , W , and E are sets of contexts, possible worlds, and extensions respectively. Hence, its value $M_x(c, w)$ given the input c and w is the extension of x in the context of utterance c and world w .

- (15) As formally impressive as Kaplan’s theory is, it — and other similar approaches — faces some problems.
- (a) Given Kaplan’s formalisation, the sentence

I am here now.

will be true in every context and every possible world since all that it’s saying is that the speaker of the context is at the place of the context at the time of utterance of the context. But at the same time, as Predelli (1998) notes, it also seems true when an answering machine conveys

I’m not here right now but ...

which contradicts that conclusion. So, pure indexicals seem to at least have more complex characters than simply pointing out the speaker, place, or time of utterance.

- (b) Another example of when ‘T’ seems more complicated comes from Nunberg (1993). Imagine that Jones is about to be executed and says that

I am traditionally allowed to order whatever I want for my last meal.

If ‘T’ simply picks out Jones in this sentence, then we should be able to replace it with his name without changing the truth-value of the sentence. But

Jones is traditionally allowed to order whatever I want for my last meal.

is false because there is no such tradition about what Jones is allowed to do.

- (c) Nunberg also offers another example where he visits another university, meets a former colleague, and asks

Are you here now?

Here, we want to say that he’s asked whether the former colleague now works for the university he is visiting, not whether they are present at the place and time of the utterance.