Lecture 9: Presuppositions

Readings:
(Kadmon 2001) *Formal Pragmatics*, Part Two: Presupposition (Chapters 5-11) (On your CD)
(Heim 1983) On the projection problem for presuppositions. -- Heim's theory of context change directly applied to presuppositions.
(Heim 1990) Presupposition projection. -- Argues that presuppositions are admittance conditions, not conventional implicatures
Suggestions for additional reading:
(van der Sandt 1992) ; (von Fintel 1999) ; (von Fintel 2000) ; (Beaver and Zeevat To appear)
Two nice new electronic resources that include recent advanced topics, not on CD:
The syllabus, with many links, from Schlenker's 2008 short course on presuppositions at NYU:
http://homepages.nyu.edu/~pds4/NYU-08/nyu-08.html
And David Beaver's bibliography on presupposition: http://www.ling.ohio-state.edu/%7Estoia/BeaverBibYab.html

See also the **APPENDIX to Lecture 7** .

1. The projection problem for presuppositions.

Linguists and philosophers have been interested for many years in the "projection problem" for presuppositions. What is the "projection problem"? It is "the problem of predicting the presuppositions of complex sentences in a compositional fashion from the presuppositions of their parts" (Heim 1990). It is really simply the "compositionality" problem for presuppositions; in early generative grammar, semantic compositionality in general was called the "projection" of meanings up through the syntactic tree (Katz and Fodor 1963), and while the term "projection" was replaced by "compositionality" among semanticists in the 1970's, the term "projection" has remained in discussions of presuppositions.

From Heim (1990):

A primitive illustration [of the projection problem] is provided by the following three sentences.

(1) The king has a son.
(2) The king's son is bald.
(3) If the king has a son, the king's son is bald.

Restricting our attention to existence presuppositions resulting from definite descriptions, we observe that (3) presupposes that there is a king, a presupposition carried by both of its constituent sentences (1) and (2), but it doesn't presuppose that the king has son, a presupposition of its right-hand constituent (2). What are the general rules that account for this and analogous observations?

There have been several stages in advances in the study of presuppositions. There are still open problems that have not been solved, but things are much clearer than they used to be. Some problems are just matters of terminology, some problems are quite technical; but I believe that the biggest problems were solved by the work of Stalnaker (1973, 1974), Karttunen (1974), and

Heim (1983). Good summaries of the history of work on presuppositions, and controversies about how to treat them, can be found in Kadmon's book (Kadmon 2001), whose central Part Two consists of seven chapters on presuppositions, and in (Heim 1990).

As for the semantics-pragmatics distinction, I believe that we probably do not need two separate notions of presupposition, but we need to understand how both semantic composition and dynamic context effects are involved in presuppositions and presupposition projection. Presuppositions are a domain in which the importance of Heim's "dynamic" view of semantics as context-change-potential is particularly clear. After we've looked at some examples and their analysis, we can come back to the question of where, if at all, to draw a line between a close-to-semantics sense of "pragmatics" (context-change potential and related aspects of context-sensitivity of meaning) and a farther-from-semantics sense of "pragmatics" (influence of real-world knowledge and conversational implicatures), and consider the different roles they play in the analysis of presuppositions.

We can see from the 1974 Karttunen-Stalnaker definitions of presupposition why Stalnaker wrote about "pragmatic presupposition"; the same notion became effectively a part of semantics with Heim's 1983 dissertation.

(1)   **Definition:** B is a presupposition of sentence S iff S can be felicitously uttered only in contexts that entail B.

What does it mean for a context to entail a proposition? The conversational context includes a *common ground*, a set of propositions, or equivalently, a set of possible worlds – all those possible worlds that are compatible with everything that the conversational participants take to be shared knowledge. We say a context entails B as shorthand for 'the common ground of the context entails B', i.e. B is true in all possible worlds in the common ground, or B is entailed by the propositions in the common ground.

