

Dynamic Semantics
Barker, ESSLLI 2010, Copenhagen
Monday: Introduction

Semantics: (natural language) meaning
Dynamic versus static:

- Static meaning: “ $3+4$ ” means “7”
- Dynamic meaning: “ $x := x + 1$ ” means “change the value of x by adding 1 to it”

Some things have meanings that are naturally static.

- Money: “\$3” means 3 dollars; it does not denote a function that turns an uncaffeinated person into a caffeinated person.

Some things have meanings that are naturally dynamic.

- [In the context of a smartphone] “[finger pinch]” means “shrink the image on the screen”, not the set of all images such that they are sufficiently tiny

So how about natural language? Are sentences static or dynamic?

- Does “John left” denote a truth value / proposition (static)?
- Or does it denote a function from information states to updated information states (dynamic)?

Clearly, static.

- Does “You’re fired!” denote a proposition (static)?
- Or does it denote a function from employment states to updated employment states (dynamic)?

Clearly, dynamic.

The five stages of thinking about dynamic versus static:

1. Curiosity: How do dynamic systems work?
2. Enthusiasm: Some types of natural language meaning appear to be essentially dynamic. Therefore the most general approach is to assume that all natural language meaning is dynamic. Of course natural language meaning is dynamic, what's the problem?
3. Conservative backlash: But wait, many, perhaps all allegedly dynamic effects can be handled with a static semantics, as long as we recognize the difference between what an expression means (static, semantics) and what agents do when they are confronted with meanings (dynamic, pragmatics).
Slogan: sentences do not have the authority to update belief states, only people do.
4. Confusion: Static and dynamic are interconvertible, so it doesn't make any real difference.
Yes it does.
No it doesn't.
I'm so confused.
Pryor's question: is there any way to define what it means for a system to be dynamic without making assumptions about the context (sets of worlds, sets of assignment/world pairs, etc.)?
5. Serenity: some aspects of meaning are essentially static (at-issue truth conditions); some aspects are essentially dynamic (non-negotiable update):
 - (a) presuppositions
 - (b) introduction of discourse referents by, e.g., indefinites
 - (c) expressive meaning
 - (d) inquisitive meaning

Stalnaker 1978:

(Some) sentences express propositions.

A proposition can be modeled as (the characteristic function of a) set of worlds.

Context set, presupposition:

p. 151: ...a set of possible worlds, the possible worlds compatible with what is presupposed. this set, which I will call the context set, is the set of possible worlds recognized by the speaker to be the "live options" relevant to the conversation. A proposition is presupposed if and only if it is true in all of these possible worlds.

Update:

p. 153: ...[H]ow does the content of an assertion alter the context? My suggestion is a very simple one: To make an assertion is to reduce the context set in a particular way, provided that there are no objections from the other participants in the conversation. The particular way in which the context set is reduced is that all of the possible situations incompatible with what is said are eliminated. To put it a slightly different way, the essential effect of an assertion is to change the presuppositions of the participants in the conversation by adding the content of what is asserted to what is presupposed.

Updates must be non-trivial:

p. 154: A proposition asserted is always true in some but not all of the possible worlds in the context set... [A] speaker should not assert what he presupposes to be true, or what he presupposes to be false. Given the meaning of presupposition and the essential effect ascribed to the act of assertion, this should be clear. To assert something incompatible with what is presupposed is self-defeating; one wants to reduce the context set, but not to eliminate it altogether. And to assert something which is already presupposed is to attempt to do something that is already done.

Kamp, Hans. 1981. A Theory of Truth and Semantic Representation. In J. Groenendijk, T. Janssen, and M. Stokhof (eds), *Formal Methods in the Study of Language*. Mathematical Centre, Amsterdam. 277–322. Reprinted in Portner and Partee 2002.

