

# File Change Semantics

24.954: Pragmatics in Linguistic Theory

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## Readings

- Irene Heim. 1983. On the projection problem for presuppositions. In *Proceedings of WCCFL 2*, 114–125. Stanford University
- Nirit Kadmon. 2001. *Formal pragmatics*. Blackwell: chapter 6
- Daniel Rothschild. 2011. Explaining presupposition projection with dynamic semantics. *Semantics and Pragmatics* 4(0). 3–1–43

## 1 Sentences as *updates*

Recall the Heim/Karttunen generalisation concerning presupposition projection in *conjunctive* sentences.

- (1) **Conjunction**  
If  $A_\pi$ , and  $B_\rho$ , then a sentence of the form “A and B” presupposes  $\pi$ , and unless A entails  $\rho$ , also presupposes  $\rho$
- (2) Sam and Ka visited Rome and Venice last Summer, and Ka visited Venice again.  
*presuppositionless*

Peter’s intuition

An assertion of the first conjunct *Sam and Ka visited Rome and Venice last Summer* should alter the common ground in such a way that an assertion of the second conjunct is felicitous (heavily paraphrased).

One way of thinking about this intuition is that we should treat (2) in a way parallel to the discourse in (3).

- (3) Sam and Ka visited Rome and Venice last Summer.  
Ka visited Venice again.  
*presuppositionless*

It’s difficult to make sense of this idea given the theory introduced last week, since *assertion* is a strictly *pragmatic* notion.

- In what sense can we say that each conjunct is a distinct assertion?
- What is the meaning of *and* such that it can conjoin assertions?

In the 80s and early 90s, a family of theories, including Discourse Representation Theory (DRT; Kamp 1981), File Change Semantics (FCS; Heim 1982: ch. 3), and Dynamic Predicate Logic (DPL; Groenendijk & Stokhof 1991) attempted to cash out this intuition.

For reasons of time, we’ll be focusing on the tradition begun by Heim.

The core idea of FCS is that the denotation of a declarative sentence is not a *proposition* but rather an *instruction* for updating the conversational context – such instructions are called **Context Change Potentials (CCPs)**.

### 1.1 The Stalnakerian Common Ground (recap)

Before we say something about what a CCP is, we first need to be precise about the notion of a *conversational context*.

Following Stalnaker, we’ll represent the Common Ground in  $c$  as the *Context Set* – the set of possible worlds compatible with the shared knowledge of the discourse participants.

Add actual Stalnaker references here

Elaborate on this

### 1.2 The CCPs of declarative sentences

The context set is a set of worlds (type  $st$ ). The denotation of a declarative sentence is an *instruction* to take the current context set, and sift out all those possible worlds that aren’t compatible with the information conveyed by a sentence.

We can model this “instruction” formally by treating the denotation of a declarative sentence as a *function from context sets to updated context sets* of type

$$(4) \quad \llbracket \text{Paul vapes} \rrbracket = \lambda c . c \cap \{ w \mid p \text{ vapes}_w \}$$

This meaning for *Paul vapes* captures the dynamic flow of information over the course of a discourse.

Imagine, we're in a context where we don't know whether or not Paul vapes:

$$c = \{ w_1, w_2, w_3, w_4 \}$$

Paul vapes in  $w_1$  and  $w_3$ , but not in  $w_2$  or  $w_4$

When we update a context set with a sentence, we simply *apply* the sentence meaning to the context set:

$$\llbracket \text{Paul vapes} \rrbracket (\{ w_1, \dots, w_4 \}) = \{ w_1, \dots, w_4 \} \cap \{ w \mid p \text{ vapes}_w \} = \{ w_1, w_3 \}$$

The result is an *updated* context set  $c'$  containing *just those worlds* in which Paul vapes.

#### An aside on notation

Here, I'm following, e.g., [Chierchia \(1995\)](#) in using the lambda notation for CCPs. CCPs are also often written as follows:

$$(5) \quad c + [\text{Paul vapes}] = c \cap \{ w \mid p \text{ vapes}_w \}$$

$$(6) \quad c[\text{Paul vapes}] = c \cap \{ w \mid p \text{ vapes}_w \}$$

These different ways of writing CCPs are equivalent. The lambda notation has the advantage of already being familiar from, e.g., [Heim & Kratzer \(1998\)](#).

### 1.3 From CCPs to propositions and back again

Our classical, static semantics is *subsumed* by this new treatment of sentence meaning, since we can define an operator ( $\downarrow$ ) to get back from CCPs to propositions.

To retrieve a proposition from a CCP  $f$ , we take the set of worlds  $w$ , such that applying  $f$  to  $\{ w \}$  returns  $w$ .

$$(7) \quad f^\downarrow = \lambda w . f (\{ w \}) = \{ w \}$$

$$(8) \quad \llbracket \text{Paul vapes} \rrbracket^\downarrow = \lambda w . (\{ w \} \cap \{ w \mid p \text{ vapes}_w \}) = \{ w \} \\ = \lambda w . \{ w \mid p \text{ vapes}_w \}$$

#### Exercise

Define an operator  $\mathbb{A} :: \langle \text{st}, \langle \text{st}, \text{st} \rangle \rangle$  which takes a classical proposition and returns the corresponding CCP.

### 1.4 Modelling presuppositions

Heim's intuition is that presuppositions impose *preconditions* for CCPs to update (i.e., apply to) the current context set.

If these preconditions are met, we say that the presuppositions of a given CCP are **satisfied** relative to a context set  $c$ .

We can easily cash out this intuition formally by treating CCPs as *partial* functions from context sets – an utterance is infelicitous if the associated CCP is undefined when applied to the current context set.

$$(9) \quad \llbracket \text{Paul quit vaping} \rrbracket = \lambda c . \begin{cases} c \cap \{ w \mid \neg p \text{ vapes now}_w \} & \{ w \mid \neg p \text{ did vape}_w \} \subseteq c \\ \# & \text{else} \end{cases}$$

The CCP associated with *Paul quit vaping* imposes as a precondition, that the current context  $c$  entails *that Paul used to smoke*.

If this precondition is satisfied, it updates  $c$  with the information that *Paul doesn't smoke now*, otherwise the result is undefined (and therefore: infelicitous).

#### Writing partial functions

The following is to be read as: that function from  $x$  to *output*, which is defined iff *condition* holds.

$$\lambda x . \begin{cases} \text{output} & \text{condition} \\ \# & \text{else} \end{cases}$$

You can also use the colon notation introduced in [Heim & Kratzer \(1998\)](#):

$$\lambda x : \text{condition} . \text{output}$$

## 2 Presupposition projection

### 2.1 Conjunctive sentences

Conjunction is just function composition

### References

- Chierchia, Gennaro. 1995. *Dynamics of meaning: Anaphora, presupposition, and the theory of grammar*. Chicago: University of Chicago Press. 270 pp.
- Groenendijk, Jeroen & Martin Stokhof. 1991. Dynamic predicate logic. *Linguistics and Philosophy* 14(1). 39–100.
- Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*. 2011 edition - typesetting by Anders J. Schoubye and Ephraim Glick. University of Massachusetts - Amherst dissertation.
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