In this introductory section, let's look at some of the descriptive generalizations about presupposition projection that were discovered in the 1970's, and then we can turn to questions about how they can best be explained.

Plugs, holes, and filters. Karttunen (1973) observed that some linguistic items and constructions pass the presuppositions of their embedded elements up the tree unchanged – these are *holes* --, some block the projection of embedded presupposition any higher – these are *plugs* – and some have more complex behavior – the *filters*. We illustrate each kind below.

Holes: Negation, Yes-No questions, *possible that ...*, *knows that ...* .
These include the classic "S-family" constructions; being preserved in the S-family is one of the main tests for presupposition. So all of the sentences below maintain the presupposition that John has children, a presupposition of the NP *John's children* and of the simple affirmative sentence *John's children are at home.*

(2) a.   John's children aren't at home.
    b.   Are John's children at home?
    c.   It's possible that John's children are at home.
    d.   Mary knows that John's children are at home.

Plugs: Some constructions, most famously non-factive propositional attitudes like *believes*, do not pass on the presuppositions of their parts.

(3)   Mary believes that John's children are at home.

The speaker of sentence (3) does not have to be committed believing that John has children, or that such a belief is part of the common ground. The speaker may be presupposing that, but need not be. It may be just "Mary's presupposition". That is, in order for Mary to have such a belief, she must also believe that John has children. But the speaker of the sentence need not.

Filters: Karttunen and Stalnaker independently identified some principles concerning presupposition projection in some constructions that are neither plugs nor holes, the *filters*. The most well-known are conjunction, *if-then* sentences, and disjunction.

Presupposition projection in conjoined sentences:

(4)   The king has a son, and the king's son is bald.

Sentence (4) presupposes that there is a king, but it does not presuppose that the king has a son. On some theories this presupposition is "cancelled" by the assertion in the first clause; but on the Stalnaker-Karttunen-Heim view, it is better to say that it is "satisfied" in the local context established by the first conjunct, and therefore it is not presupposed by the sentence as a whole: it need not be part of the common ground of the utterance context in order for the whole sentence to be felicitously uttered.

Let us use Kadmon's notation ps(p) for 'the presuppositions of p'

In general for a conjoined sentence p & q, the utterance context must entail ps(p), and the utterance context plus the first conjunct p must entail ps(q). Or in other words:

(5)   The presuppositions of p & q are: ps(p) & (p $\rightarrow$ ps(q)).

Why is "and" called a *filter*? Because in determining the presuppositions of p & q, any presuppositions of q that are entailed by p are 'filtered out', and only those presuppositions of q that are not entailed by q become presuppositions of the whole.

This is discussed in detail, with lots of examples, in Kadmon's Chapter 5.

Presupposition projection in *if-then* sentences:

Look again at Heim's initial examples in the 'first' (1-3) on p.1 above. We repeat Heim's (3) below as (6):

(6)   If the king has a son, the king's son is bald.

(7)   The presuppositions of *if p then q* are also ps(p) & (p $\rightarrow$ ps(q)).

The *if*-clause, like the first conjunct of a conjunction, is a hole. But the *if*-clause acts as a temporary supposition, adding its content to the context in which the consequent clause is interpreted. So any presuppositions of the consequent clause that are entailed by the *if*-clause are satisfied locally and don't become presuppositions of the whole.

It may seem surprising that we have the very same presupposition projection for an *if-then* sentence as for a conjunction. The difference between them is that the entailments of an *if*-clause have a short lifespan: they don't last beyond that sentence; whereas the entailments of the first conjunct of a conjunction are added to the common ground of the utterance context. So sentence (4) above could be followed felicitously by (8), while sentence (6) could not be.

(8)   A Spanish princess is in love with the king's son.

Presupposition projection in disjunction sentences.

(9) a.   Either the king doesn't have a son or the king's son is away from home.
    b.   Either the king's son is away from home or the king doesn't have a son.