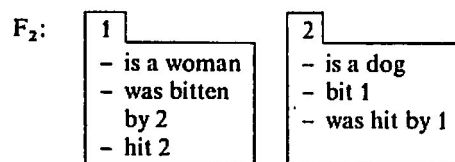
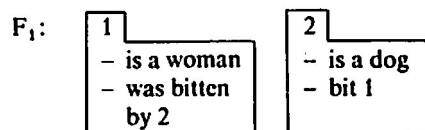
Heim, Irene. 1983a. File change semantics and the familiarity theory of definiteness. In R. Baeuerle, R. Schwarze, and A. von Stechow (eds). *Meaning, Use and Interpretation of Language*. de Gruyter. Reprinted in Portner and Partee 2002.

Heim, Irene. 1983b. On the projection problem for presuppositions. M. Barlow, D. Flickinger and M. Wescoat (eds), *WCCFL 2*: 114–25. Reprinted in S. Davis (ed), *Pragmatics*. Oxford. 397–405. Also reprinted in Portner and Partee 2002.

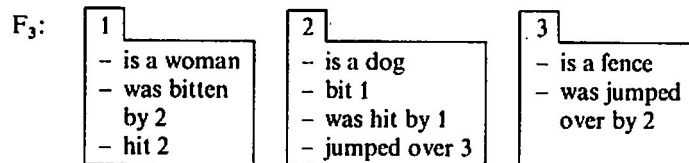
Heim, Irene. 1990. Presupposition Projection. In R. van der Sandt (ed), *Presupposition, Lexical Meaning and Discourse Processes: Workshop Reader*, University of Nijmegen. Also available at semanticsarchive.net.

Heim 1983.

- (6) a. A woman was bitten by a dog.
 b. She hit it.
 c. It jumped over a fence.



Now comes the utterance of (6c). The listener takes a new card, numbers it “3”, writes on it “is a fence” and “was jumped over by 2”, and also updates card 2 by adding on it “jumped over 3”. This leaves him with F₃, a three card file:



Compare:

- (6') a. She hit it.
b. A woman was bitten by a dog.

Order matters.

(7) For every indefinite, start a new card. For every definite, update an old card.

Referents versus discourse referents (Karttunen 1968):

(8) John didn't see a cat.

A discourse referent, but no referent.

(9) John and Mary arrived. One of them brought a cake.

Three discourse referents, two referents.

p. 227 (P&P reprint): Roughly, the model of semantics that I am going to present will embody the following assumptions. The grammar of a language generates sentences with representations on various levels of analysis, among them a level of "logical form". Each logical form is assigned a "file change potential", i.e., a function from files into files. Given an utterance with a certain logical form, this function will determine how you get from the file that obtains prior to the utterance to the file that comes to obtain as a result of the utterance.

In Heim's notation,

$$F + p = F'$$

'the result of updating F on account of p is F' .'

For instance, returning to Stalnaker land.

- Set of possible worlds W
- Propositions p, q are sets of worlds; technically, functions of type $s \rightarrow t$ from worlds to truth values
- Contexts, including the Common Ground, are likewise functions from worlds to truth values
- Sentences are associated with a proposition. Then *John left* will be associated with the function that maps a world w to true just in case John left in w . Call this proposition p .

- Sentences are also associated with a context change potential. Then *John left* will be associated with a function that maps a context C into an updated context C' just in case C' contains exactly those elements of C at which it is true that John left:

$$\delta = (\lambda C \lambda w. Cw \wedge pw)$$

Call this context change potential δ .

- Dually, we can define the proposition associated with a sentence in terms of its context change potential:

$$p = \lambda w. \delta(\lambda w'. w' = w)$$

- The context change potential determines how the content of a sentence would update a context if a listener decided to accept the assertion—it's only a *potential* context change!

Our goal: develop tools and methods for thinking precisely and clearly about dynamic issues.

Some views:

What is a dynamic theory of meaning?

Chierchia (1995, xii):

Now there are two ways of looking at what is going on. On the view of meaning as content, we might simply say that the utterance of a declarative sentence in a given context will naturally prompt us to enter its content into the common ground—and that is the end of the story. The second way to go is to view sentences as actually having as semantic values functions from information states into information states. On this second view, context updating would be an integral part of the compositional system of meanings. I will call this the "view of meaning as context change".

Kramer (1998, 225):

...we have studied presupposition and anaphora. Both phenomena have their proper place somewhere in the twilight zone between semantics and pragmatics, and as a result they have been studied from both angles. Nowadays, the traditional distinction between semantics and pragmatics is becoming increasingly blurred... [O]ne important way in which dynamic semantics differs from traditional (truth-conditional) semantics is precisely its emphasis on meanings in context.

Groenendijk, Stokhof and Veltman. 1996.

Changing the context.

Dynamic semantics and discourse. IATL3: Proceedings of the 11th annual conference and of the workshop on discourse. E. Doran and S. Wintner, 104–128. Israel Association for Theoretical Linguistics, Jerusalem:

The bite of it [i.e., the dynamic approach] does not lie in metaphors, such as the slogan that meaning is information change potential, but in providing logical tools to implement and analyze these ideas.

Stalnaker 1998:

A successful statement will thus change the context in two different ways that need to be distinguished. First, the fact that the

statement was made is information that is added to the context simply as a result of the fact that it is a manifestly observable event that it was made. Second (assuming the statement is not rejected), the content of the assertion will be added to the context. One might imagine a formal language game in which the two kinds of change take place successively: first, the addressee takes in and adjusts to the fact that a particular proposition has been asserted â that it has been proposed that a certain piece of information be mutually accepted; second, the addressee accepts or rejects the proposal, either adding the content of the assertion to the contextual information, or leaving the context as it was after the first change.

Geurts 1999:

I reject this analysis and in particular the notion of conjunction upon which it is based, because in my opinion it is obvious that and is not dynamic in the sense that its meaning, or indeed any other aspect of its lexical entry, is relevant to an explanation of why anaphora is possible in (2a) but not in (2b). For once I don't use the adverb 'obvious' to heighten the rhetorical impact of my statement: I really believe that it is obvious that and is not dynamic, and that, consequently, dynamic semantics is wrong. I have a strong pre-theoretic intuition that if you must explain the contrast between (2a) and (2b), the lexical entry for and is about the least Presuppositions and Pronouns Chapter 4 3 promising place to start, and I have found that many people have the same intuition. Somehow, however, the advocates of dynamic semantics have managed to convince themselves that this intuition is just a mistake. It may be helpful, therefore, to expand upon what I take to be a near-truism.

Schlenker 2008:

The dynamic approach posits that a presupposition must be satisfied in its local context. But how is a local context derived from the global one? Extant dynamic analyses must specify in the lexical entries of operators what their 'context change potentials' are, and for this very reason they fail to be explanatory. To circumvent the problem, we revise two assumptions of the dynamic approach: we take the update process to be derivative from a classical,

non-dynamic semantics - which obviates the need for dynamic lexical entries; and we deny that a local context encodes what the speech act participants 'take for granted'.

Points to hold on to:

- Part of knowing what a sentence means is knowing the conditions under which an assertion of that sentence would be true (analogously for other types of speech acts). Therefore any complete theory of meaning will have to deliver truth conditions.
- Something about language use is dynamic. If it's not meaning, what is it?

Empirical domains:

Anaphora:

1. a. A man walked in the park. He whistled.
- b. He whistled. A man walked in the park.

Presupposition:

2. a. France has a king, and the king is bald.
- b. The king is bald, and France has a king.

Conditionals:

3. If France has a king, the king is bald.

Donkey anaphora:

4. a. If a farmer owns a donkey, he beats it.
- b. Every farmer who owns a donkey beats it.

Weak crossover:

4. a. Everyone loves his mother.
- b. He loves everyone's mother.

Superiority:

5. a. Who bought what?
- b. ?What did who buy?

Negative polarity licensing:

6. a. John gave no one anything.
- b. *John gave anything to no one.

Questions:

7. a. It might be raining in Tulsa.
- b. Is it raining in Tulsa?

Expressives:

8. John took out the damn garbage.

[many more]