Disjunctions pose problems for the study of presuppositions, and we will not discuss them in any detail. Different researchers have made different claims about what the facts are, and there are a variety of proposals about how to analyze the various purported facts. It seems that disjunctions are more nearly symmetrical in their behavior than conjunctions; one can often easily reverse the order of the disjuncts without changing either well-formedness or what is presupposed, while that is not true for conjunctions:

(10)   # The king's son is bald, and the king has a son.

What are the "filtering facts" for disjunctions? That's a controversial question, but one proposal (Karttunen 1974) is this:

(11)   a.   If *p or q* is uttered in context c, the local context for *p* is c + ¬q and the local context for *q* is c + ¬p.
        b.   The presuppositions of *p or q* are (¬p $\rightarrow$ ps(q)) & (¬q $\rightarrow$ ps(p)).

But it is sometimes suggested that only example (9a) should be treated directly, and (9b) treated as involving something closer to an afterthought-clarification; in that case the local context for *p* is just c, and the presuppositions of *p or q* are not symmetrical, but rather ps(p) & (¬p $\rightarrow$ ps(q)).

There are analogous anaphora puzzles for disjunction, including an example of mine, cited in various places:

(12)   Either this house doesn't have <u>a bathroom</u> or <u>it</u>'s in a funny place.

Anaphora examples are not fully symmetrical, but we do have something similar to (9b) in the following:

(13)   Either the bathroom in this house is in a funny place, or it doesn't have one.

I won't say any more about disjunction examples; I can give you some references if you're interested. See, for instance, Simons (1995, 2000).

2. Heim's analysis: Context-change potential as explanation for presupposition projection

Stalnaker (1974) had already laid good foundations for an account of presupposition with his theory of assertion and the common ground: At any point in a conversation, some possible worlds are "live candidates" for being the actual world, and some are not. Making an assertion, if it is accepted by the hearer, leads to changes in the common ground, updating it with new information.

A presupposition, on the Stalnaker-Karttunen-Heim view, is a requirement that the common ground entails something or other. A presupposition of an *utterance* is a requirement that the common ground entails something in order for that utterance to be felicitous. A presupposition of a *sentence* is a requirement that the common ground entails something in order for any utterance of that sentence to be felicitous. (Since ordinary sentences are often ambiguous, we

should assume that we are speaking of "a sentence on a reading", or a "disambiguated sentence".)

The fact that we are talking about felicity of utterances with respect to the common ground makes this a species of "pragmatics". The fact that we compute many of these presuppositions compositionally, and that many of them are ones that must be satisfied in order for the semantic value of the sentence to be well-defined (not "crash"), means that we must deal with them in the semantics; we can't do semantics without them.

That last point is illustrated, for instance, in the interpretation of the e-type meaning of a definite NP: in our earliest fragment in Lecture 3, we defined the way the iota-operator works as follows:

Syntax: If $\varphi \in ME_t$ and $\boldsymbol{u}$ is a variable of type e, then $\iota u[\varphi] \in ME_e$.

Semantics: $\|\iota u[\varphi]\|^{M,w,g} = d$ iff there is one and only one $d \in D$ such that $\|\varphi\|^{M,w,g[d/u]} = 1$.
$\|\iota u[\varphi]\|^{M,w,g}$ is undefined otherwise.

So $\iota x(\mathbf{king}(x))$ denotes the unique individual who is king, if there is one, and is undefined if there is either no king or more than one king.

In other words, the e-type reading of *the king* carries the presupposition that there is one and only one king. And this presupposition will project to the whole sentence, because the semantic value of that constituent is simply not defined at all if the presupposition is not satisfied.

In Heim's semantics, the treatment of definites is different but also presuppositional: there must already be a suitable file card i (discourse referent) in the file, and the file must entail that the ith individual is a king. That latter condition is a presupposition. So an indefinite introduces a new file card and enters the descriptive content of the NP on that card (it's "asserted"), whereas a definite NP looks for an old card (it's anaphoric) and its content is presupposed. So presupposition is clearly built right into how the semantics works, just as much as anaphora is. In fact the parallels between presupposition and anaphora run very deep; we'll return to this below.

Heim's file-change semantics integrates basic "pragmatic" aspects of presupposition into the semantics; that's what the change to "dynamic semantics" is centrally about. She changes the semantic value of a sentence from truth conditions to context-change potential, and the semantic values of all sub-sentential constituents are likewise changed to reflect their contributions to context-change potential. (Those changes are in most cases small and predictable, so we don't have to "unlearn" any of what we learned from classic formal semantics.)

Recall from Lecture 6, about Heim's Chapter III theory, her file-change semantics:
A **file F** is true if there is some sequence **a** that satisfies it.
A **formula φ** is true with respect to a file **F** if **F** + φ is true, and false with respect to **F** is **F** is true and **F** + φ is false. (I.e. a formula is true if adding it to a true file gives another true file. It's false if adding it to a true file makes a false file.)

In her paper on presuppositions, we find direct updating of contexts, without mentioning the file representations. (This is more akin to 'direct compositionality'.)

So now, following (Kadmon 2001) we will use + to represent context-incrementation: application of a context-change potential (ccp) to a context.

(14)   Notation: c + S will mean "the result of applying the ccp of S to c".

Heim incorporates the idea that a presupposition is a requirement on the context into context-change semantics by specifying context-change potentials in such a way that a context-incrementation c + S will be defined only for contexts c that entail ps(S). So context-change potentials are clearly *partial functions*, just as the iota operator was; but context-change potentials are *partial functions from contexts to contexts.* The two most basic principles of Heim's theory of presupposition projection may be stated as follows:

(15)   I.   The semantics recursively defines for each expression a ccp (context change potential), which is a partial function from the set of contexts to the set of contexts.
II. B is a ps of S iff c + S is defined only for contexts c that entail B.

First, let's assume that for the simplest closed atomic formulas we have already figured out their truth conditions and their presuppositions. So for each closed atomic formula S we know what proposition it expresses, and that we can represent that proposition as a set of possible worlds (the set of possible worlds in which S is true). We will also, for simplicity, define a context as a set of possible worlds. (This is just a simplification to show how the architecture of the theory works.) So when we say "context c entails p", then since both c and p are a set of possible worlds, we will mean $c \subseteq p$.

Then the ccp of a closed atomic formula is defined as follows:

(16)   For any closed atomic formula S,

$$c + S = \begin{cases} c \cap \{w: S \text{ is true in } w\} & \text{if } c \text{ entails } ps(S) \\ \text{undefined} & \text{otherwise} \end{cases}$$

So our earlier example (1) *The king has a son* can only be added to contexts that entail that there is a king, and when c + (1) is defined, it is computed by intersecting c with the set of worlds in which the king has a son. The result is a new context containing only worlds in which the king has a son; our common ground has been narrowed.

Now let's see how Heim defines the ccp of negated sentences, conjunctions, and conditionals. In fact, we already stated Karttunen's observations about their presupposition projection properties in a way that anticipated Heim's analysis.

(17)   Negation: c + ¬S = c - (c +S)

Let's apply this definition to sentence (18) below.

(18)   The king does not have a son.

When we apply the ccp of (18), we have to first apply the ccp of *The king has a son* to c (as we did above), and then subtract the resulting context, i.e. the resulting set of worlds, from c. But that first step will require that c entails the presuppositions of *The king has a son*, i.e. all the presuppositions of the affirmative sentence must also be entailed by the context in order for the negated sentence to be felicitously uttered in it. So the definition of the context-change potential of the negation of a sentence includes within it, 'automatically', the compositional presupposition projection properties of negative sentences. When we subtract c + *The king has a son* from c, we are left with all those worlds in our original context in which the king does not

have a son; and those must all be worlds in which there is a king, or the first operation would not have been defined.

(19)   Conjunction: c + *A and B* = (c + *A*) + *B*.

(20)   If-then: c + *if A, B* = c – (c + *A* – ((c + *A*) + *B*)).

Definition (19) formalizes the familiar idea that you first update the context with the first conjunct, and that gives you a new context; then you update that new context with the second conjunct. That gives the familiar Stalnaker-Karttunen effect for the presuppositions, and it also gives the right truth-conditions. (pause; you tell me why.)

The definition for conditionals is a little more complex, but if we work through an example, we can see that it accomplishes three things: (i) it gets the same truth-conditions as a simple material conditional; (ii) it gives us the Stalnaker-Karttunen results for presupposition projection; and (iii) it correctly limits the lifespan of the material in the antecedent to just this sentence, unlike the material in the first conjunct of a conjunction.

Let's work through an example on the blackboard, using our old standard, Heim's (3), repeated above as (6):

(6)   If the king has a son, the king's son is bald.

In order to carry out the computation specified by (20), we must first compute (c + *A*), which we will need to use twice; then (c + *A*) + *B*), then do the subtraction (c + *A* – ((c + *A*) + *B*)), and finally subtract all of that from c. If you want to think of it intuitively, you can think of it as follows: when we interpret an if-then sentence, we don't end up *adding* anything to our initial context; what we do is *eliminate* from the common ground all those possible worlds in which the antecedent is true but the consequent is false. The reason that what we see above is rather that we eliminate all those possible worlds in which the antecedent is true but *the conjunction of antecedent and consequent* is false is that we need to interpret the consequent *in the context of the antecedent.* The two ways of formulating what we need to do are logically equivalent, but the way it's done in (20) gets all the dynamics right – which we need for presuppositions, for anaphora, and for other kinds of context-dependent interpretation, as discussed briefly in Lecture 6. Of course to get this full range of effects, we treat the context not just as a set of possible worlds, but enriched as in Heim's dissertation, Chapter III, with "discourse referents" (a set of indices), and more – with reference times, reference locations, etc.

3. Accommodation and more pragmatics in the processing of presuppositions

The basic analysis given in the Stalnaker-Karttunen-Heim theory accounts in a relatively explanatory way for the "plug-hole-filtering" properties of presupposition projection (though we have only looked at one hole, negation, and two 'filters', conjunction and *if-then* sentences.) It formulates a coherent and intuitively valid conception of what presuppositions are, and integrates the role of context into semantic composition.

But there are plenty of real-life examples that require accounts that go beyond these basic compositional principles. Here are a few from Kadmon's Chapter 7, which she discusses in her chapters 8-11. We'll only do a little bit to illustrate the notion of *accommodation* and discuss local vs. global accommodation, and if there's time, we'll talk about the interplay of conversational implicatures and presupposition computation. There is much more to say on these topics than we can cover here.

In the first three examples below, the basic rules would predict the presence of some presuppositions that seem somehow to be "cancelled". In the fourth one, negation seems to be acting as a plug rather than as the expected hole.

(21)   It is possible that John has children and it is possible that his children are away.
(22)   If I realize later that I haven't told you the truth, I will confess it to everyone.
(23)   If John hasn't just stopped smoking, he has just started smoking.
(24)   The king of France isn't bald – there is no king of France!

Factors that Kadmon mentions (p. 144) that may explain real or apparent "disappearance" of presuppositions that are not "filtered out":
  • Ambiguities (one lexical item with two different ccps) – but try to minimize these
  • Shifts in contextual assumptions during a conversation
  • Metalinguistic negation, other metalinguistic operators – **especially important**
  • Accommodation - **especially important**
  • Context-dependence of "conversationally triggered" presuppositions
  • Interactions between presuppositions of different presupposition-triggers

Example (24) is generally agreed, since the great work of Horn (1985, 1989), to result from metalinguistic negation, rather than from scope ambiguity (Russell) or from a lexical ambiguity in negation. We have mentioned metalinguistic negation before; it is usually marked with distinctive intonation, and can be used to deny appropriateness rather than truth. An example of a metalinguistic conditional, from D. Wilson, cited by Kadmon (2001, p.150) is the following, in which the factive presupposition of *know* is unexpectedly not inherited by the whole sentence.

(25)   If Nixon knows that the war is over, then the war is over.

This is in effect a tautology, given the factivity of *know*; it may be used as a way to make the content of the presupposition explicit, as discussed in (Landman 1986).

The other three examples in the list above are tricky cases that we may not get to; let's turn instead to some of the basics on the all-important notion of *accommodation.*

Accommodation. Let's look at examples where our official rules of presupposition projection don't seem to give results that match our intuitions, and where an understanding of the process of *accommodation* adds just what we need.
(26)   Geraldine is a Mormon and she has given up wearing her holy underwear!
(27)   We need more napkins and JOHN will have a beer too.
(28)   Bill drinks and JOHN drinks too.   (all from Kadmon (2001, p.151)

What the Karttunen-Stalnaker-Heim theory says about the presuppositions of the second conjunct in each sentence above can be stated equivalently as in (29) or (30) below.

(29)   p & q can be felicitously uttered only in a context c such that c + p entails q.
(30)   p & q presupposes (p → ps(q)).

But as Kadmon points out, intuitively we may easily accept that example (26) presupposes (p → ps(q)), but we would judge that (27) presupposes ps(q) and that (28) presupposes nothing. It's easy to explain our judgments basied on the idea that c + p must satisfy (entail) ps(q). In the case of (27), if we know nothing about the context, we will probably conclude that p is irrelevant to the satisfaction of ps(q), so we will conclude that c alone must satisfy ps(q), i.e. that the whole

sentence presupposes ps(q). But that's still perfectly consistent with the official story, that c + p satisfies ps(q): if c alone does, then certainly c + p does. And it's just a little work to find contexts in which p really does contribute something to the satisfaction of ps(q). All in all it's theoretically most economical to keep the single general principle in (29) - (30), supplementing it with additional reasoning where that's called for. And likewise, in the case of (28), our intuition that it "presupposes nothing" is just a reflection that since p alone entails ps(q), the "c" part of c + p doesn't have to do any work in this case; but it's still true that c + p entails ps(q).

Beaver (1993) introduces a useful bit of terminology: he calls the "official" presuppositions predicted by the filtering mechanism the **linguistics presuppositions**, and the assumptions that hearers actually seem to accommodate when faced with the sentence, i.e. the presuppositions that we intuitively judge the sentence to have, the **cognitive presuppositions.**

Local accommodation as responsible for "presupposition disappearance"

Global accommodation: Faced with a sentence that has a presupposition that's not already entailed by the context, a hearer may *accommodate* the given assumption into the context; as for instance in hearing (26) you may accommodate the information that Mormons wear holy underwear. It's *global accommodation* if you accommodate it into the context c of the whole sentence. And as Kadmon points out, it's also usually global in the sense that once it's accommodated, it stays there for good.

Let's look at some cases of **local accommodation**, where we accommodate some needed presupposition at some more embedded level, and consequently only temporarily.

(31)   A: I don't have a dog.
        B: So at least you don't have to walk your dog.

(Discuss.)

Or consider example (23) above:

(23) If John hasn't just stopped smoking, he has just started smoking.

When we try to just use our basic filtering rule, we get contradictory presuppositions that can't be satisfied. But with the use of local accommodation, we can account for why we're able to process that sentence and end up with a new context in which either John didn't used to smoke and has just started, or he used to smoke and has just stopped. See Kadmon pp. 156-157.

4. Parallels between anaphora and presupposition

We discussed this in Lecture 6; now we can just stop and reflect a little on *why*, given the context-change theory of semantics, these phenomena are so parallel, and what "accessibility" of an 'antecedent' context means semantically.

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